Robin L. Simmons
Regional Land Manager

February 11, 2019

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Oklahoma Water Resources Board

Oklahoma Water Resources Board
3800 N. Classen Boulevard
Oklahoma City, OK 73118
Attn: Mr. Matt Cogburn

Re: Martin Marietta/TXI Mill Creek Limestone Quarry Monitoring Report Q4 and Annual 2018

Dear Mr. Cogburn:

Attached please find the Q4 and Annual 2018 Monitoring Report for Martin Marietta/TXI's Mill Creek Limestone quarry. The report is summarized on the table labeled Appendix C. Supporting data is also included.

This report shows an update to the data for all four quarters in line 8 of Attachment 1 (Appendix C). The "Vol. of pit groundwater that is carried away with the mined material transp. Off of the mine site" was miscalculated because the amount of water calculated and reported on the Moisture Content Summary page was not transferred into the calculation spreadsheet.

We also discovered that we underreported augmentation to our recharge basin. That formula has been corrected and that correction shows in this report.

These numbers have been corrected for the year in this report and updates of Attachment 1 (Appendix C) for each previous quarter in 2018 will be submitted to OWRB.

Please call if you have any questions or comments.

Sincerely,

Robin L. Simmons

Robin L. Simmons
Regional Land Manager

North Texas/Oklahoma District
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ATTACHMENT 1 (Appendix C)

Martin Marietta (TXI) Mill Creek 2018

Appendix C . Consumptive use of Pitwater

			Q1 2018	Q2 2018	Q3 2018	Q4 2018	2018 Total
	PIT GROUNDWATER VOLUME						
1	Total volume pumped from producing mine pit(s) (AC-FT)		472.23	594.35	487.27	648.67	2202.52
2	Volume of precipitation that falls onto the surface of producing Mine Pits (AC-FT)		109.54	89.47	186.63	219.00	604.65
3	Portion of total precipitation that flows over the land surface that drains into the mine pit water (AC-FT)		68.44	26.73	76.56	96.64	268.36
4	**(WATER HELD IN PIT FROM PREVIOUS MONTHS) other non pit waters pumped from the producing mining pit (AC-FT)**						0.00
5	add lines 2 through 4		177.98	116.20	263.19	315.64	873.01
6	**Pit Groundwater Volume (AC-FT)** (line 1 minus Line 5)		**294.25**	**478.15**	**224.08**	**333.03**	**1329.50**
	DEFINED ELEMENTS OF CONSUMPTIVE USE						
7	Vol. of pit groundwater that is driven off (by drying) the mined material transp. off of the mine site (AC-FT)		0.00	0.00	0.00	0.00	0.00
8	Vol. of pit groundwater that is carried away with the the mined material transp. off of the mine site (AC-FT)		1.73	4.10	2.66	3.65	12.14
9	Vol. of pit groundwater that evaporates from producing mine pits, process ponds and lined ponds (excluding structures used for augmentation) (AC-FT)		1.15	3.99	2.74	4.15	12.03
10	Volume of pit groundwater that is used for other beneficial uses off of the mine site (AC-FT) (includes on-site dust control)		8.69	35.42	9.27	6.28	59.66
11	**DEFINED ELEMENTS OF CONSUMPTIVE USE** of Pit groundwater (AC-FT) (add lines 7 through 10)		**11.58**	**43.50**	**14.67**	**14.07**	**83.83**
	PIT GROUNDWATER BALANCE						
12	Lines 6 minus 11		282.67	434.65	209.40	318.95	1245.67
13	**Groundwater Augmentation** Volume of pit water returned to GW Basin or subbasin. (Troy Recharge AC-FT)	**Credits**	272.71	623.02	666.97	99.29	1661.99
14	**Stream Augmentation** volume of pit water discharged to a definite Stream, during flow conditions that are less than or equal to the accepted exceedance level (AC-FT)		179.20	0.00	0.00	0.00	179.20
15	**PPT and Runoff** Volume of Precipitation and surface runoff into a recharge pit or holding pond (AC-FT)		106.38	68.95	162.33	195.17	532.83
16	**Recycled Pit Groundwater** - Volume of ground water returned to the mine pit or holding basin (AC-FT)		173.21	364.78	213.49	211.69	963.18
17	**Other Non-Consumptive GW Losses** Including pit GW returned to the land surface from which surface runoff flows into a mine pit and other losses (AC-FT)		0.00	0.00	0.00	0.00	0.00
18	add lines 13 through 17		731.50	1056.76	1042.79	506.15	3337.19
19	**OTHER CONSUMPTIVE USE** Line 12 minus Line 18		-448.83	-622.11	-833.38	-187.20	-2091.52
	TOTAL REPORTED CONSUMPTIVE USE (AC-FT)						
	TOTAL NET CONSUMPTIVE USE (AC-FT) Line 11 plus line 19		-437.25	-578.61	-818.71	-173.12	-2007.69

