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| 20U.S. EPA-Region 5*Internal review of Endangered Species Act compliance (memo to file)9/22/201621Western Michigan UniversityMichigan Hydrologic Atlas, Part I (Hydrology for UIC in Michigan)198122U.S. EPA-Region 5*National Historical Preservation Act impact of well project (memo to file)7/26/201623U.S. EPA-Region 5*Seismic risk impact regarding well project (memo to file)9/28/201624Michigan Dept. of Env. QualityGeoWebFace maps and well reports of wells within the Area of Review9/28/201625U.S. EPA-Region 5Draft Permit transmittal letter to Muskegon Development Company2/10/201726U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to ACHP2/10/201727U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan SHPO2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan SHPO2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201734U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/2017 <td></td> <td>18</td> <td>U.S. EPA-Region 5</td> <td>*Internal well construction analysis and diagram</td> <td>9/16/2016</td> | | 18 | U.S. EPA-Region 5 | *Internal well construction analysis and diagram | 9/16/2016 |
| 21Western Michigan UniversityMichigan Hydrologic Atlas, Part I (Hydrology for UIC in Michigan)198122U.S. EPA-Region 5*National Historical Preservation Act impact of well project (memo to file)7/26/201623U.S. EPA-Region 5*Seismic risk impact regarding well project (memo to file)9/28/201624Michigan Dept. of Env. QualityGeoWebFace maps and well reports of wells within the Area of Review9/28/201625U.S. EPA-Region 5Draft Permit transmittal letter to Muskegon Development Company2/10/201726U.S. EPA-Region 5Draft Permit transmittal letter to Muskegon Development Company2/10/201727U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to ACHP2/10/201728U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MIChigan SHPO2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MIChigan SHPO2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/2017 <td></td> <td>19</td> <td>Muskegon Development Company</td> <td>Endangered Species Act compliance report (included with permit application)</td> <td>6/13/2016</td> | | 19 | Muskegon Development Company | Endangered Species Act compliance report (included with permit application) | 6/13/2016 |
| 22U.S. EPA-Region 5*National Historical Preservation Act impact of well project (memo to file)7/26/201623U.S. EPA-Region 5*Seismic risk impact regarding well project (memo to file)9/28/201624Michigan Dept. of Env. QualityGeoWebFace maps and well reports of wells within the Area of Review9/28/201625U.S. EPA-Region 5Draft Permit transmittal letter to Muskegon Development Company2/10/201726U.S. EPA-Region 5Updated Fact Sheet, February 20172/10/201727U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to ACHP2/10/201728U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Service2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan SHPO2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201734Lilly SimmonsCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736 <td< td=""><td></td><td>20</td><td>U.S. EPA-Region 5</td><td>*Internal review of Endangered Species Act compliance (memo to file)</td><td>9/22/2016</td></td<> | | 20 | U.S. EPA-Region 5 | *Internal review of Endangered Species Act compliance (memo to file) | 9/22/2016 |
| 23U.S. EPA-Region 5*Seismic risk impact regarding well project (memo to file)9/28/201624Michigan Dept. of Env. QualityGeoWebFace maps and well reports of wells within the Area of Review9/28/201625U.S. EPA-Region 5Draft Permit transmittal letter to Muskegon Development Company2/10/201726U.S. EPA-Region 5Updated Fact Sheet, February 20172/10/201727U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to ACHP2/10/201728U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Service2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MIChigan SHPO2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201734Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201736U.S | | 21 | Western Michigan University | Michigan Hydrologic Atlas, Part I (Hydrology for UIC in Michigan) | 1981 |
| 24Michigan Dept. of Env. Quality U.S. EPA-Region 5GeoWebFace maps and well reports of wells within the Area of Review9/28/201625U.S. EPA-Region 5Draft Permit transmittal letter to Muskegon Development Company2/10/201726U.S. EPA-Region 5Updated Fact Sheet, February 20172/10/201727U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to ACHP2/10/201728U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MICH, Service2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201736U.S. EPA-Region 5Certificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 22 | U.S. EPA-Region 5 | *National Historical Preservation Act impact of well project (memo to file) | 7/26/2016 |
| 25U.S. EPA-Region 5Draft Permit transmittal letter to Muskegon Development Company2/10/201726U.S. EPA-Region 5Updated Fact Sheet, February 20172/10/201727U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to ACHP2/10/201728U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Service2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 23 | U.S. EPA-Region 5 | *Seismic risk impact regarding well project (memo to file) | 9/28/2016 |
| 26U.S. EPA-Region 5Updated Fact Sheet, February 20172/10/201727U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to ACHP2/10/201728U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201736U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 24 | Michigan Dept. of Env. Quality | | 9/28/2016 |
| 27U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to ACHP2/10/201728U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Service2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201736U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 25 | U.S. EPA-Region 5 | Draft Permit transmittal letter to Muskegon Development Company | 2/10/2017 |
| 28U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.2/10/201729U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan SHPO2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 26 | U.S. EPA-Region 5 | Updated Fact Sheet, February 2017 | 2/10/2017 |
| 29U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division2/10/201730U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan SHPO2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 27 | U.S. EPA-Region 5 | Transmittal letter: Public Notice and Comment Period, to ACHP | 2/10/2017 |
| 30U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division2/10/201731U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan SHPO2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 28 | U.S. EPA-Region 5 | Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div. | 2/10/2017 |
| 31U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Michigan SHPO2/10/201732U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 29 | U.S. EPA-Region 5 | Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division | 2/10/2017 |
| 32U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service2/10/201733U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 30 | U.S. EPA-Region 5 | Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division | 2/10/2017 |
| 33U.S. EPA-Region 5Transmittal letter: Public Notice and Comment Period, to Harrison District Library2/10/201734Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 31 | U.S. EPA-Region 5 | Transmittal letter: Public Notice and Comment Period, to Michigan SHPO | 2/10/2017 |
| 34Lilly SimmonsTransmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)2/10/201735Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 32 | U.S. EPA-Region 5 | Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service | 2/10/2017 |
| 35Lilly Simmons & Bill TongCertificate of Service and Mailing List for Public Notice and Fact Sheet2/10/201736U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 33 | U.S. EPA-Region 5 | Transmittal letter: Public Notice and Comment Period, to Harrison District Library | 2/10/2017 |
| 36U.S. EPA-Region 5Hearing & Public Comment Advertisement sent to Clare County Review6/20/201737U.S. EPA-Region 5Updated Fact Sheet, June 20176/20/2017 | | 34 | Lilly Simmons | Transmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail) | 2/10/2017 |
| 37 U.S. EPA-Region 5 Updated Fact Sheet, June 2017 6/20/2017 | | 35 | Lilly Simmons & Bill Tong | Certificate of Service and Mailing List for Public Notice and Fact Sheet | 2/10/2017 |
| 37 U.S. EPA-Region 5 Updated Fact Sheet, June 2017 6/20/2017 | | 36 | U.S. EPA-Region 5 | | 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 | 2 | | | 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 |

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| 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-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
- 83 Rick Fanslau
- 84 gxcube@verizon.net
- 85 Emerson Addison
- 86 Letha Raymond
- 87 Martin Johnson
- 88 Stephanie Terpening
- 89 LuAnne Kozma
- 90 Paul J. Mooradian

Holcomb 1-22 well MI-035-2R-0034 Holcomb 1-22 well,#MI-035-2R-0034 Fwd: Holcomb 1-22 well, #MI-035-2R-0034 Holcomb 1-22 well, #MI-035-2R-0034 Public Comment - Permit Number: MI-035-2R-0034. Holcomb 1-22 well, Hamilton Twp, C Re: Holcomb 1-22 well, #MI-035-2R-0034 Holcomb 1-22 well, #MI-035-2R-0034 RE: Holcomb 1-22 weel, #MI035-2R-0034 Holcomb Well

Permit Writer

8/15/2017 56 KB

8/17/2017 46 KB

8/17/2017 52 KB

8/18/2017 125 KB

8/18/2017 184 KB

8/18/2017 49 KB

8/18/2017 58 KB

8/18/2017 209 KB

8/19/2017 52 KB

Date Signed

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 Formation. 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/035r0034.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 WHPA. |
| 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 MI0062653 |
| Nearest Private Water Supply | None shown nearby |
| Other notes | |

Bedrock from the MDNR Michigan Bedrock Geology shapefile, dated 8/12/16.



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 | | | | | |
|--|---------------------|--------------------------|-------------------|--|--|--|--|--|
| Selected VariablesPercentilePercentilePercentileEJ Index soEJ Index for PM2.5697054EJ Index for Ozone686954EJ Index for NATA* Diesel PM717257EJ Index for NATA* Air Toxics Cancer Risk707156EJ Index for NATA* Respiratory Hazard Index707256EJ Index for Traffic Proximity and Volume666853EJ Index for Superfund Proximity646145EJ Index for RIMP Proximity697156EJ Index for RIMP Proximity697156EJ Index for RIMP Proximity697156EJ Index for RIMP Proximity697156EJ Index for Hazardous Waste Proximity444938 | | | | | | | | |
| 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 RIMP 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.

August 18, 2016



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 |



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. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|--------|---------------|------------------|-----------------------|--------------------------|-------------|----------------|
| Environmental Indicators | 100157 | | | | | | |
| Particulate Matter (PM 2.5 in µg/m³) | 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 | <50th | 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 | | | and the second | | | | |
| 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 of age | 6% | 6% | 58 | 6% | 54 | 6% | 51 |
| Population over 64 years of age | 22% | 15% | 84 | 14% | 85 | 14% | 85 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

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

EISCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. 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 EISCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EISCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

August 18, 2016

MUSKEGON DEVELOPMENT COMPANY

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

August 9th, 2016

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

RECEIVED

AUG 1 1 2016 UIC BRANCH EPA, REGION 5

Attention: WU-16J

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, T19N-R3W, Clare County, MI, and is a part of our Smith Creek Unit.

Thank you.

Sincerely, emp

Bennett E. Myler, Geologist Muskegon Development Company

Encl.

MI · 035-2R-0034 Permit Writer - Bill Tong

| Holeson 1-22 Muskegon Development Company irred. Address Phone Number Wirk, NC4, NW4, Scotion 22 Phone Number Street Address (98) 772-4900 WM, ND24, NW4, Scotion 22 State If yok-RD3W State N. Commercial Facility V. Ownership V. Commercial Facility V. Ownership V. Commercial Facility V. Ownership Vil. Ball Contact Vil. Silc Codes Weil Status (Mark "x") Image of the stated Owner Image of the stated Image of the state state of the state of the state of the state | | | | | OMB No. | 2040-0042 | Approv | al Expires 12 | /31/2018 | - |
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PROPOSED CONVERSION TO WATER INJECTION WELL HOLCOMB 1-22 HAMILTON TOWNSHIP, CLARE COUNTY, MICHIGAN T19N-R03W, SECTION 22 <u>MICHIGAN PERMIT # 59345</u>

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.



ATTACHMENT A: AREA OF REVIEW

The area of review includes the area within 1/4 mile of the Holcomb 1-22 wellbore.

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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 1. Fanslau 1-22

2. Miller 1-22

Permit # 58365 48189 (Plugged)

Location

NE/4, NW/4, NW/4, Section 22, T19N-R03W NW/4, SE/4, NW/4, Section 22, T19N-R03W

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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.



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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.

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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.

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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 ¹/₄ mile of where the supply well will be located is included in the appendix.



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.



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.

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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.

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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.

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ATTACHMENT M: CONSTRUCTION DETAILS

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

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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.



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.



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 1/2" casing at about 3164'.
- 6. Run tubing 50' below top of 4 1/2" 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 |



ATTACHMENT R: NECESSARY RESOURCES

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



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.



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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



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WELL CONSTRUCTION

Holcomb 1-22

Permit # 59345



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.



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)



| Pump Model | Flange Cor | inections | | Dimens | sions in I | nches (mm | 1) |
|-----------------|----------------------------|--------------------------|-------|--------|------------|-----------|---------|
| | Discharge Connection Sizes | Suction Connection Sizes | А | В | С | 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 | | RPM | 350 | | | RPM | 450 RPM | | 500 RPM | |
|--------|------------------------|----------------------------|-------------------|-------------------|-----------------------|-----|-----------|------|-------|------|-------|------|-------|---------|-------|---------|-------|
| 007.04 | 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 |
| | | sepower Requ | | | | | 2.0 | | 8.0 | 2 | 1.0 | | 24 | | 27 | | 30 |

| PUMP | | Metric Units | | | | | 200 * RPM | | RPM | 350 RPM | | 400 RPM | | 450 RPM | | 500 RPM | |
|--------|-----------------------|------------------------|---------------------|----------------------|-----------------------|------|-----------|------|--------|---------|--------|---------|--------|--------------------|--------|---------|--------|
| | Plunger Dia. mm | Plunger Area cm² | Mº/Hr per RPM | L/Sec. per RPM | Max. Press. kPa | | | | L/Sec. | MP/Hr | L/Sec. | MV/Hr | L/Sec. | M ³ /Hr | L/Sec. | M%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 | | | | | | 13.4 | | 1 | 5.7 | 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 RPA), 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 nake their own evaluations and datalsians, and are nation guarantoes nor to be construed as express or implied warranties of subsolity for these or other applications. National Oliwell makes no warrasty either express or implied boyond that stipulated in National Oliwell Standard Terms and Conditions of Sale.

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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



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TECHNI-HIBTM 606W Corrosion Inhibitor

Product Information



ANTE

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 | SOLUBILI | TIES: |
| Pounds Per Gallon @ 60°F | 8.0 - 8.4 | Fresh Water | Soluble |
| Freeze Point | -40°F | 2% Brine | Soluble |
| Flash Point(TCC) | 85°F | 15% Brine | Soluble |
| pH | 6 - 6.5 | Crude Oil | Insoluble |
| Appearance | Dark Brown Liquid | | |

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.



