

MICHIGAN GROUNDWATER USE ASSOCIATED WITH HIGH VOLUME HYDRAULIC FRACTURING SINCE 2008

Permittee (current permittee)	Well name and number	Wellhead Co/T/R/S	Permit #/App. #	analyzed proposed withdrawal	Water withdrawal tool results	Well completion fluid volumes and dates
2008						
Cimerex	SOPER 1-25 HD1	Oseola (17N 10W 25)	59173/A080523	(NOT A LARGE VOLUME WATER WITHDRAWAL)	NA, 2008 completion	1,838 million gallons slickwater/Aug. 2008
2009						
NO HIGH VOLUME HYDRAULIC FRACTURING WELL COMPLETIONS OCCURRED IN 2009						
2010						
Encana (Marathon)	STATE PIONEER 1-3 HD1	Missaukee (24N 7W 3)	59979/A090305	5 million gallons	Zone A - Passed, 6/22/2011	6.72 million gallons slickwater/Feb. 2010
Encana (Marathon)	STATE KOEHLER & KENDALL 1-27 HD1	Cheboygan (35N 2W 33)	60170/A100212	5 million gallons	Zone B/Cold Transitional - Failed 8/20/2010. SSR cleared by WRD.	3.26 million gallons slickwater/Oct. 2010
Merit	HUBBEL 2-22 HD/HD1	Montmorency (29N 1E 22)	60041/A100042	(NOT A LARGE VOLUME WATER WITHDRAWAL)	NA, 2010 completion	HD/HD1 - 96,000 gallons N2 & 27,000 gallons diluted acid/June 2010
2011						
Merit	HUBBEL 2-22 HD1	Montmorency (29N 1E 22)	60041/ACOW	(NOT A LARGE VOLUME WATER WITHDRAWAL)	NA, 2011 recompletion	HD 1 - 230,000 gallons slickwater/July 2011
Continental (CountryMark)	KELLY ET AL 1-26 HD1	Hillsdale (6S 2W 26)	60212/A100244	3 million gallons	Zone A - Passed, 3/19/2012	228,291 gallons gelled water/Sept. 2011
Encana (Marathon)	STATE EXCELSIOR 1-13 HD1	Kalkaska (27N 6W 24)	60360/A110099	7.2 million gallons	Zone B/Cold transitional - Failed 5/10/2011. SSR cleared by WRD.	5.86 million gallons slickwater/Nov. 2011
Encana (Marathon)	STATE EXCELSIOR 1-25 HD1	Kalkaska (26N 6W 1)	60389/A110139	7.4 million gallons	Zone B/Cold Transitional - Failed 8/1/2011. SSR cleared by WRD.	8.46 million gallons slickwater/Nov. 2011
2012						
Merit	HUBBEL 2-22 HD2	Montmorency (29N 1E 22)	60041/ACOW	(NOT A LARGE VOLUME WATER WITHDRAWAL)	NA, 2012 rework and completion	HD 2 - 147,000 gallons N2 & 18,000 gallons diluted acid/July 2012
Whiting	SCHULTZ 1-36	Sanilac (12N 15E 36)	59112/A080354	<200,000 gallons. (NOT A LARGE VOLUME WITHDRAWAL)	2012 rework	154,600 gallons slickwater/Feb. 2012
Devon	CRONK 1-24 HD1	Gladwin (19N 1W 24)	60380/A110141	7.2 million gallons	Zone B - Passed, 9/16/2011	758,000 gallons/April and May 2012
Devon	WILEY 1-18 HD1	Gladwin (18N 2W 18)	60452/A110199	13.3 million gallons	Zone B/Cold Transitional - Failed 10/5/2011. SSR cleared by WRD.	1.42 million gallons slickwater/May and June 2012
Rosetta	STATE ORANGE & CHRISTENSEN 1-25 HD1	Ionia (6N 6W 21)	60615/A120106	2.1 million gallons (NOT A LARGE VOLUME WITHDRAWAL)	Zone A - Passed 8/3/2012	394,000 gallons diluted acid/May June 2012 & 394,000 gallons slickwater/June 2012
Continental (CountryMark)	MCNAIR ET AL 1-26 HD1	Hillsdale (6S 2W 25)	60537/A110262	385,000 gallons (NOT A LARGE VOLUME WITHDRAWAL)	Zone A - Passed 3/19/2012	350,448 gallons gelled water/August 2012
Encana (Marathon)	STATE EXCELSIOR 2-25 HD1	Kalkaska (26N 6W 1)	60545/A120041	12.6 million gallons/modified to 15 million	Zone B/Cold Transitional - Failed 3/28/2012. SSR cleared by WRD.	12.7 million gallons slickwater/Oct. 2012
Encana (Marathon)	STATE EXCELSIOR 3-25 HD1	Kalkaska (26N 6W 1)	60546/A120044	16.8 million gallons/modified to 20 million	Zone B/Cold Transitional - Failed 3/28/2012. SSR cleared by WRD.	21.2 million gallons slickwater/Oct. 2012
Devon	STATE RICHFIELD 1-34 HD1	Roscommon (22N 1W 27)	60560/A120052	7.2 million gallons	Zone A - Passed 4/13/2012 and 10/11/2012	4.8 million gallons slickwater/Nov 2012
Encana (Marathon)	STATE GARFIELD 1-25 HD1	Kalkaska (25N 6W 36)	60579/A120079	10.5 million gallons/ modified to 15 million	Zone A - Passed 6/7/12	12.5 million gallons slickwater/Dec. 2012
2013						
Alta	RILEY 1-22 HD1	Oceana (15N 18W 22)	60575/A120072	214,000 gallons (NOT A LARGE VOLUME WITHDRAWAL)	Zone A - Passed 12/12/12	844,937 gallons N2/Dec. 2012 & 93,000 gallons diluted acid/May 2013
Encana (Chevron)	WESTERMAN 1-32 HD1	Kalkaska (28N 8W 29)	60601/A120095	8.4 million gallons/modified to 25.2 million gallons	Zone A - Passed 7/11/12	12,718,500 gallons water used during fracturing completion/May and June 2013.