RESULTS FROM RUNOFF MODELLING

2018	PPT.	Quarry Monthly Totals				FW Pond Monthly Totals		Re-cycle Recharge (Troy) Monthly Totals		TXI-Mill Creek Totals	
		Sump Direct ppt	In-Quarry Runoff	Runoff from beyond Quarry	Quarry Totals	Direct ppt	Runoff	Direct ppt	Runoff	Direct ppt	Runoff
	Inches	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
January	0.25	0.004	0.175	0.000	0.18	0.39	0.00	0.82	0.00	1.22	0.17
February	7.50	0.125	93.183	48.293	141.60	11.69	53.63	24.69	69.73	36.50	264.83
March	2.28	0.038	16.020	4.087	20.14	3.55	1.54	7.51	3.64	11.10	25.29
Q1 Subtotal		**0.17**	**109.38**	**52.38**	**161.92**	**15.63**	**55.17**	**33.02**	**73.37**	**48.81**	**290.29**
April	3.46	0.058	22.332	3.975	26.36	5.39	0.28	11.39	2.13	16.84	28.72
May	5.98	0.100	55.732	21.603	77.43	9.32	19.94	19.68	27.58	29.10	124.85
June	2.37	0.040	11.209	1.154	12.40	3.69	0.02	7.80	0.37	11.53	12.75
Q2 Subtotal	**11.81**	**0.20**	**89.27**	**26.73**	**116.20**	**18.40**	**20.24**	**38.87**	**30.08**	**57.48**	**166.32**
July	2.16	0.04	10.55	1.53	12.12	3.37	0.11	7.11	0.80	10.51	13.00
August	3.62	0.06	36.69	14.47	51.22	5.64	13.80	11.92	18.65	17.62	83.61
September	12.07	25.15	114.14	60.56	199.85	18.81	64.67	39.73	84.12	83.69	323.49
Q3 Subtotal	**17.85**	**25.24**	**161.39**	**76.56**	**263.19**	**27.82**	**78.58**	**58.76**	**103.57**	**111.81**	**420.10**
October	11.13	23.19	111.62	172.05	306.85	17.34	61.80	36.64	83.03	77.17	428.50
November	0.85	1.77	2.19	2.35	6.31	1.32	0.00	2.80	0.03	5.89	4.57
December	6.79	14.15	66.09	102.14	182.37	10.58	39.08	22.35	50.32	47.08	257.62
Q4 Subtotal	**18.77**	**39.10**	**179.90**	**276.54**	**495.54**	**29.25**	**100.87**	**61.78**	**133.38**	**130.14**	**690.69**
ANNUAL TOTALS	**48.43**	**64.71**	**539.93**	**432.21**	**1036.85**	**91.10**	**254.86**	**192.43**	**340.40**	**348.24**	**1567.40**

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Water Volume Movements		December	January	February	March	April	May	June	July	August	Septembe	October	November	December
Pumped from Pit	(Ac-Ft)	132.9	103.4	160.8	208.0	155.0	220.0	219.4	133.2	170.3	183.8	218.2	218.8	211.7
Groundwater Component of Pitwater		118.8	103.2	19.2	187.9	128.6	142.6	207.0	121.1	119.1	34.0	22.9	214.7	95.4
Quarry dust suppression		4.0	2.8	3.4	5.4	4.9	8.5	9.3	5.3	5.2	2.5	2.3	4.8	2.9
Q- freshwater pond	(Ac-Ft)	0.0	18.7	60.1	202.6	150.1	211.5	210.1	127.9	165.1	181.3	215.8	214.0	208.8
To Secondary FM7	(Ac-Ft)	402.0	389.1	432.3	598.6	463.0	584.8	554.2	431.4	530.8	565.2	533.9	328.3	379.3
To sand Plant FM8	(Ac-Ft)	102.8	96.3	89.3	123.0	86.2	116.6	110.8	87.5	101.9	146.7	130.4	61.4	73.6
to loadout FM6	(Ac-Ft)	271.2	247.9	284.1	370.7	274.3	190.2	201.9	332.6	384.2	353.8	354.1	238.7	265.4
to dust control FM9	(Ac-Ft)	5.0	72.8	-116.8	0.0	117.0	1.4	1.6	1.3	1.0	0.7	0.1	0.0	0.0
to Plant FM7+FM8+FM6	(Ac-Ft)	776.0	733.4	805.8	1092.4	823.6	891.7	866.8	851.5	1016.9	1065.7	1018.4	628.4	718.3
to stream Augmentation	Ac-ft	128.90	81.93	97.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
To Troy FM3	(Ac-Ft)	869.1	811.6	829.1	1200.7	893.8	1154.3	1139.9	888.0	1058.6	1116.6	1067.5	630.9	727.8
From Troy to Freshwater Pond FM4	+	853.3	833.4	733.4	975.5	720.2	888.0	939.9	736.4	876.3	863.8	717.7	436.9	521.3