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| Casing | | Packer | | | | | | |
|-------------|--|-----------|------|---------|--------|--------|------------------|--|
| OD | | Weight * | Size | No | Nom ID | | Max Gage Ring OD | |
| in. | nint | lb/ft | 0120 | in. | mm | in. | nsm | |
| 4 | 101.6 | 9.5-11.6 | 41A | 1.890 | 48.1 | 3.281 | 83.3 | |
| 4-1/2 114.3 | 114.2 | 12.6-15.1 | 41B | 1.890 | 48.1 | 3.609 | 91.7 | |
| | 174.5 | 9.5-13.5 | 43A | 1.090 | 40.1 | 3.786 | 96.2 | |
| 5 | 127.0 | 15-18 | 43B | 1.890 | 48.1 | 4.140 | 105.2 | |
| | 127.0 | 11.5-15 | 430 | 1.090 | | 4.265 | 108.3 | |
| 5-1/2 | | 26 | 43C | 1.890 | 48.1 | 4.265 | 108.3 | |
| | 139.7 | 20-23 | 45A2 | 1.953 | 49.6 | 4.515 | 114.7 | |
| | 138.7 | 15.5-20 | 4544 | | | 4.656 | 118.3 | |
| | | 13-15.5 | 45B | | | 4.796 | 121.8 | |
| 5-3/4 | 146.1 | 22.5 | 458 | 1.953 | 49.6 | 4.796 | 121.8 | |
| 6 | | 26 | 458 | 1.953 | 49.6 | 4.796 | 121.8 | |
| | 152.4 | 20-23 | 45C | | | 5.077 | 129.0 | |
| | | 15-18 | 450 | | | 5.171 | 131.3 | |
| | | 34 | 45E2 | 1.052 | 49.6 | 5.421 | 137.7 | |
| 6-5/8 | 169.3 | 26-32 | 45E4 | - 1.953 | | 5.499 | 139.7 | |
| | 100.3 | 24 | 47A2 | - 2.409 | 61.2 | 5.671 | 144.0 | |
| | | 17-20 | 47A4 | | | 5.827 | 148.0 | |
| | | 38 | 47A2 | | 61.2 | 5.671 | 144.0 | |
| | | 32-35 | 47A4 | | | 5.827 | 148.0 | |
| 7 | 177.8 | 26-29 | 47B2 | 2.409 | | 5.983 | 152.0 | |
| | | 20-26 | 47B4 | - | | 6.093 | 154.8 | |
| | | 17-20 | 47C2 | | | 6.281 | 159.5 | |
| | | 33.7-39 | 47C4 | 2.409 | 61.2 | 6.468 | 164.3 | |
| 7-5/8 | 193.7 | 24-29.7 | 47D2 | | | 6.687 | 169.9 | |
| | | 20-24 | 47D4 | | | 6.827 | 173.4 | |
| | | 40-49 | 49A2 | | 76.2 | 7.327 | 186.1 | |
| 8-5/B | 219.1 | 32-40 | 49A4 | 3.000 | | 7.546 | 191.7 | |
| | | 20-28 | 498 | | | 7.796 | 198.0 | |
| 9-5/8 | and the second | 4753.5 | 51A2 | | 101.6 | 8.218 | 208.7 | |
| | 244.5 | 40-47 | 51A4 | 4.000 | | 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 | 558 | 4.000 | 101.6 | 12.000 | 304.8 | |

SPECIFICATION GUIDES

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

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

| Casing | | Packer | | | | | | | |
|---------|-------|------------|-------------|-------------|-------|--------------|-------|-------|-------|
| OD | | Weight • | Size | Nom ID | | Gage Ring OD | | | |
| in. | mm | ib/ft | size | in. | mm | in. | тт | | |
| 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 | 3 73.7 | 5.000 | 127.0 | | | |
| | 132,4 | 18-20 | 45D x 2.90 | 2.903 | /3./ | 5.218 | 132.5 | | |
| 7 177.8 | - | (77.0 | 23–29 | 478 x 4.12 | 4 100 | 4 405 | 104.8 | 5.983 | 152.0 |
| | 177.0 | 17-20 | 47C2 x 4.12 | 4.125 104.1 | 104.5 | 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.
Retrievable Packer Systems

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-1¹⁰ 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.



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TUBING TABLES

| | | Di | mensional & | Grade Desi | gnators | | | | Inter | rnal Yield Pre | ssure |
|------------|-----------------|----------------------|-----------------|---------------------|-----------|-------------------|------------------|------------------------|--------------|----------------|--------------------------------------|
| OD Size | T& Non-Upset | Weight C Upset | PE Non-Upset | NOM Body Wall | NOM ID | Drift Diameter | Product Grade | Collapse Resistance | Pipe Body | 12 00.00 | Suttress Thd 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 | 44 | |
| 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 | | |
| 2.053 | 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 | 22 | |
| 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 | | 1 |
| 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 |

| | | | | | | | | | ANTER STATUS | The state | |
|--------------------|-------------|--------------|------------------|---|--------------------|-------------------|-----------|------------------|--------------|-------------|----------------|
| 1 | | | | Tens | | | | sure | I Vield Pres | Interna | |
| Ductile Rupture | | | Coupled Join | | | Yield | | | | | |
| Capped | | Round Thread | | 1999 1997 1997 1997 1997 1997 1997 1997 | Improved B | Pipe | Ion Mises | | 509 - C | ound Thread | 1 |
| End | t eue | Upse | NUE | Upset | Non- | Body | Capped | Open | 2000000 | Upset | NÜE |
| | Special Clr | Regular | Regular | Special Clr | Regular | | End | End | Special Clr | Regular | Non-Upset |
| psi | lb | lb | lb | lb | lb | lb | psi | psi | psi | psi | psi |
| 32,050 | | | | | | 143,300 | 26,080 | 25,010 | | | |
| 32,050 | | | | | | 143,300 | 26,080 | 25,010 | | | |
| 5,900 | | | | | | 37,400 | 5,690 | 5,230 | | | |
| 7,420 | | | | | | 51,400 | 7,830 | 7,200 | | | |
| 11,540 | | | | | | 74,800 | 11,390 | 10,470 | | | |
| 10,020 | | | | | | 74,800 | 11,390 | 10,470 | | | |
| 12,150 | | | | | | 74,800 | 11,390 | 10,470 | | | |
| 13,510 | | | 44 | | | 84,200 | 12,810 | 11,780 | | | |
| 12,860 | | | | | | 88,800 | 13,530 | 12,430 | | | |
| 14,240 | | | | | | 88,800 | 13,530 | 12,430 | | | |
| 14,240 | | | | | | 88,800 | 13,530 | 12,430 | | | |
| 8,690 | | | | | | 52,000 | 7,960 | 7,460 | | | |
| 10,950 | | | | | | 71,400 | 10,940 | 10,260 | | | |
| 17,100 | | | | | | 103,900 | 15,920 | 14,920 | | | |
| 14,780 | | | | | | 103,900 | 15,920 | 14,920 | | - ** | ** |
| 18,000 | | | | | | 103,900 | 15,920 | 14,920 | | | |
| 20,080 | | | | | | 116,900 | 17,910 | 16,780 | | | |
| 19,060 | | | | | | 123,400 | 18,900 | 17,720 | | | |
| 21,160 | | | | | | 123,400 | 18,900 | 17,720 | | | |
| 21,160 | | | | | | 123,400 | 18,900 | 17,720 | | | |
| 22,840 | | | | | | 142,900 | 21,880 | 20,510 | | | |
| 25,350 | | | | | | 142,900 | 21,880 | 20,510 | | | |
| 5,460 | | | 30,100 | 46,300 | 46,300 | 46,300 | 5,320 | 4,870 | | | 4,920 |
| 6,880 | | | 41,400 | 63,700 | 63,700 | 63,700 | 7,320 | 6,700 | | | 6,770 |
| 10,690 | | | 60,200 | 92,600 | 92,600 | 92,600 | 10,640 | 9,750 9,750 | | | 9,840 |
| 9,290 | | | 60,200 | 92,600 | 92,600 92,600 | 92,600 | 10,640 | 9,750 | | | 9,840 9,840 |
| 11,250 | | | 60,200 | 92,600 | | 92,600 104,200 | 10,840 | | | | |
| 12,510 11,910 | | | 67,800 71,500 | 104,200 110,000 | 104,200 110,000 | | | 10,970 11,580 | | | 11,070 |
| 13,180 | | | 71,500 | 110,000 | 110,000 | 110,000 | 12,640 | 11,580 | | | 11,690 |
| 13,180 | | | 71,500 | 110,000 | 110,000 | 110,000 | 12,640 | 11,580 | | | 11,690 |
| 6,250 | 52,200 | 52,200 | 36,000 | 52,200 | 52,200 | 52,200 | 6,000 | 5,530 | 5,600 | 5,600 | 5,600 |
| 7,880 | 71,700 | 71,700 | 49,400 | 71,700 | 71,700 | 71,700 | 8,250 | 7,600 | 7,700 | 7,700 | 7,700 |
| 12,250 | 104,300 | 104,300 | 71,900 | 104,300 | 104,300 | 104,300 | 12,000 | 11,060 | 11,200 | 11,200 | 11,200 |
| 10,630 | 104,300 | 104,300 | 71,900 | 104,300 | 104,300 | 104,300 | 12,000 | 11,060 | 11,200 | 11,200 | 11,200 |
| 12,900 | 104,300 | 104,300 | 71,900 | 104,300 | 104,300 | 104,300 | 12,000 | 11,060 | 11,200 | 11,200 | 11,200 |
| 14,350 | 117,400 | 117,400 | 80,900 | 117,400 | 117,400 | 117,400 | 13,500 | 12,440 | 12,600 | 12,600 | 12,600 |
| 13,660 | 123,900 | 123,900 | 85,400 | 123,900 | 123,900 | 123,900 | 14,250 | 13,140 | 13,300 | 13,300 | 13,300 |
| 15,120 | 123,900 | 123,900 | 85,400 | 123,900 | 123,900 | 123,900 | 14,250 | 13,140 | 13,300 | 13,300 | 13,300 |
| 15,120 | 123,900 | 123,900 | 85,400 | 123,900 | 123,900 | 123,900 | 14,250 | 13,140 | 13,300 | 13,300 | 13,300 |
| 16,370 | 143,400 | 143,400 | 98,900 | 143,400 | 143,400 | 143,400 | 16,500 | 15,210 | 15,400 | 15,400 | 15,400 |
| 18,120 | 143,400 | 143,400 | 98,900 | 143,400 | 143,400 | 143,400 | 16,500 | 15,210 | 15,400 | 15,400 | 15,400 |
| 10,720 | 93,100 | 93,100 | 70,800 | 93,100 | 93,100 | 93,100 | 10,750 | 10,070 | 7,860 | 10,220 | 10,290 |
| 16,740 | 135,400 | 135,400 | 103,000 | 135,400 | 135,400 | 135,400 | 15,640 | 14,640 | 11,440 | 14,860 | 14,970 |
| 14,470 | 135,400 | 135,400 | 103,000 | 135,400 | 135,400 | 135,400 | 15,640 | 14,640 | 11,440 | 14,860 | 14,970 |
| 17,620 | 135,400 | 135,400 | 103,000 | 135,400 | 135,400 | 135,400 | 15,640 | 14,640 | 11,440 | 14,860 | 14,970 |

<u>VII-10</u>

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:

Macha

Michael A. Mesbergen

Date: __June 7, 2016

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Registration Number State of Michigan: 6201027199

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 |



Plante & Moran, PLLC Suite 300 600 East Front Strant Traverse City, MI 49686 Tel: 281.947,7800 Fax: 231.947,0348 plantemetan.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 I.





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 i Moran, PLLC

June 29, 2016

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Muskegon Development Company

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

| | D | ecember 31, 2015 | D | ecember 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 Equi | ty | | |
| 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 | | í I,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 |
| | | | | |

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Muskegon Development Company

Statement of Revenue and Expenses Income Tax Basis

| | | Year E | Inde | d |
|---|----|-------------|------|-------------|
| | De | ecember 31, | De | ecember 31, |
| | | 2015 | | 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 |

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| | Common Stock | lditional -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 |

Statement of Stockholder's Equity Income Tax Basis

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Monday, July 18, 2016

Fibertec Project Number: Project Identification: Submittal Date: 73682 Amended Smith Creek - Supply Water / 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 R

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

For Daryl P. Strandbergh Laboratory Director

Enclosures



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lab@fibertec.us

| Parameter(s) | Result | Q | Ur | iits | Reporting Limit | Dilution | Prepa P. Date | ration P. Batch | A. Date | Analysis A. Batch | Ini |
|---|---|--------|-------------|---|------------------|----------------------|----------------------------|----------------------|---------------------|----------------------|---------|
| Sulfide Method: HACH 8131 | | | | | | uot ID: cription: | 73682-001A Supply Water | | round Wate | | |
| 1. Sulfate | 12 | | m | g/L | 1 | 1.0 | 06/17/16 | PW16F16B | 06/17/16 | WT16F17A | A NR |
| Parameter(s) | Result | Q | nesue setti | a statute to | Reporting Limit | Dilution | Prepa P. Date | P. Batch | A. Date | Analysis A. Batch | Ini |
| Inorganic Anions by Method: EPA 9056A | IC | | | | | uot ID: cription: | 73682-001 Supply Water | | round Wate | 38 | |
| 1. Iron | U | | mj | g/L | 2.5 | 500 | 06/17/16 | PT16F17C | 06/17/16 | T416F17A | JL |
| Parameter(s) | Result | Q | Ur | iits | Reporting Limit | Dilution | Prepa P. Date | ration P. Batch | A. Date | Analysis A. Batch | In |
| an an in the second | (Total Recoverable)/EPA 6020A | | | | | | Supply Water | | | | |
| Trace Elements by IC | CP/MS, Total Recoverable | | | | Alia | uot ID: | 73682-001C | Matrix: G | round Wate | 1 | |
| 5. Sodium | | | m | g/L | 3 | 100 | 06/17/16 | PT16F17B | 06/17/16 | T416F17A | JL |
| 4. Potassium | 2 | | m | g/L | 1 | 100 | 06/17/16 | PT16F17B | 06/17/16 | T416F17A | |
| 3. Magnesium | 20 | | materia and | g/L | 1 | 100 | 06/17/16 | PT16F17B | 06/17/16 | | |
| 2. Calcium | 71 | | | g/L | 3 | 100 | 06/17/16 | PT16F17B | 06/17/16 | T416F17A T416F17A | |
| Parameter(s) | Result | Q | | nits g/L | Reporting Limit | Dilution 100 | P. Date 06/17/16 | P. Batch PT16F17B | A. Date 06/17/16 | A. Batch | In |
| Developed and A | | ~ | | | | D 11 11 | Prepa | | | Analysis | |
| Trace Elements by IC Method: EPA 3005A | CP/MS, Dissolved (Dissolved)/EPA 6020A | | | | | uot ID: cription: | 73682-001B Supply Water | Matrix: G | round Wate | ər | |
| 1. Specific Gravity | 1.000 | | N | A | 0.000 | 1.0 | NA | NA | 06/14/16 | NA | C |
| Parameter(s) | Result | Q | Ur | iits | Reporting Limit | Dilution | Prepa P. Date | ration P. Batch | A. Date | Analysis A. Batch | In |
| Method: ASTM D142 | 9-08D | | | | Des | cription: | Supply Water | | | | |
| a de la companya de l | D°F (Analysis Performed in Cadilla | ic) | | | Aliq | uot ID: | 73682-001D | Matrix: G | round Wate | er. | - |
| Definitions: | Q: Qualifier (see definitions at end | of rep | ort) N. | A: Not A | applicable ‡:Pa | rameter n | ot included in NEL | AC Scope of A | nalysis. | | |
| Sample Comments: | | | | | | | | | | | |
| Client Project No: | NA | | Samp | ole Matri | ix Groun | d Water | | Collec | t Time: | 12:30 | |
| Client Project Name: | Smith Creek - Supply Water | | Samp | ole No: | 1 | | | Collect | t Date: | 06/13/16 | |
| Client Identification: | Muskegon Development Company | | Sam | ole Desc | cription: Supply | / Water | | Chain | of Custody: | 42531.422 | 2 |
| environmenta services | 1 | L | | | Project Number | | | | | Date: 07/1 | |
| Fibertec | | | | 1995 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - | al Laboratory F | | | | (| Page: 2 of | 82 4 |