Encana (Marathon)	STATE BEAVER CREEK 1-23 HD1	Crawford (25N 4W 11)	60621/A120124	14.7 million gallons	Zone A - Passed 8/21/12	15,810,735 gallons water used during fracturing completion/May 2013
Jordan	STATE JEROME & STARNES 15-8 HD1	Midland (8N 1W 8)	60718/A130024	(NOT A LARGE VOLUME WITHDRAWAL)	NA	294,747 gallons water and 6,000 gallons diluted acid/October 2013
Tiger	STATE GARFIELD & TIGER 1-14	Kalkaska (25N 6W 14)	54696/ACOWS PB	Rework for HVHF	NA	210,000 gallons slickwater/Oct. 2013
Whiting	WALKER 11-25 HD1	Sanilac (12N 15 E 25)	60809/A130124	1 million gallons (NOT A LARGE VOLUME WITHDRAWAL)	Zone A - Passed 7/11/2013	2,544,121 gallons water and 40,000 gallons 15% Fe Acid/December 2013
2014						
Union	MERTEN 1-24 HD1	Oceana (15N 17W 22)	60788/A130103	3 million gallons	Zone A/Cold Stream - Passed 6/26/2013	156,000 gal. water and 2,436 gal 15% HCL/February 2014. 41,538 gal 10.4# Brine and 529 gal 15% HCL/November 2014
Geosouthern	SHERWOOD 1-22 HD1	Livingston (4N 3E 23)	60811/A130128	3 million gallons	Zone A - Passed 7/17/2013	258,132 gallons gel water, brine, and fresh water/May-June 2014
Whiting	VAN DAMME 41-4 HD1	Sanilac (9N 13E 9)	60955/A140057	2,800,000 gallons (NOT A LARGE VOLUME WITHDRAWAL)	Zone A Proceed (OOGM - 5/8/2014)	750 gal 28% Fe Acid, 10,500 gal 15% Fe Acid, 144,559 gal water, and 246,706 gal Q Foam/Oct - Nov 2014
Merit	USA BIG CREEK 3-16	OSCODA (25N 2E 16)	53588/ACOWS	Rework for HVHF (906,000 gallons) (NOT A LARGE VOLUME WITHDRAWAL)	NA - Zone A Proceed (OOGM 10/3/2014)	841,302 gallons slickwater and 2,142 gal 15% HCL/October 2014
O.I.L. Energy	USA MERRILL 1-18A	NEWAYGO (15N 13W 18)	60859/A130196	99,600 gallons (NOT A LARGE VOLUME WITHDRAWAL)	NA	114,618 gallons water used during hydraulic fracturing /October 2014
2015						
HSE MI	SMITH 1-26	Saginaw (9N 2E 28)	61061/A140181	No water use proposed in well completion (NOT A LARGE VOLUME WITHDRAWAL)	NA	No water used in HF. 188,034 gallons mineral oil/butane and 4,477 bbls propane gas/February 2015
HSE MI	VONDRUSKA 1-24	Gratiot (9N 1W 24)	61072/A140200	No water use proposed in well completion (NOT A LARGE VOLUME WITHDRAWAL)	NA	No water used in HF. 179,454 gallons mineral oil/butane and 3,797 bbls propane gas/March 2015
Marathon	STATE BEAVER CREEK 1-14 HD1	Crawford (25N 4W 11)	61130/A150072	1.82 million gallons (NOT A LARGE VOLUME WITHDRAWAL)	NA	1.64 million gallons water/November 2015
2016						
Marathon	SCHLABACH 1-7 HD1	Clare (17N 3W 18)	61154/A150077	1.82 million gallons (NOT A LARGE VOLUME WITHDRAWAL)	NA	947,778 gal water and 20,000 gal acid/February 2016
Interstate Explorations	ROOT 1-15	Eaton (4N 5W 15)	61176/ACOWS	Rework for HVHF (575,000 gal water) (NOT A LARGE VOLUME WITHDRAWAL)	NA	449,970 gallons total treated water, cross link, gelled 28%NeFe acid, 15% HCl acid/July & August 2016
Interstate Explorations	ROLL 2-28	Eaton (4N 5W 28)	61180/ACOWS	Rework for HVHF (504,000 gal water) (NOT A LARGE VOLUME WITHDRAWAL)	NA	637,896 gallons total treated water, cross link, 15% HCl acid/November 2016
Interstate Explorations	BURK 1-30	Eaton (4N 5W 30)	61184/ACOWS	Rework for HVHF (756,000 gal water) (NOT A LARGE VOLUME WITHDRAWAL)	NA	938,154 gallons total treated water, cross link, 15% HCl acid/November 2016
2017						
NO HIGH VOLUME HYDRAULIC FRACTURING WELL COMPLETIONS OCCURRED IN 2017						
2018						
NO HIGH VOLUME HYDRAULIC FRACTURING WELL COMPLETIONS OCCURRED OR PROPOSED IN 2018						
2019						
NO HIGH VOLUME HYDRAULIC FRACTURING WELL COMPLETIONS OCCURRED OR PROPOSED IN 2019						