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Quarter Summary	4th QTR
Total Tons Shipped	1,120,000
Total Acre Feet	24.11
Average Moisture %	2.93%

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#
# Additional info: https://help.waterdata.usgs.gov/policies/provisional-data-statement
#
# File-format description:  https://help.waterdata.usgs.gov/faq/about-tab-delimited-output
# Automated-retrieval info: https://help.waterdata.usgs.gov/faq/automated-retrievals
#
# Contact:   gs-w_support_nwisweb@usgs.gov
# retrieved: 2019-02-11 15:04:28 EST       (nadww01)
#
# Data for the following 1 site(s) are contained in this file
#    USGS 07331200 Mill Creek near Mill Creek, OK
# ------------------------------------------------------------------------------------
#
# Data provided for site 07331200
#            TS   parameter     statistic     Description
#        111780       00060     00003     Discharge, cubic feet per second (Mean)
#
# Data-value qualification codes included in this output:
#     A  Approved for publication -- Processing and review completed.
#     P  Provisional data subject to revision.
#
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USGS    07331200        2018-10-03      37.2    P
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USGS    07331200        2018-10-22      58.2    P
USGS    07331200        2018-10-23      51.2    P
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USGS    07331200        2018-10-25      60.4    P
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USGS    07331200        2018-10-27      41.9    P
USGS    07331200        2018-10-28      36.4    P
USGS    07331200        2018-10-29      35.0    P
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USGS    07331200        2018-10-31      62.0    P
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# Automated-retrieval info: https://help.waterdata.usgs.gov/faq/automated-retrievals
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# Contact:   gs-w_support_nwisweb@usgs.gov
# retrieved: 2019-02-11 15:05:26 EST       (nadww01)
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# Data for the following 1 site(s) are contained in this file
#    USGS 07331200 Mill Creek near Mill Creek, OK
# -------------------------------------------------------------------------------
#
# Data provided for site 07331200
#            TS   parameter     statistic     Description
#        111780       00060     00003     Discharge, cubic feet per second (Mean)
#
# Data-value qualification codes included in this output:
#     P  Provisional data subject to revision.
#
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USGS    07331200        2018-11-03      50.2    P
USGS    07331200        2018-11-04      41.9    P
USGS    07331200        2018-11-05      37.6    P
USGS    07331200        2018-11-06      36.8    P
USGS    07331200        2018-11-07      36.6    P
USGS    07331200        2018-11-08      32.1    P
USGS    07331200        2018-11-09      27.3    P
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USGS    07331200        2018-11-20      13.7    P
USGS    07331200        2018-11-21      13.0    P
USGS    07331200        2018-11-22      12.5    P
USGS    07331200        2018-11-23      12.4    P
USGS    07331200        2018-11-24      11.8    P
USGS    07331200        2018-11-25      13.0    P
USGS    07331200        2018-11-26      12.3    P
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USGS    07331200        2018-11-28      12.4    P
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USGS    07331200        2018-11-30      12.2    P
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# Automated-retrieval info: https://help.waterdata.usgs.gov/faq/automated-retrievals
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# Contact:   gs-w_support_nwisweb@usgs.gov
# retrieved: 2019-02-11 15:06:54 EST       (nadww01)
#
# Data for the following 1 site(s) are contained in this file
#    USGS 07331200 Mill Creek near Mill Creek, OK
# -------------------------------------------------------------------------------
#
# Data provided for site 07331200
#            TS   parameter     statistic     Description
#        111780       00060     00003     Discharge, cubic feet per second (Mean)
#
# Data-value qualification codes included in this output:
#     P  Provisional data subject to revision.
#
agency_cd       site_no datetime        111780_00060_00003      111780_00060_00003_cd
5s      15s     20d     14n     10s
USGS    07331200        2018-12-01      12.0    P
USGS    07331200        2018-12-02      10.7    P
USGS    07331200        2018-12-03      8.88    P
USGS    07331200        2018-12-04      7.85    P
USGS    07331200        2018-12-05      7.70    P
USGS    07331200        2018-12-06      7.90    P
USGS    07331200        2018-12-07      7.56    P
USGS    07331200        2018-12-08      12.2    P
USGS    07331200        2018-12-09      13.2    P
USGS    07331200        2018-12-10      10.7    P
USGS    07331200        2018-12-11      9.71    P
USGS    07331200        2018-12-12      11.0    P
USGS    07331200        2018-12-13      309     P
USGS    07331200        2018-12-14      610     P
USGS    07331200        2018-12-15      160     P
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USGS    07331200        2018-12-22      54.6    P
USGS    07331200        2018-12-23      46.2    P
USGS    07331200        2018-12-24      38.3    P
USGS    07331200        2018-12-25      35.4    P
USGS    07331200        2018-12-26      62.3    P
USGS    07331200        2018-12-27      195     P
USGS    07331200        2018-12-28      92.4    P
USGS    07331200        2018-12-29      61.3    P
USGS    07331200        2018-12-30      47.5    P
USGS    07331200        2018-12-31      166     P
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Date	Daily Rainfall Total	Total Daily Evaporation
10/1/2018	0.00 "	0.117 "
10/2/2018	0.00 "	0.104 "
10/3/2018	0.00 "	0.241 "
10/4/2018	0.00 "	0.191 "
10/5/2018	0.00 "	0.253 "
10/6/2018	2.34 "	0.143 "
10/7/2018	2.08 "	1.182 "
10/8/2018	0.02 "	0.121 "
10/9/2018	1.34 "	1.221 "
10/10/2018	0.00 "	0.205 "
10/11/2018	0.00 "	0.158 "
10/12/2018	0.65 "	0.433 "
10/13/2018	1.51 "	0.572 "
10/14/2018	0.72 "	0.723 "
10/15/2018	0.67 "	0.458 "
10/16/2018	0.01 "	0.055 "
10/17/2018	0.00 "	0.073 "
10/18/2018	0.01 "	0.073 "
10/19/2018	0.37 "	0.225 "
10/20/2018	0.01 "	0.148 "
10/21/2018	0.00 "	0.157 "
10/22/2018	0.00 "	0.115 "
10/23/2018	0.00 "	0.140 "
10/24/2018	0.40 "	0.156 "
10/25/2018	0.06 "	0.052 "
10/26/2018	0.00 "	0.010 "
10/27/2018	0.00 "	0.172 "
10/28/2018	0.00 "	0.214 "
10/29/2018	0.00 "	0.191 "
10/30/2018	0.00 "	0.158 "
10/31/2018	0.94 "	0.437 "