1914 Holloway Drive 11766 E. Grand River 8660 S. Mackinaw Trail Holt, MI 48842 Brighton, MI 48116 Cadillac, MI 49601 T: (517) 699-0345 T: (810) 220-3300 T: (231) 775-8368 F: (517) 699-0388 F: (810) 220-3311 F: (231) 775-8584

lab@fibertec.us

| | 1914 Holloway Drive | | Holt, | MI 48842 | | T: (517) 699 | 9-0345 | F: (| 517) 699-0388 | | |
|--|---|---------------|--------|--------------------------|------------------------------|-----------------------|--|--------------------|----------------------------|-----------------------|--------------|
| ‡ 1.pH | | 7,95 | | pH Units | -1.00 | 1.0 | NA | NA | 06/13/16 14:0 | 3 NA | CA |
| Parameter(s) | | Result | Q | Units | Reporting Limit | Dilution | Prepa P. Date | ration P. Batch | A. Date | nalysis A. Batch | Ini |
| pH, Electrometric (A Method: SM 4500-H· | nalysis Performed in Ca + B-2000 | idillac) | | | | uot ID: scription: | 73682-001D Supply Water | Matrix: | Ground Water | | |
| ‡ 1. Chloride | | 21 | | mg/L | 10 | 1.0 | NA | NA | 06/17/16 | NA | CA |
| Parameter(s) | | Result | Q | Units | Reporting Limit | Dilution | and the second states of the | P. Batch | A. Date | nalysis A. Batch | Ini |
| Chloride by Titrimet Method: SM 4500-Cl | ry (Analysis Performed i T B-1997 | in Cadillac) | | | | uot ID: cription: | 73682-001D Supply Water | | Ground Water | | |
| | | | 12 (1) | ingr. | | the and should be | | | | | |
| Parameter(s) ‡ 1. Total Dissolved | Polido | Result 250 | Q | Units mg/L | Reporting Limit | Dilution 10 | | P. Batch | A. Date 06/29/16 | A. Batch | lni EA |
| Method: SM 2540 C- | | | | | | S | Supply Water Prepa | | | nalysis | |
| Residue. Filterable (| TDS) (Analysis Perform | ed in Cadilla | ac) | | Alio | uot ID: | 73682-001D | Matrix: | Ground Water | | |
| Parameter(s) ‡ 1.Resistivity | | Result 13 | Q | Units ohm-m | Reporting Limit | Dilution 1.0 | P. Date NA | P. Batch NA | A. Date 06/14/16 | A. Batch NA | Ini CA |
| | | | | 11.20 | | | Prepa | | | nalysis | |
| Resistivity at 25°C (Method: SM 2510 B- | Analysis Performed in C | adillac) | | | | juot ID: | 73682-001D Supply Water | Matrix: | Ground Water | | |
| 1. Specific Condu | ctance | 790 | | µmho/cm | 1.0 | 1.0 | NA | NA | 06/14/16 | NA | CA |
| Parameter(s) | | Result | Q | Units | Reporting Limit | Dilution | Prepa P. Date | ration P. Batch | A. Date | nalysis A. Batch | Ini |
| Specific Conductan Method: SM 2510 B- | ce at 25°C (Analysis Per 1997 | formed in C | adill | ac) | | uot ID: cription: | 73682-001D Supply Water | | Ground Water | | |
| ‡ 2. Carbonate Alka | linity | U | | mg CaCO3/L | 20 | 1.0 | NA | NA | 06/17/16 | WD16F17 | A RK |
| 1. Bicarbonate Alk | and the second se | 190 | G | mg CaCO3/L | 20 | 1.0 | NA | NA | 06/17/16 | WD16F17 | 10000000 |
| Parameter(s) | | Result | Q | Units | Reporting Limit | Dilution | Prepa | ration P. Batch | A. Date | nalysis A. Batch | Ini |
| Alkalinity by Titrimer Method: SM 2320 B- | (107) | | | | | uot ID: | 73682-001 Supply Water | Matrix: | Ground Water | | |
| Definitions: | Q: Qualifier (see definit | ions at end o | of rep | oort) NA: Not | Applicable ‡: Pa | arameter n | ot included in NEL | AC Scope of | Analysis. | | |
| Sample Comments: | | | | ei : | | | | | | | |
| Client Project No: | NA | | | Sample Mat | rix: Groun | d Water | | Colle | ect Time: | 12:30 | |
| Client Identification: Client Project Name: | Muskegon Developme Company Smith Creek - Supply 1 | | | Sample Des Sample No: | cription: Supply | y Water | | | n of Custody: ect Date: | 42531.42 | 2 |
| | | | | | | | | | | Abata Marca - Nava | |
| Fibertec environmento service | ıl. | | 1 | Laboratory | Project Numb ample Number | er: 73682 | | | | ge: 3 of ite: 07/* | i 4 18/16 |
| | | | | Analytic | al Laboratory I | Report | | | Or | der: 736 | 82 |

11766 E. Grand River 8660 S. Mackinaw Trail Brighton, MI 48116 Cadillac, MI 49601 T: (517) 699-0345 T: (810) 220-3300 T: (231) 775-8368 F: (517) 699-0388 F: (810) 220-3311 F: (231) 775-8584

lab@fibertec.us



Analytical Laboratory Report Laboratory Project Number: 73682 Order: 73682 Page: 4 of 4 Date: 07/18/16

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.





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Central Michigan Cementing Services

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

20

JOB DESCRIPTION FORM

| OMPANY Muskegon Develope | itest | _ DATE5 | 25-16 | JOB # |
|----------------------------------|---------------------------|---|--|--|
| VELL NAME REP FANSlau | 2 . 1 | NO | 1-22 | |
| COUNTY Clare | SECTION 58 365 | TWP | lomiltov. | STATE |
| CONTRACTOR Kip Howland | | | | |
| OB DESCRIPTION Treat Perfs w/ 1. | 500 6 Als 20% A | 1CL | | an director |
| 08400 Spot Equipment | - Rigel IP | $= \left\{ \begin{array}{c} 0 & 1 \\ 0 & 0 \\ 0 $ | former of the sector of the sector | $(\frac{1}{2}) = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) \left(\frac{1}{2} + \frac{1}{2} \right) \left(\frac{1}{2} + 1$ |
| OBIG Roll Hole W/ 50B | BLS FW | | | |
| 0830 Pressure Test Lines to | 1,500 PSJ | | | |
| 0832 SPOT ACTO 19.7 8 | BLS & Set PACKEr | 13 | | |
| 0835 Start Treating . 25 | SBP- 3. SOOPJI | | | |
| 0845 go to 1 BBL Flush 7 | | | 35 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | |
| 0-859 Start Pumping + 25 | 5 Rpm 3,825 PSJ | | | and provide the second second |
| 0919 .25 Bpin 3, 40085 | 17 25 BBU 1470 | Pumpel | | an a |
| 0921 JACFELIS Rete -50 | Bpar 26 BBCS IN | e de la companya de La companya de la comp | | |
| 0730 150 APM 3,610 PSI | 318815 12 | | | <u></u> |
| 0938 Start Flush Incre | wolfte .75 Bp. | 3,6501 | T20 | |
| 0955 3,600 PSI 128811 | Flush in Increas | e Rate | 1.0 Bpm | _ |
| 1064 20BBLS Flushics 1.0 | BAR 3, 200 PSZ | | | |
| 1014 " BOBBLS Flushing 1.0 | | | | |
| 10461 Shot Down Jotsely | Flos Ini francisco in | i na statistica (na statistica) na statistica (na statistica) | | 1 - 3.8501 |
| IJIP 3,675 PJI | | | | |
| 5 ~: 3,280 PSI | | 9 | TOTAL ACI |) 35.7 BBIJ |
| 10 miu 3,130 PSI | | 7 | TOTAL Flush | 70 BBU |
| 15 min 2, 983 PS 3 | | | | |
| 1656 Shutin Well Rig D | 10000 FJ Toling 2 | Stand | by | 1.00 |
| | | | | |
| | $e^{ik_{i}} = e^{ik_{i}}$ | | in the property | |
| | Party and the states | 1 1 | and the second second | |

CEMENTER DD Stahl

OPERATOR Dave Davis & Andrew Weber

JOB REPORT

Central Michigan Cementing Services



Muskegon Development Company Smith Creek Fracture Pressure Gradient Calculation

1

| 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 1 1 2016 UIC BRANCH EPA, REGION 5



STATE OF MICHIGAN MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY STATE HISTORIC PRESERVATION OFFICE

KEVIN ELSENHEIMER EXECUTIVE DIRECTOR

GOVERNOR

July 25, 2016

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

ALIG - 1 2018

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 <u>no historic properties are affected</u> 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



AUG 1 1 20'S UIC LIRANNOH CPA, REGION 6



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

RUE N AUG 1 1 2015 Returned and a second

| BA I | IUGHES | | IMPENSATE | DN | C-DENSILOG ™ EUTRON LOG Y LOG | |
|--|--|---|---|--------------|---|--|
| Baker Atla | as | C.SHP. | | | | |
| FILE NO; | COMPANY | Contraction of the second s | HORE PETROLEUM | <u>, ШС.</u> | | |
| API NO: | FIELD | HAMILTO | and the second se | | a tra de la competencia de la | |
| 21-035-59345 | COUNTY | CLARE | | STAT | TE MICHIGAN | |
| Ver. 3.87 THANK YOUI | LOCATION: NW/4, NE/4, H 490' FNL & H HAWILTON TWP SEC 22 | 828' FWL, | n rge <u>0.3</u> W | | OTHER SERVICES | |
| PERMANENT DATUM LOG MEASURED FROM DRILL. MEAS. FROM | G.L. K.B. KELLY BUSHI | 12.6 FT | 10N <u>933.3 FT</u> ABOVE P.D. | | ELEVATIONS: KB 945.6 FT DF 944.4 FT GL 933.3 FT | |
| DATE | 06- | SEP-2008 | na da anti-a da anti-a da anti-a da bara | | | |
| RUN TRIP | 1 | | aleman | 1 | <u>ar.</u> 1 | |
| SERVICE ORDER | 559 | 1849 | | pept | MARN | |
| DEPTH DRILLER | Charles and an and a second se | 12 FT | 1.1.2 1.1.2 | NS M | | |
| DEPTH LOGGER | and the second se | 202 FT STRE | | Sec. | Self- | |
| BOTTOM LOGGED INTER | the second s | 12 FT | GEEN I CO | | | |
| TOP LOGGED INTERVAL CASING DRILLER | the second se | 100 FT 7 IN 04078 FT | | 0 | | |
| CASING LOGGER | the second se | 16 FT | | | | |
| BIT SIZE | and the second se | 25 IN | | | | |
| TYPE OF FLUID IN HOLI | the second se | and the second state of the second state of the second | | 1 | | |
| DENSITY | State of the state | 5 L8/G | 28 S | | | |
| And in the local data was not as a second data was |) LOSS 10. | | N/A | | | |
| SOURCE OF SAMPLE | and the second se | EHOLE | - 9 | | NAMES OF TAXABLE PARTY OF TAXABLE PARTY. | |
| RM AT MEAS, TEMP. | the second se | 4 CHIMM | 085 DEGF | <u> </u> | 0 | |
| RMF AT MEAS. TEMP. | division of the second | 4 OHIM | 085 DEGF | | 0 | |
| RMC AT MEAS, TEMP. | and the second se | 4 DHWW | 085 DEGF | | 0 | |
| SOURCE OF RMF | RMC C. | | | | | |
| RM AT BHT | the second s | OHMM | @117 DEGF | | 0 | |
| TIME SINCE CIRCULATIO | A COMPANY OF THE OWNER | RS. | | | | |
| MAX, RECORDED TEMP. | Contract of the American Street Stree | DEGF | 1.05 101 04.05 | | n anna a chuire ann an thug a sa chuirte ann an chuireannach | |
| EQUIP. NO. LOCA | Contraction of the state of the party of the state of the | No. of Concession, Name of Street, or other | NT. PLSNT. | <u> </u> | | |
| RECORDED BY | | WIN BROWN | and a state of the second s | 1465 | OTHE POST I HAR | |
| WITNESSED BY | I MK. | WARK AND | INCASUN | LWN, d | OHN COLLINS | |

IN MAKING INTERPRETATIONS OF LOGS DUR 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, DR EXPENSES WHATSOEVER INCURRED OR SUSTAINED BY THE CUSTOMER RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR EMPLOYEES.

| BOREHOLE | REHOLE RECO | RD | | 0 | CASING RECORD | 0 | |
|----------|-------------|---------|----------|--------|---------------|--------------------------------------|---|
| BIT SIZE | FROM | TO | SIZE | WEIGHT | GRADE | FROM | 2 |
| 19999 [N | 0 FT | 78 FI | 13.375 N | | | 0 FT | 182 |
| 12.25 M | 78 FT | 792 FT | 9.625 N | | | 0 FT | 1 792 F |
| 8.75 W | 792 FT | 4090 FT | 7 14 | | | 0 FT | 4078 1 |
| B.125 N | 4090 FT | 5202 FT | | | | A second second second second second | all a strategy and a strategy at the second |

KELLY BUSHING WAS USED AS DEPTH REFERENCE POINT. 2.5 *** RUN 1 TRP

REMARKS

CNC AND PORZ WERE RUN ON A LIMESTONE MATRIX.

EVOL = CEMENT VOLUME CORRECTED FOR 4 1/2" CASING.

| mm | Amerika Amerika A | | |
|--|-------------------------|--------------------|--------------|
| CLEICE OL ORDORICH SOMEL 2.1VLE OL WILLINGTON | | P1 | 006> |
| | | Rich Part | |
| | | | |
| | | | |
| | -ny-n-n-n-kanden | -ALAN-1-AstAsiatha | and all book |







Baker Atlas

| File No: | Company | NORTHSHOR | E PETROLEU | A, LLC. | |
|---|---|---|--|---------|--|
| | Well | HOLCOMB 1 | -22 | | |
| API No: | Field | HAMI LTON | | | |
| 21-035-59345 | County | CLARE | | State | MICHIGAN |
| THANK YOU! | Location NW/4, NE/ | A 11777 / A | | | Other Services |
| IDAMA IVU: | 10 10 10 10 10 | | | | TEMP/NOISE |
| | A REALIST CONTRACTOR | & 1826' FWL | | 1 | PERF |
| | HAMILTON | CO. | | | |
| | SEC 22 | TWP 19 | N RGE | 03W | |
| Permanent Datum | G.L. | Elevation | 933.3 1 | Et | Elevations |
| Log Measured From | K.B. | 12.6 ft | Above P. I |). | KB 945.9 ft |
| Drill Measured From | KELLY B | TISHTNC | - | 20 | DF 944.4 ft |
| in an and a state | areddidd i'r dd | er er leb de Alber | | | GL 933.3 ft |
| D. J. | - | | | | |
| Date Run | | L9 SEP 2008 | | | na |
| Service Order | | DNE | i di nativi da | | |
| Depth Driller | | 560357 | | | e li stance e considerate activitation |
| the second se | | 5202 ft | | | |
| Depth Logger Bottom Logged Interval | | 5101 ft | | | |
| Top Logged Interval | and the second se | 5097 ft | | _ | |
| Time Started | | 3100 ft | | | |
| Time Finished | | 11:00 | | | |
| Operator Rig Time | and the second se | <u>13:00</u> ? | | | |
| Type of Fluid in Hole | | 2 VATER | | | |
| Fluid Density | | VAIER | | | |
| Salinity | | va. VA | | | |
| Fluid Level | | 500 £t | | | |
| Logged Cement Top | | 100 TP | | | |
| Wellhead Pressure | I. |) psi | | + | |
| Maximum Hole Deviation | | NA NA | | | |
| Nominal Logging Speed | | 35 fpm | | 1 | |
| Maximum Recorded Tem | | | | | |
| Reference Log | | L-DEN/ NEU | | | |
| Reference Log Date | | 5 SEP 2008 | | | |
| Equipment No. Loca | | the second se | MT.PLEASAN | 7 | |
| Recorded By | | TASON SERVOCE | | | |
| Witnessed By | 1 | WR. LARRY AND | | | |

DEPTH OFFSETS

(for Acquired Curves)

| SERIES | DEPTH OFFSET | ACQUI | RED CUR | VES | | | |
|--------|--------------|-------|---------|------|----|-----|-----|
| 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 | | | | |
| | | | | | | | |





DEĐ

3

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - OFFICE OF GEOLOGICAL SURVEY RECORD OF WELL DRILLING OR DEEPENING

- 10. Miles - 2

.

| | KECORD OF WELL I | DRILLING OR DEEPENING | | | | |
|--------------------------------------|---|---|--|--|--|--|
| | pervisor of Wells or Part 625 Mineral V | | | | | |
| amended. Non-submission and/or f | alsification of this information may resu | It in fines and/or imprisonment. 59345 | | | | |
| 4 | | API number | | | | |
| (Submit 3 copies within 6 | 0 days of drilling completion.) | 21-035-59345-00-00 | | | | |
| | | Well name and number | | | | |
| Part 615 Oil/Gas We | II 🗌 Part 625 Mineral Well | HOLCOMB 1-22 | | | | |
| Name and address of permittee | | Surface location | | | | |
| Northshore Petroleum, LLC | | NW 1/4 of NE 1/4 of NW 1/4 Section 22 T19N R3W | | | | |
| 4406 Grand Cavman Dr. | | Township County | | | | |
| Sugar Land, Texas 77479 | | Hamilton Clare | | | | |
| | | Footages North/South East/West | | | | |
| Name and address of drilling contra- | ctor | 490 ft. from North line and 1826 ft. from West line of sec. | | | | |
| Arrow Drilling Services | | Directionally drilled (check one) Previous permit numbers | | | | |
| 4030 Columbus Dr. | | Yes No none | | | | |
| Kalkaska, MI 49646 | | Subsurface location (if directionally drilled) | | | | |
| | | 1/4 of 1/4 of 1/4 Section T R | | | | |
| Date drilling began | Date drilling completed | Township County | | | | |
| August 22, 2008 | Sept. 5, 2008 | | | | | |
| Total depth of well | Formation at total depth | Footages North/South East/West | | | | |
| Driller 5200 ft Log 5202 ft | Amherstburg | ft. from line and ft. from line of sec. | | | | |
| Elevations | | Feet drilled - cable tools Feet drilled - rotary tools | | | | |
| K.B. 945.6 ft. R.F. 944.4 ft. | R.T. ft. Grd 933.3 ft | from n/a to n/a from Surface to 5200 ft | | | | |

| Cas | sing, Casing Lin | ers and Cementing | , Operating Sti | rings | Water Fill Up (F.U.) or Lost Circulation (L.C.) (X) | | | |) (X) |
|--------|------------------|-------------------|-----------------|------------|---|------|------|---------|--------|
| Size | Where set | Cement | T.O.C. | Ft. pulled | Formation | F.U. | L.C. | Depth | Amount |
| 9.625" | 792 ft | 500 sxs | Surface | | Dundee | | X | 3884 ft | |
| 7.0" | 4082 ft | 150 sxs | 3375 ft | | | | | | |
| 4.5" | 5201 ft | 200 sxs | 3744 ft | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Gr | oss Pay Interva | Is | | All Other Oil and Gas Shows Observed or Logged | | | | | | | 142084 | |
|-----------|-----------------|------|------|--|---------------|-------|--------------|------|----------|-------------|------------|------------|
| Formation | Oil or Gas | From | То | | | | | Whe | ere Obs | erved (X | 5) | |
| Richfield | Oil | 4948 | 5010 | Formation | Oil or Gas | Depth | Sam- ples | Odor | Pits | Mud Line | Gas Log | Fill Up |
| | | | | See attached | | | | | | | | |
| | | | | sheet | | | | | <u> </u> | | | |
| | | | | N | | | | | | | | L |

| Depth C | Correction | Dev | iation Survey | | Plu | igged Back |
|---------|------------|---------|---------------|-----|-----|------------|
| Depth | Correction | Run at | Degrees | Yes | No | Depth |
| | | 2080 ft | 1-1/2 dea | | | |
| | | 2530 ft | 1 dea | | | |
| | | 3050 ft | 3/4 dea | | | |
| | | 3570 ft | 1/2.dea | | | |

| | | Geophysical / Mechanical Logs (list each | type run) |
|--|---|--|---|
| Bra | nd | 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 compl | ete sample and forma | tion record, coring record, and drill stem test informat | ion on reverse side. |
| CERTIFICATION "Is accurate and complete | state that I am authoriz te to the best of my kn | ted by said owner. This report was prepared under moviedge." | ny supervision and direction. The facts stated herein are true, |
| Date | Name and title (p | rint) | Signature |
| Nov. 10, 2008 | Mark W. Andr | | - Millin Mi |
| EQP 7200-5 (rev. 8/ | Submit to: 2004) | OFFICE OF GEOLOGICAL SURVEY, MICHIGAN DEPT OF ENVIRONMENTAL QUALT PO BOX 30256, LANSING, MI 46909-7756 | DEC 2 6 2008 |

1

API number FORMATION RECORD Permit number/Deepening number Attach additional sheets if necessary 59345 Elevation used Geologist name Tops taken from 945.6 ft Driller's log Sample log Electric log Allen Bentz / Mark Andreason Formation Formation From To (type, color, hardness) From (type, color, hardness) To 5200 ft AMHERSTBURG 5142 ft Note: if well directionally drilled, add true vertical depth formation tops where appropriate (TD)FORMATION -GLACIAL DRIFT 464 ft Limestone, dk brn-Surface 923 ft SAGINAW FORMATION - Shale, brn, argill & foss 464 ft It grey, frm, sl. calc. 981 ft PARMA SANDSTONE - Sandstone, 923 ft It. brn to clr, sub rnd, calc cement 1238 ft MICHIGAN FORMATION - Shale, 981 ft It -med grey, sdst interbeds at top, calc. interbeds at base, Triple Gyp @ 1028ft, Brown Lime @1098 ft. 1314 ft STRAY SANDSTONE - Sandstone 1238 ft clr, frosted, vf-mg, strong gas show 1530 ft MARSHALL SANDSTONE -1314 ft Sandstone, clr, fg-mg, sub-rnd 2472 ft COLDWATER SHALE - Shale, If well was cored, attach core description 1530 ft med-dk grey, sli calc, pyr. DRILL STEM TEST DATA 2506 ft SUNBURY SHALE - Shale, blk None 2472 ft 2522 ft BEDFORD SHALE - Shale, It gry 2506 ft 3034 ft ANTRIM SHALE - Shale, dk brn-blk 2522 ft calc at places, gas shows 3068 ft TRAVERSE FORMATION - Shale, 3034 ft grey - brn, limest interbeds 3716 ft TRAVERSE LIMESTONE - Limest. 3068 ft It gry - It brn, vf-fxlyn, foss, dns, hd 3782 ft BELL SHALE - Shale, m-dk grey 3716 ft 4044 ft **DUNDEE LIMESTONE - Limest.**, 3782 ft from 3782-3834 ft, It 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 LIST ATTACHMENTS 4648 ft **DETROIT RIVER SALTS - Massive** Z-Densilog-Comp Neutron-Gamma Log 4149 ft Dual Laterolog-Micro-Laterolog-Gamma Log salt beds w/interbed dol & anhydrite SOUR ZONE - Introdded Dolomite, 4878 ft 4648 ft brn & Limest., dk. gy, & anhydrite, oil/gas shws at 4686-94 & 4810-22 4966 ft MASSIVE ANHYDRITE - Anhydrite, 4878 ft milky-transl, numerous thin brn, vfx limestone & dolomite beds. 4966ft 514Zft RICHFIELD ZONE - Dolomite, brn, OFFICE OF GEOLOGICAL SURVEY USE ONLY Reviewed by vf-mx and Limestone, brn-lt brn, vfx, beds, oil shows in dolomite beds, Date of review anhydrite interbeds in upper half.



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

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

| Sugar Land, Texas 77 | 479 | | | | | | |
|--|---------------------------------|------------------------|----------------------------------|------------------|---------------|------------|--------------|
| Directionally drilled (check of Yes No | ne) Previous p | ermit numbers | Total depth of well M.D. 5200 | T.V. | D. 5200 | | |
| Surface location | | | Subsurface location (if | directionally dr | illed) | | |
| NW % of NE % of NV | V 1/4 Section 22 | т 19N R 3W | 1/4 of 1/4 | of ¼Se | ection | Т | R |
| Township Hamilton | County Clare | | Township | | County | | |
| Footages: North/South | 1 | East/West | Footages: North/ | South | | East/West | |
| 490 Ft. from North lin | e and 1826 Ft. from | m West line of Sec. | Ft. from | line and | Ft. fc | om | line of Sec. |
| P | art 615 - oil/gas wells | | | Part 625 - m | nineral wells | | |
| | oducing formation(s) chfield | Injection formation(s) | Date of first injection | Disposal for | mation(s) | Solution f | formation(s) |

COMPLETION INTERVALS(S)

| Date Number holes | | | Open | | | |
|-------------------|--|---|------|----|--|--|
| | | Perforation or open hole interval | Yes | No | | |
| | | 4,948-54', 4,966-76', 4,990-5,000', 5,004-10' | X | | | |
| .000 | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | 1 | | |
| | | | | | | |

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-HCI |
| 9/29/08 | 4,948-54', 4,966-76' | 2,000 gals. 20% NE-HCI |
| | | |
| | 10 | 1 |
| | | |
| | | |
| | | |

PRODUCTION TEST DATA

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

| CERTIFICATION "I state that I am authoriz stated herein are true, accurate and complete | ed by said owner. This report was prepared under my supervision ate to the best of my knowledge." | on and direction. The facts |
|--|--|-----------------------------|
| Name and title (print or type) Mark W. Andreason, COO | Signature | Date November 10, 2008 |
| Submit to: | OFFICE OF GEOLOGICAL SURVEY MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY PO BOX 30256 LANSING MI 48909-7756 | |

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - OFFICE OF GEOLOGICAL SURVEY RECORD OF WELL DRILLING OR DEEPENING

| | pervisor of Wells or Part 625 Mineral National National Nation of this information may rest | |
|---|---|---|
| (Submit 3 copies within 6 | 0 days of drilling completion.) | API number 21-035-58365-00-00 Well name and number |
| Part 615 Oil/Gas We Name and address of permittee | II 🔲 Part 625 Mineral Well | R & P FANSLAU #1-22 Surface location |
| Northshore Petroleum, LLC 4406 Grand Cavman Dr. Sugar Land, Texas 77479 | | NE 1/4 of NW 1/4 of NW 1/4 Section 22 T19N R3W Township County Hamilton Clare Footages North/South East/West |
| Name and address of drilling contract Bigard & Huggard Drilling, Inc 5580 Venture Way Mt, Pleasant, Michigan 48858 | 5 | 330 ft. from North line and 987 ft. from West line of sec. Directionally drilled (check one) Previous permit numbers Image: Subsurface location (if directionally drilled) none 1/4 of 1/4 of 1/4 Section T |
| Date drilling began September 20, 2007 | Date drilling completed September 27, 2007 | Township County |
| Total depth of well Driller 4135 ft Log 4129 ft | Formation at total depth Detroit River Anhydrite | Footages North/South East/West ft. from line and ft. from line of sec. |
| Elevations K.B. 951 ft. R.F. 950 ft. R.T. | ft. Grd 939 ft | Feet drilled - cable tools Feet drilled - rotary tools from n/a to n/a from Surface to 4135 ft |

| Cas | ling, Casing Lin | ers and Cementing | , Operating Str | ings | Water Fill U | p (F.U.) or L | ost Circ | ulation (L.C. | .) (X) |
|--------|------------------|-------------------|-----------------|------------|--------------|---------------|----------|---------------|---------------|
| Size | Where set | Cement | T.O.C. | Ft. pulled | Formation | F.U. | L.C. | Depth | Amount |
| 9.625" | 791 ft | 450 sacks | Surface | | | | | | |
| 7.0" | 4114.ft | 450 sacks | 801 ft | | | | | | enter Marcate |
| | | | | | | | | | i |
| | | - | | | 8 | | | 1 | |

| Gross Pay Intervals | | | Ai | Other Oil an | d Gas Sho | ws Obse | erved or | Logged | 1 | | | |
|---------------------|------------|------|------|--------------|---------------|---------|--------------|--------|---------|-------------|------------|------------|
| Formation | Oil or Gas | From | To | 1 | T | | | Whe | ere Obs | erved (X | 0 | |
| Dundee | Oil | 3840 | 4032 | Formation | Oil or Gas | Depth | Sam- ples | Odor | Pits | Mud Line | Gas Log | Fill Up |
| | | | | See attached | | | | | | | | |
| | | | ļ | sheet | | | | | | | - | |
| | | | | | | 1 | - | | | | | |

| Depth Correction | | Deviation Survey | | Plugged Back | | | |
|------------------|------------|------------------|---------|--------------|----|-------|--|
| Depth | Correction | Run at | Degrees | Yes | No | Depth | |
| | | 720 ft | 1.5 dea | | | | |
| | | 1309 ft | 1 deg | | | | |
| | | 2899 ft | 1.5 dea | | | | |
| | | 3146 ft | 1 dea | | | | |

| | | 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 | | |

CERTIFICATION "J 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

| Date | Name and title (pi |
|-----------------|--------------------|
| October 4, 2007 | Mark W. Andr |
| | Submit to: |