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Date	Daily Rainfall Total	Total Daily Evaporation
11/1/2018	0.00 "	0.137 "
11/2/2018	0.00 "	0.150 "
11/3/2018	0.55 "	0.262 "
11/4/2018	0.00 "	0.170 "
11/5/2018	0.00 "	0.155 "
11/6/2018	0.00 "	0.219 "
11/7/2018	0.01 "	0.130 "
11/8/2018	0.00 "	0.096 "
11/9/2018	0.00 "	0.100 "
11/10/2018	0.00 "	0.099 "
11/11/2018	0.00 "	0.097 "
11/12/2018	0.13 "	0.082 "
11/13/2018	0.00 "	0.010 "
11/14/2018	0.00 "	0.076 "
11/15/2018	0.00 "	0.166 "
11/16/2018	0.00 "	0.128 "
11/17/2018	0.00 "	0.162 "
11/18/2018	0.00 "	0.072 "
11/19/2018	0.00 "	0.061 "
11/20/2018	0.00 "	0.026 "
11/21/2018	0.00 "	0.004 "
11/22/2018	0.00 "	0.007 "
11/23/2018	0.00 "	0.007 "
11/24/2018	0.00 "	0.008 "
11/25/2018	0.00 "	0.010 "
11/26/2018	0.00 "	0.006 "
11/27/2018	0.00 "	0.008 "
11/28/2018	0.00 "	0.004 "
11/29/2018	0.00 "	0.005 "
11/30/2018	0.16 "	0.162 "

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Date	Daily Rainfall Total	Total Daily Evaporation
12/1/2018	0.00 "	0.007 "
12/2/2018	0.00 "	0.003 "
12/3/2018	0.00 "	0.005 "
12/4/2018	0.00 "	0.008 "
12/5/2018	0.00 "	0.006 "
12/6/2018	0.01 "	0.012 "
12/7/2018	0.08 "	0.083 "
12/8/2018	0.50 "	0.499 "
12/9/2018	0.00 "	0.004 "
12/10/2018	0.00 "	0.005 "
12/11/2018	0.00 "	0.004 "
12/12/2018	0.00 "	0.007 "
12/13/2018	3.48 "	0.929 "
12/14/2018	0.63 "	0.635 "
12/15/2018	0.00 "	0.005 "
12/16/2018	0.00 "	0.004 "
12/17/2018	0.00 "	0.006 "
12/18/2018	0.00 "	0.009 "
12/19/2018	0.02 "	0.021 "
12/20/2018	0.00 "	0.008 "
12/21/2018	0.00 "	0.005 "
12/22/2018	0.00 "	0.004 "
12/23/2018	0.00 "	0.004 "
12/24/2018	0.00 "	0.007 "
12/25/2018	0.08 "	0.081 "
12/26/2018	1.14 "	0.540 "
12/27/2018	0.10 "	0.105 "
12/28/2018	0.00 "	0.005 "
12/29/2018	0.00 "	0.001 "
12/30/2018	0.20 "	0.201 "
12/31/2018	0.55 "	0.344 "

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MESONET CLIMATOLOGICAL DATA SUMMARY
(TISH) Tishomingo
Latitude: 34-19-57