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

OCT 0 9 2007

15

FORMATION RECORD Attach additional sheets if necessary Geologist name

Jim Sanborn / Mark Andreason

Elevation used

951 ft KB

| API number |
|-----------------|
| Tops taken from |
| Driller's log |

Permit number/Deepening number 58365

| | | Formation | | | Formation |
|--------------|--------------------|--|---|--|---|
| From | То | (type, color, hardness) | From | То | (type, color, hardness) |
| Note: if wel | I directionally di | rilled, add true vertical depth formation tops | | | 3404-3424. |
| where appro | | | 3700 ft | 3762 ft | BELL SHALE - |
| Surface | 490 ft | GLACIAL DRIFT | | | Shale, med-dk gy |
| 490 ft | 922 ft | SAGINAW FORMATION - Shale, | 3762 ft | 4041 ft | DUNDEE FM - Ls |
| | | grey, firm to soft and thin & thick | | | tan-buff, fxyln w/ |
| | | beds of Sandstone, clear to white, | F | | abunt dd oil stn & |
| | | fine-coarse grained, friable to cmt'd. | | | flor 3762-3842; Ls |
| 922 我 | 946 ft | PARMA SANDSTONE - Sandstone, | | | grading to Dol, tar |
| | | clear, fgr, abundant pyrite. | | | to It brn, fxyin, gd |
| 946 ft | 975 ft | BAYPORT LIMESTONE - Limest., | | | suc, intrxlyn & vug |
| | | It grey, vfxlyn, hard, dense, mixed | 2 | | por, gd cut& >40% |
| | | w/ Sandstone, fgr, clear, well-srtd. | | | brite yel gold flor |
| 975 ft | 1243 ft | MICHIGAN FORMATION - Shale, | | | 3842-4020 ft. |
| | 1 | med-dk grey, frm-hd w/ stringers of | 4041 ft | 4135 ft (TD) | DET. RIVR ANHY |
| | | Limestone and Sandstone; Triple | | | Anhy & Dol intrbed |
| | | Gyp Mbr @ 1040 ft, interbedded | lf well | was cored, attach cor | e description |
| | | shale, med-dk gry and anhy; Brown | | DRILL STEM TEST I | DATA |
| | | Lime Mbr @ 1104 ft, interbed Ist | None | | a prove products (here) |
| | | w/ scat gold flor and shale. | | | |
| 1243 ft | 1311 ft | STRAY SANDSTONE - Sandstone, | | | |
| | 1 | clr to tan, frosted sub-rnd grains, yel | | | |
| | | gold flor; Limest w/ shale stringers | | | |
| | | from 1270-1311 ft. | 1 | | |
| 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, It to | | | |
| | | med gry to bluish gry, firm, hard, | | | |
| | | slightly pyritic and calc in part. | | | |
| 2472 ft | 2505 ft | SUNBURY SHALE - Shale, dk gry - | | | |
| | 00000 | black, firm, hard, brittle, v. carb. | | | generation of a |
| 2505 ft | 2520 ft | BEDFORD SHALE - Shale, gry to | | LIST ATTACHMEN | and the second se |
| | | dk brn, dense, brit, argill. | | p Neutron-Gamma Lo licro-Laterolog-Gamm | |
| 2520 ft | 3030 ft | ANTRIM SHALE - Shale, blk-dk gry, | | Borehole Imager (CBI | |
| | | frm, hard, brittle, v carb., tr spores | | serence integer (essi | -/ |
| | | 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, | | | |
| | | It gry grn, soft, silty and calc. | | | |
| 3054 ft | 3700 ft | TRAVERSE LIMESTONE - Limest., | | F GEOLOGICAL SUF | VEY USE ONLY |
| | | dk brn to brn and crmy wh to tan, | Reviewed by | | |
| | | typically vf-fxlyn, hd, dense, shale | | | |
| | | beds incr at base; micropor-vuggy | Date of review | | |
| | 1 | 15-30% flor & cut 3270-3302 & | and the second se | | |

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - OFFICE OF GEOLOGICAL SURVEY RECORD OF WELL DRILLING OR DEEPENING

| | pervisor of Wells or Part 625 Mineral alsification of this information may res | in the second seco |
|---|---|--|
| (Submit 3 copies within 6 | 0 days of drilling completion.) | API number <u>21-035-58365-00-00</u> Well name and number |
| Part 615 Oil/Gas We Name and address of permittee | II 🔲 Part 625 Mineral Well | R & P FANSLAU #1-22 (Deepening) Surface location |
| Northshore Petroleum, LLC 4406 Grand Cavman Dr. Sugar Land, Texas 77479 | 8. | NE 1/4 of NW 1/4 of NW 1/4 Section 22 T19N R3W Township County Hamilton Clare Footages North/South East/West |
| Name and address of drilling contra Bidard & Huddard Drillind, Ind 5580 Venture Way Mt. Pleasant, Michidan 48858 | ÷. | 330 ft. from North line and 987 ft. from West line of sec. Directionally drilled (check one) Previous permit numbers □ Yes No none Subsurface location (if directionally drilled) 1/4 of 1/4 of 1/4 Section T |
| Date drilling began February 17, 2007 | Date drilling completed February 22, 2007 | Township County |
| Total depth of well Driller 5200 ft Log 5118 ft | Formation at total depth Amherstburg Fm. | Footages North/South East/West ft. from line and ft. from line of sec. |
| Elevations K.B. 951 ft. R.F. 950 ft. R.T. | ft. Grd 939 ft | Feet drilled - cable tools Feet drilled - rotary tools from n/a to n/a from 4135 ft to 5200 ft |

| Cas | Casing, Casing Liners and Cementing, Operating Strings | | | | | Water Fill Up (F.U.) or Lost Circulation (L.C.) (X) | | | |
|--------|--|-----------|----------|------------|-----------|---|------|-------|--------|
| Size | Where set | Cement | T.O.C. | Ft. pulled | Formation | F.U. | L.C. | Depth | Amount |
| 9,625" | 791.ft | 450 sacks | Surface_ | | | | | | |
| 7.0" | 4114 ft | 450 sacks | 801 ft | | | | | | |
| 4.5" | 5197 ft | 175 sacks | 3704 ft | | | _ | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Gross Pay Intervals | | | All Other Oil and Gas Shows Observed or Logged | | | | | | - | | | |
|---------------------|------------|------|--|--------------|--------|-------|------|------|---------|----------|-----|------|
| Formation | Oil or Gas | From | To | | | | | Whe | ere Obs | erved (X | 3 | |
| Sour Zone | Oil/Gas | 4679 | 4684 | Formation | Oil or | Depth | Sam- | | | Mud | Gas | Fill |
| Sour Zone | Oil/Gas | 4752 | 4756 | | Gas | | ples | Odor | Pits | Line | Log | Up |
| Richfield | Oil/Gas | 4966 | 5014 | See attached | | | | | | | | |
| | | | | sheet | | | - | | | | | |
| | | | | | | | | | | | | |

| Depth C | Correction | Dev | lation Survey | | Plu | lgged Back |
|------------------|------------|---------|---------------|-----|-----|--------------|
| Depth Correction | | Run at | Degrees | Yes | No | Depth |
| | | 4679 ft | 0.75 dea | | | |
| | | 5160 ft | 1.5 dea | | | |
| | | | | | | |
| | 1 | | | | | ener suit te |

| | Geophysical / Mechanical Logs (list | t each type run) |
|------------------|---|--|
| E | rand Log types | Logged intervals |
| Baker Atlas | Z-Densilog-Comp. Neutron-Gamma | 4111 - 5118 ft |
| Baker Atlas | Dual Laterolog-Micro-Laterolog Gam | ma 4111 - 5118 ft |
| CERTIFICATION | plete sample and formation record, coring record, and drill stem test info I state that I am authorized by said owner. This report was prepared un lete to the best of my knowledge." | and the second |
| Date | Name and title (print) | Signature |
| February 26, 2 | 08 Mark W. Andreason, CEO | Signature |
| EQP 7200-5 (rev. | Submit to: OFFICE OF GEOLOGICAL SURVEY, MICHIGAN DEPT OF ENVIRONMENTAL Q | |

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| FORMATION RECORD Attach additional sheets if necessary | | API number | Permit numb 58365 | er/Deepening number |
|---|------------------------------|-----------------|----------------------|---------------------|
| Elevation used | Geologist name | Tops taken from | | |
| 951 ft KB | Jim Sanborn / Mark Andreason | Driller's log | Sample log | Electric log |

| | | Formation | | | Formation |
|----------------------------|---------|---|---|--------------------|-------------------------|
| From | То | (type, color, hardness) | From | То | (type, color, hardness) |
| Note: if well where approp | | led, add true vertical depth formation tops | | | |
| 4148 ft | 4640 ft | DETROIT RIVER SALT - Salt beds | | | |
| 4640 ft | 4878 ft | w/ anhydrite & dolomite interbeds SOUR ZONE - Intrbdded Dolomite, brn & Limest., dk. gy, & anhydrite, crm, micro-suc por, w/ oil staining, | | | |
| | 1000.6 | 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- fxyln, tan to brn, interxyln-suc por, abridt vis oil, good flor & cut from | | | |
| | | 4968-5016. Some anhydrite intrbds | If well was | cored, attach core | description |
| | | at top. Denser dolomites and incr | | ILL STEM TEST DA | TA |
| 5150 ft | 5200 ft | lime % toward base. AMHERSTBURG FM Limestone, | None | | means of the Large Com |
| | (TD) | dk - med brn, vfxln, hd, dns, fossils | | | |
| | | | | | × |
| | | | | | |
| | | | i. | | |
| | | | | | |
| | | | | | |
| | | | | IST ATTACHMENT | S |
| | | | Z-Densilog-Comp N Dual Laterolog-Micro | | Log |
| | | | | | |
| | | | | | |
| | | | | EOLOGICAL SURV | EV LISE ONLY |
| | | | Reviewed by | | |
| | | | Date of review | | |



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY – OFFICE OF GEOLOGICAL SURVEY RECORD OF WELL COMPLETION

| | art 615 or Part 625 of an-submission and/or f | | Permit number/deep 58365 | ening permit no. | API number 21-035-58 | | 00 |
|--|---|--|-----------------------------------|------------------|--|-----------|--------------|
| | ay result in fines and/o | Type of well (after co OIL PRODUCEF | | | | | |
| | ies within 60 days of w il/Gas Well 🔲 Part 6 | Well name & numbe R. & P. FANSLA | £ | | <u> - </u> | | |
| Name and address of per Northshore Petroleu 4406 Grand Caymar Sugar Land, Texas 7 | m, LLC 1 Dr. | | | | | | |
| Directionally drilled (chec | k one) Previous | permit numbers | Total depth of well M.D. 5,200 | T.V | .D. 5,200 | | |
| Surface location | | | Subsurface location | | | | |
| NE % of NW % of N | | <u>T19N R3W</u> | | 14 of% S | ection | T | R |
| Township Hamilton | County | | Township | | County | | |
| Footages: North/So | outh | East/West | Footages: Nor | th/South | | East/West | |
| 330 Ft. from North | line and 987 Ft. fr | om West line of Sec. | Ft. from | line and | Ft. in | om | line of Sec. |
| | Part 615 - oil/gas well |) | | Part 625 - r | nineral wells | | |
| | Producing formation(s) Richfield | Injection formation(s) | Date of first injection | Disposal fo | rmation(s) | Solution | formation(s) |

COMPLETION INTERVALS(S)

| | | | 0 | pen |
|----------|---------------------------------------|-----------------------------------|-----|-----|
| Date | Number holes | Perforation or open hole interval | 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% HCI - (interval made only water) |
| 3/13/08 | 4,968-4,978'; 4,996-5,002' | 500 gals. 20% HCI |
| | 5,006-5,014' | |
| | | |
| | | |
| | | <u></u> |
| | | |
| | | |

PRODUCTION TEST DATA

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

| stated herein are true, accur | rate and comple | ed by said owner. This report was prepared under my super te to the best of my knowledge." | vision and direction. The face |
|---|-----------------|---|--------------------------------|
| Name and title (print or type) Mark W. Andreason | | Signature | Date April 16, 2008 |
| | Submit to: | OFFICE OF GEOLOGICAL SURVEY MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALI PO BOX 30256 | TY |
| EQP 7130 (rev. 8/2004) | | LANSING MI 48909-7756 | APR 2 2 2008 |