October 2018
Nearest City: 6.0 N Tishomingo
Longitude: 96-40-44

Time Zone: Midnight-Midnight CST
County: Johnston
Elevation: 879 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	84	69	74.1	69.6	0	11	100	63	87	0.01	29.18	30.12	SSE	6.5	19.5	13.79	75.4	75.7	82	72
2	83	66	72.7	69.3	0	9	100	69	90	0.01	29.15	30.09	SSE	5.8	16.6	11.26	75.3	74.5	80	70
3	88	68	76.9	69.9	0	13	98	56	81	0.00	29.02	29.96	S	10.3	29.0	19.57	76.2	75.5	82	71
4	89	69	77.4	70.6	0	14	100	56	81	0.00	29.04	29.98	SSE	7.5	20.7	17.13	77.2	76.9	84	71
5	89	67	76.7	69.0	0	13	99	53	79	0.00	29.00	29.94	SSE	8.9	24.5	18.48	76.9	76.0	83	70
6	87	68	77.3	71.3	0	13	100	57	83	3.33	29.00	29.94	S	9.3	26.0	14.39	77.4	77.4	84	74
7	81	66	70.9	69.0	0	8	100	78	94	1.46	28.99	29.93	SE	5.4	34.2	9.44	75.4	75.8	81	72
8	82	69	73.5	70.5	0	10	99	74	91	0.18	28.93	29.87	SE	8.8	25.1	9.38	75.8	76.4	81	73
9	71	63	66.3	65.9	0	2	100	89	99	1.12	28.82	29.76	SSE	7.5	35.4	1.90	73.8	72.5	75	70
10	67	51	59.7	53.1	6	0	100	53	80	0.00	28.99	29.93	NW	7.1	17.5	19.32	72.6	71.1	78	67
11	68*	47*	55.6*	46.6*	7*	0*	92*	45*	74*	0.00*	29.17*	30.11*	NNE*	7.7*	23.0*	NA	69.5*	66.8*	77*	60*
12	60	54	57.5	55.3	8	0	99	77	93	0.67	29.05	29.99	SSE	4.9	18.3	2.69	67.5	65.1	66	64
13	59	52	55.4	54.5	10	0	99	92	97	2.17	28.92	29.86	NE	8.2	21.3	1.67	65.5	62.9	65	61
14	61	42	55.4	54.2	13	0	99	88	96	0.95	28.98	29.92	NNW	6.5	32.8	3.82	65.2	63.1	65	61
15	48	38	42.6	36.7	22	0	95	66	80	0.20	29.33	30.28	N	15.7	33.2	5.16	61.2	55.9	60	54
16	58	43	49.6	38.1	14	0	83	41	65	0.00	29.33	30.28	NNE	9.0	21.7	8.09	60.5	56.6	62	53
17	64	49	55.5	44.3	9	0	95	42	68	0.03	29.42	30.37	NNE	5.6	20.3	7.57	61.6	59.9	64	56
18	65	54	58.2	49.3	5	0	91	50	73	0.00	29.42	30.37	E	5.6	14.8	7.35	62.6	62.3	67	59
19	57	53	55.0	53.6	10	0	99	75	95	0.52	29.25	30.20	S	2.8	9.7	2.76	62.6	61.9	63	61
20	69	47	56.5	50.0	7	0	100	37	82	0.00	29.31	30.25	NNE	5.9	23.0	11.64	62.6	62.7	69	58
21	68	41	53.3	42.3	11	0	97	36	71	0.01	29.34	30.29	N	3.5	11.5	17.65	61.4	61.5	71	54
22	64	40	52.4	45.0	13	0	99	49	78	0.00	29.24	30.19	SSE	3.9	13.6	13.74	60.5	60.6	68	54
23	70	47	56.5	46.5	7	0	97	37	73	0.00	29.26	30.21	ENE	3.6	13.7	15.29	61.6	63.1	72	57
24	57	48	52.7	48.5	13	0	97	70	86	0.30	29.17	30.12	ENE	6.2	18.6	2.94	60.2	59.5	61	58
25	59	48	52.1	50.2	12	0	99	75	94	0.03	28.98	29.92	ENE	4.6	15.3	4.21	60.1	59.1	62	57
26	70	44	55.1	48.8	8	0	99	49	82	0.00	29.00	29.94	NW	5.0	16.7	16.40	60.5	60.0	69	54
27	83	44	61.4	47.5	1	0	99	18	71	0.01	29.03	29.97	NW	3.0	10.5	17.22	61.6	62.8	73	55
28	79	49	62.8	51.0	1	0	99	40	69	0.00	29.11	30.06	NE	5.4	16.2	16.54	62.8	64.6	74	57
29	82	53	65.8	55.0	0	2	93	44	69	0.00	29.06	30.00	SSE	7.2	23.5	15.28	63.6	65.1	74	58
30	79	60	68.9	61.8	0	5	93	63	79	0.00	28.91	29.85	S	11.3	25.6	7.32	65.7	66.3	71	63
31	60	50	53.7	49.1	10	0	97	70	85	1.08	28.94	29.88	N	9.1	23.4	1.30	63.6	61.3	65	58
	71*	53*	61.3*	55.0*	<- Monthly Averages ->						29.11*	30.05*	SSE*	6.8*	35.4*	10.44*	67.0*	66.2*	72*	62*

Temperature - Highest: 89*
Lowest: 38*

Degree Days - Total HDD: 187*
Total CDD: 101*

Rainfall: Monthly Total: 12.08* in.
Greatest 24 Hr: 3.33* in.

Humidity - Highest: 100*
Lowest: 18*

Number of Days With:
Tmax ≥ 90: 0*
Tmax ≤ 32: 0*
Tmin ≤ 32: 0*
Tmin ≤ 0: 0*
Rainfall ≥ 0.01 inch: 17*
Rainfall ≥ 0.10 inch: 11*
Avg Wind Speed ≥ 10 mph: 3*
Max Wind Speed ≥ 30 mph: 4*

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* Denotes incomplete record

Monthly data generated on Monday, December 31, 2018 at 18:46 UTC

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MESONET CLIMATOLOGICAL DATA SUMMARY
(TISH) Tishomingo
Latitude: 34-19-57

November 2018
Nearest City: 6.0 N Tishomingo
Longitude: 96-40-44

Time Zone: Midnight-Midnight CST
County: Johnston
Elevation: 879 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	59	40	50.4	41.2	15	0	98	49	72	0.00	28.98	29.92	NNW	10.1	29.2	13.55	61.3	58.7	65	55
2	70	39	53.3	39.8	11	0	97	29	65	0.00	29.01	29.95	WSW	6.1	21.4	15.05	59.6	57.6	66	51
3	71	44	56.7	47.2	8	0	99	49	73	0.47	28.90	29.83	S	10.1	38.2	10.87	59.3	57.2	62	52
4	61	42	51.2	40.6	13	0	93	40	69	0.00	29.07	30.01	NW	6.2	18.6	15.38	59.6	57.9	66	52
5	74	46	58.4	48.5	5	0	95	42	72	0.00	28.84	29.77	SE	8.1	26.2	13.53	60.0	59.4	67	55
6	75	42	60.2	46.2	6	0	96	31	64	0.00	28.97	29.91	NE	7.2	22.0	15.11	60.0	60.8	69	53
7	61	52	56.7	49.0	9	0	87	57	76	0.00	29.10	30.05	NE	12.3	24.4	5.54	61.2	61.0	63	59
8	55	43	50.5	42.9	16	0	91	58	76	0.08	29.17	30.12	E	8.8	20.7	3.05	59.6	57.8	60	54
9	53	34	42.9	32.9	21	0	91	36	70	0.00	29.41	30.36	N	10.7	24.6	10.75	57.4	53.7	60	50
10	51	24	37.9	20.8	28	0	84	27	53	0.00	29.39	30.34	SE	7.2	15.8	15.14	53.9	49.6	58	42
11	48	42	44.2	34.0	20	0	76	58	67	0.00	29.20	30.15	SE	7.8	20.0	5.42	54.1	51.5	55	49
12	44	28	36.0	31.4	29	0	94	71	84	0.16	29.32	30.27	N	15.5	33.0	2.02	52.5	47.4	51	42
13	39	23	29.1	17.9	34	0	82	38	64	0.00	29.56	30.51	N	11.7	27.5	14.92	49.7	43.5	51	39
14	45*	23*	30.9*	17.8*	31*	0*	89*	28*	63*	0.00*	29.46*	30.41*	N *	6.0*	26.7*	NA	47.6*	42.2*	50*	38*
15	65	22	42.4	28.3	21	0	93	28	63	0.00	29.21	30.16	SSW	6.1	18.7	14.73	47.5	43.8	53	37
16	69	31	49.4	36.5	15	0	98	32	65	0.00	29.12	30.07	S	5.3	16.4	14.51	50.3	48.2	57	41
17	69	40	53.5	39.8	11	0	84	37	62	0.00	29.12	30.07	S	8.4	22.5	14.34	51.7	49.9	57	43
18	43	33	36.3	32.3	27	0	94	78	85	0.00	29.29	30.24	NNW	9.5	22.8	3.05	50.0	45.5	50	42
19	53	27	38.5	29.8	25	0	95	45	73	0.00	29.26	30.21	NW	4.2	15.4	14.07	48.4	45.0	53	38
20	56	30	41.7	30.2	22	0	92	36	67	0.00	29.38	30.33	N	5.0	15.6	14.11	48.6	45.5	54	39
21	60	27	42.9	30.3	22	0	95	32	66	0.00	29.37	30.32	SSE	4.3	12.6	13.95	48.6	45.7	54	39
22	62	29	47.0	35.0	20	0	98	39	66	0.00	29.25	30.20	SSE	6.9	21.6	13.00	49.2	46.6	54	40
23	70	37	55.8	40.9	12	0	89	31	60	0.00	28.85	29.79	SSE	10.5	27.7	10.44	52.1	51.1	57	48
24	76	34	54.8	35.0	10	0	93	18	55	0.00	28.75	29.69	S	10.7	34.3	12.45	51.2	49.0	56	43
25	60	32	47.0	32.1	19	0	69	44	57	0.00	28.92	29.86	NW	16.5	45.3	11.56	51.0	48.2	52	41
26	49	22	33.7	24.0	29	0	93	39	70	0.00	29.32	30.26	NW	6.3	23.9	13.59	46.1	41.6	49	37
27	62	23	41.0	27.0	22	0	95	24	65	0.00	29.15	30.09	NE	4.5	17.1	13.31	46.1	43.1	52	37
28	66	32	48.6	34.9	16	0	90	33	63	0.00	28.89	29.83	S	8.5	27.3	13.01	47.7	45.0	52	38
29	75	46	57.3	46.6	5	0	99	34	71	0.00	28.81	29.75	S	8.8	22.4	13.02	50.6	50.4	58	45
30	70	49	60.6	53.7	5	0	94	66	78	0.26	28.73	29.66	SSE	10.2	47.5	4.75	53.6	53.8	59	48
	60*	35*	47.0*	35.6*	<- Monthly Averages ->						29.13*	30.07*	S *	8.4*	47.5*	11.52*	52.9*	50.3*	57*	45*