| BUTE OF MODINAL WITCH STATUS Difference in Modinal Water State Stat | | | | | FE | 8 1 5 195 | | | | | | | | | | | |
|---|--|---------|---------------------------------------|--|------------------------------|--|------|---|---|----------|-------------------------|-------|----------|-------|--------|--------|---|
| RECORD OF WELL DRLLING OF DEEPENING (Be proving the conset of one of users outware and the consettion of comparison of the workshow of the section of the workshow of the consettion of comparison of the workshow of the workshow of the consettion of comparison of the workshow of the workshow of the consettion of the section of the workshow of the workshow of the consettion of the section of the workshow of the workshow of the workshow of the consettion of the section of the workshow of the workshow of the workshow of the consettion of the section of the workshow of the workshow of the workshow of the workshow of the consettion of the section of the section of the workshow of the workshow of the consettion of the section of th | | DEPAF | STATE OF TMENT OF N EOLOGICAL S | MICHIGAN ATURAL RESOUR | ICES | 2 1000 | | | | | | | | | | | |
| IEGUMED BY AUTIONTY OF BY AU | RECORD OF WELL DRILLING OR DEEPENING | | | | | | | | | | | | | | | | |
| NON-BARGED A BARGED ASSERTATION OF THE INFORMATION MAY RESULT IN MOME AND ADDRESS OF DRUERS NY K of A SEG of ADDRESS OF DRUE OF A SEG OF PO F at 10 n GRO Dart Rd., P.O. Box 177 NY K of DOTAGES MORTHSCITC SEG of Clare NY K of Clare Clare MAME AND ADDRESS OF DRUE NO CONTRACTOR MAS ADDRESS OF DRUE NO CONTRACTOR MOLACALIAN DF111ing Company P.O. Box 548 Use and 920 (com E Line of K Sec. DATE DRUE OF MELL COMPARED O2-18-94 DOTAGES MORTHSCITCH MAY N of SEG of NYK Section 22 T 19N 3W DOSDEFACE LOCATION IF INVESSION NVK of SEG of NYK Section 22 T 19N 3W DOSDEFACE LOCATION IF Investment of MAS BARGED AND ADDRESS OF DRUE ON THE LOW SEC. DOLE OF ING PARL DATE DRUE OF MELL OF AND ADDRESS OF DRUE ON TAGE O2-08-94 DOSDEFACE LOCATION IF Investment POTAGES MORTHSCITCH IF Investment O2-08-94 DOSDEFACE LOCATION IF Investment POTAGES MORTHSCITCH IF Investment POTAGES MORTHSCITCH INFORMATION NVK of SEG oF INFORMANT NATA DOSDEFACE LOCATION IF Investment POTAGES MORTHSCITCH INFORMATION NOT A SEC OF INFORMANT NATA DOSDEFACE LOCATION IF Investment POTAGES MORTHSCITCH INFORMATION NATA NA DOSDEFACE LOCATION IF Investment POTAGES MORTHSCITCH INFORMATION NATA NA DOSDEFACE LOCATION IF INVESTMENT POTAGES MORTHSCITCH INFORMATION NATA NA DOSDEFACE LOCATION NATA NA DOSDEFACE NOT NATA NA DOSDEFACE NOT NATA NA DOSDEFACE NOT NATA NA DOSDEFACE N | REQUIRED BY AUTHORITY OF: | | | | | | | | | | | | | | | | |
| Dart Oil & Gas Corporation 600 Dart Rd., P.O. Box 177 Hamilton Clare converse mornsport Masson, MI 48854-0177 Box 177 Signame Mornsport Seatymest Seatymest Mass and access or BELLING CONTRACTOR MCLachian Drilling Company P.O. Box 548 Signame Mornsport Seatymest Seatymest Seatymest Seatymest Evary, MI 49631-0548 Date Belling Contractors Date Belling Contractors 02-08-94 Date Belling Contractors 02-08-94 Obst Contractors 02-18-94 Date Belling Contractors 100% 2001 Clare Clare Date Belling Contractors 10% 2001 Elevations 10% 10% 10% 10% Date Belling Contractors 10% 2001 Box 10000 Date Belling Contractors 10% 2001 Seatymest 10% 10% 10% 10% Date Belling Contractors 10% 2001 From NA To Elevations 10% 10% 10% 10% 10% 10% Date Belling Contractors 10% 2001 Seatymest 10% 2001 Seatymest 10% 2001 Bate of Wissen 10% 2001 Bate of Wisse | NON-SUBMISSION AND/OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN | | | | | | SUR | | | of | NW 14 | Sec | tion 2 | 2т | 191 | k 3 | W |
| 600 Dart Rd., P.O. Box 177 Processes Process Process Proces | | | | | | | | | | | | | | | | | |
| MASON, MI 43554-0177 990t, from S Line and 990t, from E Line of W. Sec. Mollachlan Drilling Company Pro. Box 548 Subsynthet Location of Western Board 100 Subsynthet Location of Western Older Board 100 Subsynthet Location of Western Double Board 100 Double Board 100 | | | | | | | | | | | | | | | | | |
| MGLachlan Drilling Company P.O. Box 548 NW4 of SEA of NW4 Sector 22 T 19Nh 3W TOWNSHP Sector 22 T 19Nh 3W TOWNSHP Evart, MI 49831-0548 Date DRUL COMPLETED DATE WELL COMPLETED 02-08-94 Date Well COMPLETED POINTS Date Sector 7 01 are Date Sector 7 01 are Date Sector 7 01 are Exat/WEST Exat/WEST Exat/WEST D2-08-94 05-06-94 990t from S Line and 990t from S Line and 990t from S Line on 990t, from S Line and 990t from O To 5220' Elevation - ontar vols Feer Sector 7 01 are Exat/WEST Elevation - ontar vols Feer Sector 7 0 To 5220' To 5220' Date or Rest Rescriction NA NA NA NA Feer Sector 7 0 To 5220' Feer Sector 7 0 To 5220' To 5220' Date or Rest Rescriction NA NA NA NA KE PERFORATIONS Elevations Sector 7 0 To 5220' A Size WHERE Sector COMENT FF. PULED Date NUMBER NUMBER NUMBER NTERVAL PERFORATED YES NO Size WHERE Sector OF Coment FF. PULED Date NUMBER NTERVAL PERFORATED YES NO Size WHERE Sector Tro | | | | | | | | | | | | | | Sec. | | | |
| P.O. Box 548 TOWNSHP COUNTY Clars Evart, MI 49631-0548 Namilton Olars County Clars OR BONL COMPETED OVACONS MALE DATE WELL COMPETED DATE WELL COMPETED DATE WELL COMPETED 990f. from S Line and 980 from. K Line of % Sec. O2-08-94 02-18-94 06-06-94 990f. from S Line and 980 from. K Line of % Sec. D'B220' 5220' Amherstburg Dundee From NA Fee omlise - Case tools. D'B220' 5220' Amherstburg Dundee From NA Form O To 5220' DATE OF PREFINECTION NA NA NA ELEVATIONS ELEVATIONS Size WHERE SET CEMENT FT. 2ULED DATE MUMBER NETEVAL PERFORATED VERS NO 95/B'' 805' 400 sx Class A D-3-594 4 3860' - 3852' VES NO 6 1/2'' 4013' 600 sx Howo Lt, 180 sx Class A D-3-594 4 3860' - 3852' VES NO Stravy G Gas Gas IZ2N' X ELEVATION A VES NO SOUS Stravy G Gas Gas I | and some the set of th | | | | | | | | | | | | | | | | |
| BYART, MI 49631-0548 Hamilton Clare DATE DRILLO GROAN DATE DRILL COMPLETED DATE MULLICOMPLETED POTAGES MONTHYSOUTH ENSTWEET 02-08-94 02-08-94 05-06-94 90 ft. from S Line and 9940 from. S Eine and 9940 from. S | | | | ing Comp | any | | | | SEA | of | | | | 2 T | 1.91 | R C | SW . |
| Date Date <t< td=""><td></td><td></td><td></td><td>0540</td><td></td><td></td><td>TOW</td><td></td><td>1ton</td><td></td><td>1</td><td>COUN</td><td>TY</td><td>01</td><td>000</td><td></td><td>1</td></t<> | | | | 0540 | | | TOW | | 1ton | | 1 | COUN | TY | 01 | 000 | | 1 |
| 02-08-94 02-18-94 05-06-94 99 ØFt. from. S Line and 99% from. E Line of Va Sec. TOTUL DEPTH OF WELL 10% 22 01 ' 922 01 FORMATIONA TO. MADE XT STUDY FORMATIONA TO. DUITE OF PRATERIALS FORMATIONA TO. PROD. FORMATIONA FORMATIONA TO. PROD. FORMATIONA FORMATIONA TO. PROD. FORMATIONA FORMATIONA TOTUL OPENATIONA FORMATIONA FORMATIONA FORMATIONA TOTUL OPENATIONA FORMATIONA TOTUL OPENATIONA FORMATIONA TOTUL OPENATIONA FORMATIONA TOTUL OPENATIONA TOTUL OPENATIONA <t< td=""><td>second in the second second</td><td></td><td></td><td>14.44</td><td>Leave Merry</td><td>CONSISTER</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<> | second in the second | | | 14.44 | Leave Merry | CONSISTER | - | | | | | | | | | | |
| Drigsz 20 * 6920 * Amherstburg Dundee From NA To From 0 To 5220 * DATE OF FRIST RAJECTION NA NA NA Solution FORMATION ELEVATIONS ELEVATIONS NA NA NA NA NA NA ELEVATIONS ELEVATIONS CASING, CASING LINERS AND CEMENTING, OPERATING STRINGS PERFORATIONS PERFORATIONS PERFORATIONS Size WHERE SET CEMENT F7. PULLED DATE HUMBER INTERVAL PERFORATED YES NO 9 5/8" 808* 400 sx Class A D-3-94* 3860* - 3852* X 6 1/2" 4013* 600 sx Howce Lt. 180 sx Class A D-3-94* 3860* - 3852* X GROSS PAY INTERVALS ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED WHERE COSERVED (N) NHERE COSERVED (N) NHERE COSERVED (N) NA 0L OR GAS FROM TO FORMATION OR GAS COEPTH WHERE COSERVED (N) GROSS PAY INTERVALS ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED Stras 1280* X | | Steel 1 | | | 1000 ADD 100 ADD 100 ADD 100 | | FUC | | | Lin | e and | 9.94 | A from . | | | of 1/4 | Sec. |
| DATE OF PRAT NUECTON NA NA NA NA NA NA ELEVATIONS NA NA NA NA K.B. 966.9t/ R.F. 965 * R. R.F. 965 * R. R.T. NA | | C.V.C. | FORMATION | AT T.D. | 1.00020000000 | | | | - GABLE TOO | LS | | FEET | | | | | |
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| OIL - Bbis/day GRAVITY - API COND. Bbis/day NA NA NA NA NA NA NA NA NA | ains/100 cu. ft. B.H.P. AND DEPTH |
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I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

2.13.95 NAME AND TITLE (PRINT) David W. Farner, Petroleum Engineer Midw. famu

NOTICE: REPORT COMPLETE SAMPLE AND FORMATION RECORD, CORING RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE. PA 7200-5 Rev 8185

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FORMATION RECORD

#48189

| Mill ELEVATION USED. | er 1-22 | (ATTACH ADDITIONA | | | VECES | SARY | } | | • | 010 | |
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| FROM | то | FORMATION (TYPE, COLOR, HARDNESS) | | FROM | <u>т</u> | 0 | | F (TYPE,CO | ORMAT | TION HARDNESS} | |
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| 0 | 660 | Glacial Drift | | | | | | | | | |
| 660 | 1278 | Saginaw/Michigan sh, ss, Lm, gyp | | | | | | | | | |
| 1278 | 1350 | Michigan Stray ss, shly IP, gas sh | c v | | | | | | | | |
| 1350 | 1510 | Marshall ss, shly IP | | | | | | | | | |
| 1510 | 2508 | Coldwater sh | | | | | | | | | |
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| 2560 | 3070 | Antrim sh, dk brn-drn | | | | | LL STEM TE | | | | |
| 3070 | 3111 | Traverse Formation sh-shly Lm | | | | | | | | | |
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| 3742 | 3803 | Bell Shale | | | | | | | | | |
| 3803 | 4076 | Dundee Lm, tan, Dol, brn-d brn-tan, vf-fxln, v Ø, good oil show 3858-3870 | k | | | | | | | | |
| 4076 | 4910 | Detroit River Anhy, salt, Dol | | | | | | | | | |
| 4910 | 4992 | Massive Anhydrite | | | | L | ST ATTACH | MENTS | : | | |
| 4992 | 5163 | Richfield Dol brn, mic-vfxln, some vis Ø and oil mostly tite-low Ø, show 4992-5002 | sit. | , . L | 1 | e. | | | | | |
| 5163 | 5220 | Amherstburg Lm∽dk brn, brn, blk grainst, tite | | EVIEWED BY. | G | OLOG | ICAL SURVE | Y USE | ONL | .Y | |
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| DNR Michigan Department of Natural Resources Geological Survey Division DNR Michigan Department of Natural Resources Geological Survey Division 3 1994 Trans of Well Name & Number 48189 Miller 1-22 Field Name | | | | | | | | | | | | | |
| DNR | Turv | 48189 Miller 1-22 Type of Well Field Name | | | | | | | | | | | |
| • | | | Oi | Oil East Hamilton | | | | | | | | | |
| REQUIRED BY AI PA 1969, as amer | | | | 1/4 1/4 1/4, Section, Township, Range, County NW, SE, NW, Sec 22 T19N R3W | | | | | | | | | |
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| | | | RELIMIN | | Name and Address of Contractor/Service Company (attach additional sheets as needed) | | | | | | | | |
| Dart Oi | l & Gas | | | Beckman Production Services | | | | | | | | | |
| 600 Dar | t Road, | P O Box | | | Box 67 Aska, | | 9646 | | | | | | |
| Mason, | | 854-017 | | - | | | | Issuing Plugg | | or Apr | orovina | Chan | ae of Well |
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| ni in grandi i gand | CEMENTING | TO PLUG AND | | ATA. | and the second | PLUG # | 1 PLUG # | 22 | PLUG #3 | PLUG #4 | PLUG #5 | PLUG #6 | PLUG #7 |
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| inf | formation is tru ssibility of fine | ie, accurate, a | nd complete, | l am awa | re that th | ere are sig | gnificant per | naltie | es for subm | itting false | information, | including the | 9 |
| | | 120.0 | 8 | | | | | | | | | | |
| | d Official Title n C. Myler, Jr. | | or print) | | Sigr | hature | ll | 1 | m | 27 | | Date Signed | |
| | | | | | | 1-5 | | | , | X | - | ~ (97) | ~~~~~ |
| EPA Forr | n 7520-14 (Rev | . 12-11) | | | | | | | (| 10 | | | |



Muskegon Development Company

Financial Report December 31, 2015



plante moran

AUG 1 1 2016 UIO LINGAL ICH 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 <u>bennettmyler@muskegondevelopment.com</u> if you have any questions. Thank you.

Sincerley,

Burt Maln

Bennett Myler, Geologist

(1) <u>http://www.fws.gov/midwest/endangered/lists/michigan-cty.html</u>

(2) <u>http://www.fws.gov/midwest/endangered/mammals/nleb/index.html</u>

(3) http://www.fws.gov/midwest/endangered/birds/Kirtland/kiwafctsht.html



N



GOVERNOR

RE:

STATE OF MICHIGAN 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

> 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 <u>no historic properties are affected</u> 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,

Drian Brian G. Grennell

Cultural Resource Management Specialist

for Brian D. Conway State Historic Preservation Officer

SAT:BGG

Copy: Bennett Myler, Muskegon Development Company



UIC BRANCH EPA, REGION 5



State Historic Preservation Office Michigan Library and Historical Center

• 702 West Kalamazoo Street
• PO BOX 30740
• Lansing, Michigan 48909-8240 www.michigan.gov/shpo
• 517.373.1630
• FAX 517.335.0348
• TTY 800.382.4568

MI-035-2R-0034 Page B-1 of 2

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| Willian | n C. Myler, Jr. | , President | en e stand de la same person | مرعارين وماجمه | | 2 | \subseteq | ll | mi | (A) | _ | 8/8/ | 16 |
| EPA For | m 7520-14 (Rev | . 12-11) | 1. 1. | | | - | | | (| 10 | | | |





UIC Permit Application Completeness Review Checklist

Source of information: <u>G:\UIC\Reporting, Tracking, & Communications\Quality System-Quality Assurance (SOPs)\SOPs-</u> <u>UIC\Permits\Permitting SOP & Info\Form 7520-6 0 508c.pdf</u>

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 |
|-------------------------|--|---|
| \checkmark | 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) |
| 1 | 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) |
| (Central | Class I: | Required |
| | Class II: | Required |
| | Class III: | Required |
| Class V: | | Not Applicable |
| 1 | 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: Class III: | | In addition to requirements for Class I, include pertinent information known to the applicant. This requirement does not apply to existing Class II wells. |
| | | 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 |
|---------------|--------------------|---|
| V | 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 no 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. |
| 4 | Class V: | Required (see Class V Permit Application Guidelines for details) |
| 1 | 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 |
| 19 | Class II: | Required |
| | | Not Required |

| 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. | | | | |
|------------------------|--------------|--|--|--|--|--|
| ţi. | 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 | | | | |
| Section of | Class II: | Required | | | | |
| Class III: Class V: | | Required | | | | |
| | | Required (see Class V Permit Application Guidelines for details) | | | | |
| 1 | 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.) | | | | | |
|-------------------------|--------------|--|--|--|--|--|--|
| 4 | Class V: | Not Applicable | | | | | |
| \checkmark | Attachment J | STIMULATION PROGRAM - Outline any proposed stimulation program. | | | | | |
| | Class I: | Required | | | | | |
| | Class II: | Required | | | | | |
| 1 | Class III: | Required | | | | | |
| | Class V: | Not Applicable | | | | | |
| 1 | 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) | | | | | |
| 1 | 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 | | | | | |
| \checkmark | 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: Class III: | | Required | | | | | |
| | | 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 | | | | | |
| 13.4 | 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 | | | | |
| | | 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) | | | | |
| \checkmark | 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) | | | | |
| 7 | 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 | | | | |
| | | | | | | |

| 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 | | | | |
| \checkmark | 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) | | | | |
| \checkmark | Attachment U | DESCRIPTION OF BUSINESS - Give a brief description of the nature of the business. | | | | |
| emb | Class I: | Required | | | | |
| | Class II: | Required for new Class II wells | | | | |
| 113 14 | Class III: | Required | | | | |
| | Class V: | Required | | | | |



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



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

MUSKEGON DEVELOPMENT COMPANY

 1425 South Mission Road, Mount Pleasant, Michigan 48858

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

October 19th, 2016

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

OCT 2'5 2016

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





EASE 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 HAN 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 1/2" , cut n puli (3164')
- 3. Day 3:
 - a. Run in tubing 50' into 4 1/2" 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

Other Cost:

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

TOTAL:

\$29,600

Terms:

- o Lease Management will provide our services on a time and material basis
- o 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

OCT 2,5 2015

UIC ERAMON EPA, RECENS



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.