Temperature - Highest: 76*
Lowest: 22*

Degree Days - Total HDD: 527*
Total CDD: 0*

Rainfall: Monthly Total: 0.97* in.
Greatest 24 Hr: 0.47* in.

Humidity - Highest: 99*
Lowest: 18*

Number of Days With:
Tmax ≥ 90: 0*
Tmax ≤ 32: 0*
Tmin ≤ 32: 14*
Tmin ≤ 0: 0*
Rainfall ≥ 0.01 inch: 4*
Rainfall ≥ 0.10 inch: 3*
Avg Wind Speed ≥ 10 mph: 10*
Max Wind Speed ≥ 30 mph: 5*

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* Denotes incomplete record

Monthly data generated on Tuesday, January 08, 2019 at 18:45 UTC

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MESONET CLIMATOLOGICAL DATA SUMMARY
(TISH) Tishomingo
Latitude: 34-19-57

December 2018
Nearest City: 6.0 N Tishomingo
Longitude: 96-40-44

Time Zone: Midnight-Midnight CST
County: Johnston
Elevation: 879 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	66	41	55.9	37.3	11	0	82	27	51	0.00	28.55	29.48	WSW	12.5	34.1	13.04	53.7	52.5	57	48
2	55	34	45.3	32.1	21	0	89	41	61	0.00	28.90	29.84	NW	6.6	19.6	12.63	50.3	47.7	54	42
3	47	30	38.4	28.0	27	0	83	47	67	0.00	29.26	30.20	N	10.1	21.7	12.83	48.5	44.9	51	41
4	41	27	32.9	23.8	31	0	88	52	70	0.00	29.41	30.36	NNE	6.5	17.4	9.18	46.1	41.4	47	37
5	50	21	36.8	26.9	29	0	96	42	70	0.00	29.38	30.33	SSE	6.3	21.9	12.82	45.0	41.0	48	36
6	53	44	46.8	39.6	16	0	98	60	77	0.02	29.28	30.23	S	6.9	24.7	2.42	47.5	45.2	48	42
7	44	36	38.8	35.0	25	0	96	80	86	0.18	29.38	30.33	NNE	10.7	22.2	2.50	47.3	44.0	46	42
8	36	33	34.9	33.4	30	0	96	90	94	0.49	29.30	30.25	N	13.2	23.2	1.60	44.6	40.4	42	39
9	48	28	37.7	26.9	27	0	91	33	67	0.00	29.36	30.31	NNW	8.0	19.5	12.12	44.2	41.4	48	38
10	54	24	36.7	25.6	26	0	93	33	69	0.00	29.38	30.33	NW	3.3	11.0	12.49	43.6	41.1	49	36
11	59	24	43.0	31.2	24	0	96	37	67	0.01	29.24	30.19	S	8.8	28.4	10.49	43.8	41.4	47	36
12	59	43	51.5	46.5	14	0	97	64	83	0.00	28.96	29.90	S	8.3	19.0	6.23	47.5	46.9	51	43
13	62	41	51.3	49.7	13	0	99	89	94	3.02	28.79	29.73	N	14.9	42.6	2.44	50.4	51.4	57	47
14	47	40	42.5	38.7	22	0	95	54	87	0.46	29.05	29.99	N	19.2	39.5	2.97	46.5	45.6	47	44
15	60	30	42.5	25.6	20	0	91	24	54	0.00	29.22	30.16	NW	7.4	18.6	12.93	45.0	45.5	52	40
16	59	28	43.1	32.2	21	0	93	39	68	0.00	29.27	30.21	NNW	3.7	12.9	6.95	45.3	44.5	50	41
17	56	36	45.4	37.4	19	0	95	58	74	0.00	29.26	30.21	NNE	4.7	12.6	6.07	45.8	44.2	49	40
18	58	42	47.7	43.4	15	0	100	55	86	0.00	29.11	30.05	SSE	4.8	13.7	8.95	48.3	48.1	53	45