<u>Underground Sources of Drinking Water (USDWs)</u>: 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

Christopher Korleski

Director, Water Division

UNITED STATES JONEDR

UNITE STATES ENVIRONMENTAL PRODUCTION AGENCY REGION 5 77 WEST JACKSON BOULEVARD CHICAGO, IL 60604-3590

Page 1 of 15

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 <u>et seq.</u>, (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

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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. <u>Records</u>

- 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. <u>Planned Changes</u> 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. <u>Anticipated Noncompliance</u> 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. <u>**Transfer of Permits</u>** 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.</u>
- d. <u>Compliance Schedules</u> 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.

Twenty-Four Hour Reporting

e.

f.

- (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.
- 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. <u>Other Information</u> 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(1)(8).
- h. <u>**Report on Permit Review</u>** 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.</u>

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:

- 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 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).
- 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.
- 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 $\Pi(B)(3)(d)$ 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. <u>Restriction on Injected Substances</u>

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. <u>Analytical Methods</u> 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. <u>Injection Fluid Analysis</u> 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. <u>Injection Pressure, Annulus Pressure, Annulus Liquid Loss, Flow</u> <u>Rate and Cumulative Volume</u> - 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.

<u>Monthly Reports</u> - 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.

- <u>Quarterly Reports</u> 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. <u>Annual Reports</u> 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. <u>Reports on Well Tests, Workovers, and Plugging and</u>

<u>Abandonment</u> - The applicant shall provide the Director with the following reports and test results within sixty (60) days of completion of the activity:

- 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)

| i. | | Minimum M Require | Minimum Reporting Requirements | |
|---|---------------------|----------------------|--------------------------------------|-----------|
| Characteristic | Limitation | Frequency | Туре | 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 |

OPERATING, MONITORING AND REPORTING REQUIREMENTS

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.

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|--|-------------------------|--|--|-------------------------|-------------------|----------------------------------|----------------------------|---|----------------------------------|----------------------------------|
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| lolcomb 1-22 | | | M | fuskego | Deve | elopment C | omapany | | | |
| mith Creek Field | | | 14 | 425 Sou | th Mis | ssion Road, | Mt. Pleasa | nt, MI, 4885 | 8 | |
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| | | | idual Perr | mit | | | | | | |
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| SIZE WT (LB/FT) TO BE PUT IN WELL (FT | TO BE | E LEFT IN WE | ELL (FT) | HOLE | SIZE | The | Balance Me | athod | | |
| 9 5/8" 36 | 792 | | | 12 1/4 | í ' - | | Dump Bail | | | |
| 7" 23 | 1432 | | | 8 3/4" | | | Two-Plug B | | | |
| 4.5" 11.6" | 2037 | 47 1 M 44 1 | | 6 1/8" | | | | Neuroa | | |
| | | a a ta ta a | | | | | | | | |
| CEMENTING TO PLUG AND ABANDON | DATA: | | PLUG # | 1 PLU | G #2 | PLUG #3 | PLUG #4 | PLUG #5 | PLUG #6 | PLUG # |
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| Depth to Bottom of Tubing or Drill Pipe (ft | | | 4898' | 3214 | ť. | 2700 | 892' | · · · · · · · · · · · · · · · · · · · | | |
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| Slurry Volume To Be Pumped (cu. ft.) | | | 5.90 | 41.3 | 0 | 76.70 | 395.30 | 1 | | |
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| Slurry Wt. (Lb./Gal.) | | | 15.6 | 15.6 | | 15.6 | 15.6 | | | |
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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 |



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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.

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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.

AUG 7 1 2058

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| | | G/TUBING/CEMEN | | | | | | | EMPLACEMENT | |
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| epth to Bot acks of Cer urry Volum urry Weigh pe of Cem pe of Prefl | tom of Plug (ft.) ment to be Used te to be Used (cu. F nt (lb./gal.) nent, Spacer or Othe | |) E | 5 5.9 15.6 Class A ION OF PLUG | 35 41.3 15.6 Class A GING PROCED | 65 76.7 15.6 Class A URE | 335 395.3 15.6 Class A | | | |
| epth to Bot acks of Cer urry Volum urry Weigh rpe of Cem rpe of Prefi ement ervice Rig fireline Service | tom of Plug (ft.) ment to be Used le to be Used (cu. F it (lb./gal.) nent, Spacer or Othe lush Used | er Material Used \$7,000 \$10,000 \$6,000 | ES | 5 5.9 15.6 Class A ION OF PLUG | 35 41.3 15.6 Class A GING PROCED ST OF PLUGGII Water Trucking | 65 76.7 15.6 Class A URE NG AND ABANDOI \$1,500 \$1,500 | 335 395.3 15.6 Class A | | | |
| epth to Bot acks of Cer urry Volum urry Weigh ype of Cem ype of Prefi ement ervice Rig fireline Sen te Supervis | tom of Plug (ft.) ment to be Used (cu. F tt (lb./gal.) nent, Spacer or Othe lush Used | er Material Used \$7,000 \$10,000 | ES | 5 5.9 15.6 Class A ION OF PLUG | 35 41.3 15.6 Class A GING PROCED ST OF PLUGGII | 65 76.7 15.6 Class A URE URE NG AND ABANDOI \$1,500 \$1,500 \$1,500 \$27,800 | 335 395.3 15.6 Class A | | | |
| epth to Bot acks of Cer lurry Volum lurry Weigh ype of Cem ype of Prefi ement ervice Rig <i>Tireline Sen</i> ite Supervis | tom of Plug (ft.) ment to be Used le to be Used (cu. F it (lb./gal.) nent, Spacer or Othe lush Used vice sion TIFICATION I certify under the all attachments an I believe that the | r Material Used \$7,000 \$10,000 \$6,000 \$1,800 penalty of law that I h nd that, based on my | ES)) have examine inquiry of tho curate, and c | 5 5.9 15.6 Class A ION OF PLUG STIMATED CO | 35 41.3 15.6 Class A GING PROCED ST OF PLUGGII Water Trucking Total Total ar with the information mediately respons ware that there are | 65 76.7 15.6 Class A URE URE NG AND ABANDOI \$1,500\$1,500\$1,500\$1,500\$1,500\$1,500\$1,500\$1,500\$1,500\$1 | 335 395.3 15.6 Class A VMENT | | | |





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 ¹/₄ mile of where the supply well will be located is included in the appendix.

| Version: Well Const | ruction 2010-07-30 | | C |
|---|---|--|------------------------------------|
| CALCUL | ATION OF WELL-SP | ECIFIC PRESSURE | EFFECTS |
| Facility Name | mb 1-22 | Operator | lopment Company |
| Well Name Holco | mb 1-22 | USEPA Permit Number MI-035-2R-0034 | State Permit Number 59345 |
| County Clare | State MI | Well Class 2R | Analyst Bill Tong |
| Township 19N | Range 3W | Section 22 | Date 42629 |
| Sector Sector J | USTIFICATION FOR I | FRACTURE GRADIE | ENTERIO |
| Administrative Basis for Fracture G Default | iradient | Defa | l Field Name |
| Site Source of Fracture Gradient Fracture Treatment | Well Name Fanslau 1-22 | adient Test Date 5/25/2016 | Fracture Gradient 1.11 |
| | MAXIMUM INJEC | TION PRESSURE | |
| Fracture gradient, psi/ft 1.11 | Type of Fluid, liquid or gas LIQUID | Safety factor 0.05 | Average well-bore temperature, F |
| Top of Inj. Zone, ft 4948 | Specific Gravity 1.000 | Maximum Injection Pr 3 | ressure, psi 238 |
| | PRESSURE LOS | SS TO FRICTION | |
| Outer Diameter of the Tubing, in. 2.500 | Weight of Tubing, lbs/ft 0.000 | Inner Diameter of Tubing, in 0.000 | Tubing length, ft 4898 |
| Measured | Reynolds Number Method | Hazen-Williams Method | Estimated from Chart |
| Surface injection pressure, psi | Average velocity of injection, ft/sec 0.00 | Kinematic viscosity, cSt | Maximum Flow Rate, bbl/min 8.33 |
| Depth of gauge, ft | Viscosity of injectate, cp 0.0 | Maximum Injection Rate, gpm 350 | Tubing material |
| Downhole injection pressure, psi | Reynolds Number | Roughness Constant 100 | Total Friction Loss, psi |
| Total Friction Loss, psi | Total Friction Loss, psi #VALUE! | Total Friction Loss, psi NOT APPLICABLE | Friction Loss to Use, psi |
| INFORM | ATION FOR CALCU | | CHANGE |
| Total Volume of Well (tubing and C | | Total Volume of Annulus, gals | 143 |
| Predicted Well Bore Storage, gals/ 0 | | Additional Volume to Increase Pres | |

MI-035-2R-0034 Page A-1 of 1

| | | Minimum Mo Requiren | Minimum Reporting Requirements | |
|---|---------------------|------------------------|--------------------------------------|-----------|
| Characteristic | Limitation | Frequency | Туре | 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 |

OPERATING, MONITORING AND REPORTING REQUIREMENTS

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: $[\{1.112 \text{ psi/ft} - (0.433 \text{ psi/ft})(\text{specific gravity})\} \times \text{depth}] - 14.7 \text{ psi}$. 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 Aş | proval Expire | s 12/31/2018 | | |
| €E | DA | | | United States V | | ental Protectio 1, DC 20460 | n Agency | | | | | |
| VE | F74 | | PLU | GGING AN | | | MENT PL | AN | | | | |
| Vame 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 | | | | | | | |
| 1.00 | ate Well and O | utilizz Uziti za | | State | | 1 | County | | Permit | Number | 1. Nov. 4 14. (4. 4 14.) | |
| | tion Plat - 640 A | | | Michig | | -the mention | Clare | | 59345 | | and the second second | |
| | | N | | and the second second | | Description | | | | 202121 | | |
| | | | | | and the second s | | of <u>NW</u> 1/4 of | | | | and the second second second | |
| W | | | | Surface Location | n 490 ft, fi 26ft, from (i | m (N/S) <u>N</u> | om nearest lin Line of quarte e of quarter se ION | r section | | drilling unit | | |
| <i></i> | | | | | lividual Pe ea Permit Ile er of Wells | | | | ISS ISS Brine Dispos: Enhanced Re Hydrocarbon ISS | covery | | |
| | | S | | Lease N | Holc | omb | | Well Nur | umber 1-22 | | | |
| | CA | SING AND TU | BING RECORD | AFTER PLUGGI | in the second second | | METH | | LACEMENT O | F CEMENT P | UGS | |
| SIZE | WT (LB/FT) | | N WELL (FT) | TO BE LEFT IN | | HOLE SIZ | | e Balance N | | | | |
| 9 5/8" 7" 4.5" | 36 23 11.6" | | | 792' 1432' 2037' | | 12 1/4" 8 3/4" 6 1/8" | Th | ie Dump Bai ie Two-Plug her | ler Method | | | |
| | CEMENTING | TO PLUG AN | DABANDON DA | TA: | PLUG # | 1 PLUG # | 2 PLUG #3 | PLUG #4 | PLUG #5 | PLUG #6 | PLUG #7 | |
| ize of H | lole or Pipe in t | | | | 4.5" | 4.5", 7" | 7", 8 3/4" | 9 5/8" | 1 | 1 100 10 | | |
| | Bottom of Tub | | | | 4898' | 3214 | 2700' | 892' | 1 E | and the second s | | |
| | Cement To Be | | | | 5 | 35 | 65 | 335 | - | | | |
| | olume To Be Pu | | | | 5.90 | 41.30 | 76.70 | 395.30 | [| Contraction of the | laure course | |
| _ | ed Top of Plug d Top of Plug (i | | | | 4848' C.I.B.P | 3014' | 2500' | Surface | - | | 1 | |
| | t. (Lb./Gal.) | | | | 15.6 | 15.6 | 15.6 | 15.6 | A Contract of the State | | Contractor and | |
| | nent or Other N | laterial (Class | 111) | and the second second | Class A | and an and a second sec | Class A | Class A | | 1 | 1 | |
| | LIS | T ALL OPEN | HOLE AND/OR | PERFORATED IN | | - | and the second | - | E VARIED (if | any) | | |
| | From | | | То | | | From | | | То | | |
| 4948' | | | 4954' | e voetkonde die nie No ween onernoording | | 3164' | a for a strong strong a strong st | | Assumed Fr | ee Point for | 4.5" | |
| 4966' | | ente del Sector del | 4976' | | } | 2650' | | | Calculated I | Free Point fo | or 7" | |
| 4990' | | | 5000' | | | | | in the second | | | | |
| 5004' stimate \$27,80 | d Cost to Plug 0 | Wells | 5010' | | | herioan an a | | | | | | |
| | | | | | Certific | cation | | | | | | |
| at In | achments and | that, based o e, accurate, a | n my inquiry o and complete. | ersonally examin f these individua I am aware that 0 CFR 144.32) | is immedia | ately respons | ble for obtaini | ing the info | mation, beli | eve that the | | |
| | d Official Title | (Please type | or print) | SI | gnature | | | | | Date Signer | 1 | |
| Name and Official Title (Please type or print) Signate William C. Myler, Jr., President / | | | | | 3 0 | 4 | 1 | 17 | | 1-1 | 10 | |
| | n C. Myler, Jr. | , President | | 14 6 | 1 | rll | - Mri | 10 7 | | 8/8/ | 16 | |





Muskegon Development Company

Financial Report December 31, 2015

AUG 1 1 2013





| Class Permit Type | 2R Individual Permit | Add Rev | view | | | ner mer nær hen se beser beser Te | |
|----------------------|---------------------------|---------|----------|------|--|--------------------------------------|--|
| | ate 8/11/2016 12:00:00 AM | | | | e presidente de la constant de la constant | | |
| | | | | | | | |
| Monitoring | | Tests | | | 10-01-13- | | |
| Monitoring | | Tests | Category | Туре | Date | Result | |

| Inspections | | | | Violations | |
|----------------|------|------|-----|---------------|----------------|
| | Туре | Date | .a. | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | 'W' | | |
| Add Inspection | | | | Add Violation | Add Enforcemen |

Report History

Add Report

mines, wells, and known faults)

Add Test

A. Area of Review Methods
What is the AOR based on?
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
Yes v

| that depict the facility and each of its waste treatment, storage, or disposa facility are injected; and those wells, drinking water wells listed in the pub | al facilities; each well wher , springs, and other surface | ictures, hazardous e fluids from the e water bodies and | <u>No</u> |
|---|---|---|----------------|
| Is there a list of all of the land owner | rs within the AOR? | | Yes 🔻 |
| Surface elevation of the wellsite | | | 933 |
| The elevation is based on | | | Ground level V |
| 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 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 | | |

| an para serengan da kara | Injection Interval | Confining Zone | Bleed Off Zone |
|--------------------------|---------------------|-----------------------|----------------|
| Formation Name | Detroit River Group | Detroit River Group 🗳 | 8 |
| Lithology | Dolomite | Anhydrite | <u> </u> |
| 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?

Were the presence and extent of natural or induced fractures in the injection and confining zones adequately investigated?

4484 No **v**

Save Cancel

| H. Operating Data | |
|---|--|
| The injectate is | liquid 🔻 |
| Injection Rate Unit | Select |
| Method used to determine maximum injection pressure | Fracture Gradient equation V |
| | 100 Characters Le |
| 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 V |
| 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 🔻 |
| | Fresh Water with Corrosion Inhibitors 🔻 |
| What is the composition of the annulus fluid | an a |
| | |
| | Save Cancel |
| | |
| I. Formation Testing (for new wells only) | Rosental & Robert & De |
| Does the formation testing proposed meet CFR 146.12 (d) and (e) [for non-haz] or 146.32(b) [Class III]? | 146.66 [for haz] or Yes V |
| Are there adequate procedures for acquiring formation pressures above the injection | on interval? Yes 🔻 |
| Are there adequate sampling and analysis procedures for the injection zone? | Yes 🔻 |
| | Summing and the second se |
| Proposed method for determining fracture gradient Save Cancel | Nearby well acid frac |
| Coave Coalicel | - |
| J. Stimulation Program | |
| Is a stimulation proposed | Yes 🔻 |
| | The second se |
| 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 🔻 |

| te stere e Frence Frence en | |
|--|--|
| 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? | control of the second |
| The shut-off system will be | Automatic 🔻 |
| What are the shut-off thresholds? | low or high pressure |
| Save Cancel | |

Save Cancel

M. Construction Details

| | Pipe/ | Hole set | | | | C | emented |
|--|--------------------------|--|------------------|--|---------------------------|--|-------------------|
| | From top (ft) | To base(ft) | Pipe Size(in) | Hole Size(in) | Number of sacks of cement | From top | o(ft) To base(ft) |
| Conductor | • (hour company company) | | | and devident on the second sec | - Counter-ord management | | |
| 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 | | Parlameter contraction to more an Contraction contraction and | | | | A second s | |
| Perforated Section | 4948 | 5010 | | | | | |
| Open Hole | 5201 | | | The second secon | | | |
| Packer depth | | 4898 | | | | | |
| Tail Pipe depth | | and all and a second second | | | | | |
| What is the plug back total dep | oth? | 5201 | | | | | |
| What is the total depth of the v | vell? | 5201 | Sugar | | | | |
| Is the packer set 100 ft or less injection zone? | above the | No | | | | | |
| Tubing material | | | Y | | | | |
| Tubing size | | the construction of the first of the second se | | | | | |

O. Plans for well failure

Is the contingency plan adequate? What actions are proposed if MI is lost? Yes V Shut in well, inspect

Save Cancel

| P. Monitoring Program | | |
|---|-----------------|-----------|
| Where is the sample located? | At the well hea | ıd |
| Is there an adequate description of source(s) of waste? Is there a representative of waste analysis? | | V |
| What are the sampling parameters? What's the frequency of physical and chemical monitoring? What's the frequency of monitoring reports? | Select | |
| Save Cancel | | |
| Q. Plugging and Abandonment Plan | | |
| How many plugs will be used to plug the well? Signed estimate of plugging and abandonment costs (and post-closure costs, if applicabl an independent firm | e) by | 7 No 🔻 |
| Estimated Plugging Cost | 27800 | |

Date the plan was signed

Date of 3rd Party Plugging Cost Estimate

| | 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 Plua | | na na mangang kang pang pang kanang mang pang pang pang pang pang pang pang p | alations constant manufacture | | na shinonarar, Kubura afundishin | |

8/8/2016

| R. Necessary Resources | | And the second | |
|---|---------------------------------------|--|----------------|
| Available Mechanisms | Selected Mechanisms | un version a | |
| Trust agreement Add -> | Test1 Class2 | | ALC: UNK |
| Test1 Class2 Add -> Test2 Class2 <- Remove | | | |
| Surety performance bond | | | |
| | | | |
| Edit Mechanisms | | | |
| S. Aquifer Exemptions | | The second second | |
| Is the company asking for an aquifer exemption? | | N | 7 |
| Aguifer Name | | None | 1 |
| Save Cancel | | | and the second |
| | | | |
| T. Existing Permits | | | |
| List Existing permits and permit numbers | | Over 350 existing UIC pern | nit |
| List outstanding permit applications | | MI-129-2R-0042 | |
| Save Cancel | | | |
| | | | |
| U. Description of Business | Contraction States | | |
| Business description | Muskegon Development | | |
| | a Michigan Corporatio | |] |
| | dedicated to the exp. | 86 Characters l | _eft |
| Save Cancel | | | |
| | | | |
| V. Compliance with other Federal Acts | | | n Desi |
| Any designated wild and scenic rivers within the AOR | ? | No 🔻 | |
| If so, what are they? | | a summing a second s | |
| Has the permit writer evaluated whether there are end | langered 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, K | Girtl |
| Will the permit need an ESA Clause? | | No 🔻 | |
| Was the Historic Preservation Office contacted? | | Yes 🔻 | |
| Are there historic resources present? | | No 🔻 | |
| | | and produced and constrained. | |

| Is the well located in a coastal zone? If yes, then has the permit writer contac Does the permit application call for the water body in excess of 10 acres? EJ number Save Cancel | | | No ▼ NA ▼ No ▼ 1ej screen |
|--|-----------------------------------|-----------------|------------------------------------|
| X. Confidentiality Has any part of this permit application | been declared confidential by the | e operator? | No v |
| Save Cancel | | | (|
| Other | | | |
| | Comments | | |
| | | | |
| | 500 0 | Characters Left | |
| | | | |
| Update Cancel | | | |
| | | | |
| Review Completion | | | |
| Reviewer | TONG WILLIAM | | |
| Signature Date Update Cancel | 8/26/2016 | | |
| | | | |

Version: Well Construction 2010-07-30

| CALCULATION | OF CEMEN | IT FILL AND | | LUMES | |
|--------------------------------------|---|---------------------------------------|---|---|-------------|
| Facility Name | USEPA Permit Nur | | State Permit Number | | Well Class |
| Holcomb 1-22 | | 2R-0034 593 | | | 2R |
| Well Name Holcomb 1-22 | State MI | County | are | Analyst Bill | Tong |
| Operator | Township | Range | | Analysis Date | |
| Muskegon Development Company | 19N | 3W | 22 | the second se | er 16, 2016 |
| Geological Information | | | Completion | | |
| Name of Lowermost USDW | and the second se | Plugged Back Tota | and the second se | Actual or Proposed | |
| Glacial Drift | 464 | 5201 Packer Depth, ft | 4948 | act | tual |
| Richfield | 4948 | 4898 | Packer Depth OK? YES | | |
| EVALUA | TION OF W | ELL CONS | TRUCTION | | |
| | | C. | ASING STRIN | IG | |
| | surface | intermediate | long string | | |
| Top of Casing | -0, | 0 | 0 | | |
| Bottom of Casing | 792 | 4082 | 5201 | | |
| Well Bore Diameter | 12.25 | 8.75 | 6.125 | 2.5 | |
| Outside Diameter of Casing | 9.625 | 7 | 4.5 | | |
| Weight per Foot of Casing | 36 | 23 | 11.6 | 50 | |
| 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 | | 1 |
| Cement/Epoxy Used | 500 | 150 | 200 | | |
| Average Yield | 1.18 | 1.18 | 1.18 | | |
| Top of Cement in Annulus | 0 | 3101 | 3091 | 3 | |
| 2nd Stage Cement | | | | | |
| Depth of DV Tool | | | | | |
| Cu Ft to Fill Annulus in Open Hole | and a classified | | | | |
| Cu Ft to Fill Annulus in Cased Hole | | | | | 1 |
| Sacks of Cement Used | | | | | |
| Average Yield | | | | | 1 |
| Top of Cement in Annulus | | 1 | | | |
| 3rd Stage Cement | | Participation and and | | | |
| Depth of DV Tool | | | | CONTRACTOR STATE | |
| Cu Ft to Fill Annulus in Open Hole | | · · · · · · · · · · · · · · · · · · · | | | |
| Cu Ft to Fill Annulus in Cased Hole | | | | | |
| Sacks of Cement Used | | | 1 | | |
| Average Yield | | 1 | | | |
| Top of Cement in Annulus | | | | | |
| Meets Standards for Surface Casing | YES | NO-cement | NO-cement | | |
| Meets Standards for Any Casing | YES | YES | YES | l | |
| Meets Standards for Protection Casil | | NO-casing | YES | | 1 |
| Comments | | | | | 1 |
| Comments in this cell | | | | | |

le



Version: Well Construction 2010-07-30

| 0/0/0040 | Facility Name | Operator | | | |
|-------------------------------------|--------------------|---|------------------|--|--|
| 8/8/2016 Well Name | Holcomb 1-22 | Muskegon Development Company USEPA Permit Number | | | |
| Holcom | ıb 1-22 | MI-035-2R-0034 | 59345 | | |
| County Clare | State MI | 2R | Bill Tong | | |
| Township 19N | Range 3W | Section Da | ate 16-Sep-16 | | |
| Plug 1 Bala | nced on BP | Plug 2 LS F | Rip Point | | |
| Plug Type | Balanced on BP | Plug Type | LS Rip Point | | |
| Depth to BP, ft | 4898 | Depth of Long String Cut Of | 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 s | standards | | |
| Plug 3 Interm | ed Rip Point | Plug 4 Surfa | ace 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 s | standards | | |
| Plu | g 5 | Plug | 6 | | |
| Plug Type | | Plug Type | | | |
| Deep of Dive # | | Dana of Diver # | | | |
| Base of Plug, ft Sacks of Cement | | Base of Plug, ft Sacks of Cement | | | |
| Yield of Cement | | Yield of Cement | | | |
| Top of Cement | | Top of Cement | | | |
| rop of Gement | 5 | | | | |
| Plu | g 7 | Plug | 8 | | |
| Plug Type | | Plug Type | 입기 부분을 바랍니다 | | |
| | | | 和你们的 机合金油 | | |
| 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 | 1 | | |
| Plu | α 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 | | | |
| | | | | | |

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 <u>bennettmyler@muskegondevelopment.com</u> if you have any questions. Thank you.

Sincerley,

Burnt Magen

Bennett Myler, Geologist



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

N



GOVERNOR

STATE OF MICHIGAN 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 <u>no historic properties are affected</u> 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.

www.michigan.gov/shpo * 517.373.1630 * FAX 517.335.0348 * TTY 800.382.4568

Sincerely,

Brian J. Brian G. Grennell

Cultural Resource Management Specialist

for Brian D. Conway State Historic Preservation Officer

SAT:BGG

Copy: Bennett Myler, Muskegon Development Company

RECENE

AUG 0 1 2016

UIC SAMOH

Equal Housing Lender

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 L. Tong

Re: Endangered Species Determination

Eastern massasauga

(Sistrurus catenatus)

rattlesnake

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:

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

Threatened

Lives in shallow wetlands and adjacent uplands; USFWS has

determined that designating

critical habitat for the eastern massasauga is not prudent.

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

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 <u>NO EFFECT</u> on endangered or threatened species.

Endangered Species in Michigan - county distribution

Midwest Endangered Species Home

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Featured Species

Species Information

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Species Lists

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Field Office Contacts

Regional Office Contacts

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Bat Fact of the Day

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

County Distribution of Federally-Listed Endangered and Threatened Species

PDF Version of this page

Michigan

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

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.

ACC

Information about Bald Eagles

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

Gray Wolf

Due to a Federal court decision, <u>gray wolves</u> 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



Endangered Species in Michigan - county distribution

| 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. |
|-------|---|------------|---|
| | <u>Kirtland's warbler</u> (Setophaga kirtlandii) | Endangered | Nests in young stands of jack pine |
| | Eastern massasauga (Sistrurus catenatus) | Threatened | |

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



USFWS: Eastern Massasauga

Midwest Endangered Species Horne

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Bat Fact of the Day

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@fivs.gov, or contact your nearest Service field office to report your observations. See additional information on what to do.

Connect With Us







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 <u>Federal</u> <u>Register on Sept. 30, 2016</u>.

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 D; 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 selfsustaining 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; 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

Page 2 of 4

USFWS: Eastern Massasauga



- H 1 1

Midwest Region

2.1

| | Video |
|---|---|
| Life History and Ecology | from the Michigan DNR |
| Live and Let Live - Oakland County, Michigan Blog | 60-Second Snakes: The Easte |
| Species Spotlight: Eastern Massasauga - USFWS Chicago Field Office | |
| Eastern Massasauga - Michigan Society of Herpetologists | |
| Species Survival Plan | 1 |
| AZA Species Survival Plan - A Species Survival Plan® is a collaborative science-based management program of the Association of Zoos and Aquariums (AZA). | |
| <u>Michigan is Main Focus of Eastern</u> Massasauga Rattlesnake Survival Plan | From the Michigan DNR Natural Features Inventory |
| Lincoln Park Zoo Recovery Efforts | About Massasaugas |
| Conservation and Research Managing for Massasaugas - Edward Lowe | Identification and Look-Alikes |
| Foundation Land Stewardship. 4-page PDF. 2012 | Life History and Ecology |
| Long-term Research on Rattlesnake Life | Safety Tips and Snakebite Treatment |
| History Will Help Managers Plan Habitat Restoration August 7, 2012 | Report an Observation in Michigan |
| Species Action Plan - Pennsylvania Fish and Boa | t Commission (PDF). June 2011 |
| Learning to Live with the Eastern Massasaug Education in Southern Michigan Dec. 31, 2009. 17 | |
| Spotlight Species Action Plan October 2009. 9- | Page PDF |
| | |

Restoring Southeast Michigan's High Diversity Landscapes Through Collaborative <u>Stewardship</u> – 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 <u>A Handbook for Land Managers</u> (PDF 1.2 MB)

Recommended Standard Survey Protocol

Archives

Reptiles Midwest Endangered Species Home

Last updated: January 5, 2017

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MUSKEGON DEVELOPMENT COMPANY

 1425 South Mission Road, Mount Pleasant, Michigan 48858

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

June 13th, 2016

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Sincerley,

Burnt Mafr

Bennett Myler, Geologist

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