19	54	43	49.1	48.5	17	0	100	82	98	0.04	28.90	29.84	SE	6.2	16.7	2.41	48.9	48.4	51	45
20	56	43	48.9	30.4	16	0	84	29	51	0.00	28.98	29.92	NW	15.1	38.0	12.55	48.0	46.4	50	42
21	57	33	43.9	27.2	20	0	77	25	54	0.00	28.99	29.93	NW	6.5	20.2	12.53	45.7	43.7	52	37
22	60	38	46.9	32.6	16	0	76	40	59	0.00	28.92	29.86	NNW	6.1	16.0	12.08	46.3	45.1	53	39
23	53	33	42.5	31.6	22	0	91	42	67	0.00	29.35	30.29	N	8.4	24.3	12.69	46.0	44.5	51	40
24	57	26	43.1	33.5	24	0	96	45	71	0.00	29.21	30.16	SSE	7.2	25.5	11.65	45.1	43.2	49	37
25	58	34	48.7	47.1	19	0	100	79	94	0.02	29.13	30.08	ENE	5.2	15.9	4.10	46.7	46.1	51	40
26	61	53	57.7	55.7	8	0	99	81	93	0.98	28.93	29.87	ESE	10.7	31.0	1.76	51.8	53.4	55	51
27	59	33	48.0	40.9	19	0	97	55	78	0.15	28.78	29.72	S	11.3	30.7	11.29	51.4	52.3	56	47
28	42	28	33.8	23.9	30	0	87	48	68	0.00	29.20	30.15	N	8.7	21.7	12.30	45.3	44.7	50	41
29	36	27	30.8	22.9	33	0	89	61	73	0.00	29.36	30.31	NNE	8.9	21.6	4.18	42.8	38.9	41	37
30	39	26	33.2	28.7	33	0	99	67	84	0.17	29.09	30.04	SE	3.2	11.0	2.17	41.7	37.8	40	36
31	56	37	43.3	38.2	19	0	100	50	84	0.46	28.88	29.82	SSW	8.0	24.5	10.18	44.3	44.0	51	40
	53	34	43.3	34.7	<- Monthly Averages ->						29.12	30.07	N	8.4	42.6	8.34	46.7	45.0	50	41

Temperature - Highest: 66
Lowest: 21

Degree Days - Total HDD: 665
Total CDD: 0

Rainfall: Monthly Total: 6.00 in.
Greatest 24 Hr: 3.02 in.

Humidity - Highest: 100
Lowest: 24

Number of Days With:
Tmax ≥ 90: 0
Tmax ≤ 32: 0
Tmin ≤ 32: 12
Tmin ≤ 0: 0
Rainfall ≥ 0.01 inch: 12
Rainfall ≥ 0.10 inch: 8
Avg Wind Speed ≥ 10 mph: 9
Max Wind Speed ≥ 30 mph: 6

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* Denotes incomplete record

Monthly data generated on Tuesday, January 08, 2019 at 16:46 UTC

Date	Reference ET, Short [in]	Reference ET, Tall [in]	Cool Season Grass ET [in]	Warm Season Grass ET [in]	Pan Evaporation [in]
2019-01-07	0.09	0.13	0.08	0.06	0.12
2019-01-06	0.07	0.10	0.06	0.04	0.09
2019-01-05	0.06	0.08	0.05	0.04	0.07
2019-01-04	0.06	0.09	0.06	0.04	0.08
2019-01-03	0.02	0.02	0.02	0.01	0.02
2019-01-02	0.02	0.03	0.02	0.01	0.03
2019-01-01	0.05	0.07	0.04	0.03	0.06
2018-12-31	0.06	0.08	0.05	0.04	0.07
2018-12-30	0.02	0.02	0.02	0.01	0.02
2018-12-29	0.04	0.06	0.04	0.02	0.05
2018-12-28	0.05	0.08	0.05	0.03	0.07
2018-12-27	0.06	0.08	0.05	0.04	0.07
2018-12-26	0.03	0.04	0.03	0.02	0.04
2018-12-25	0.02	0.03	0.02	0.01	0.03
2018-12-24	0.06	0.08	0.05	0.03	0.07
2018-12-23	0.06	0.10	0.06	0.04	0.08
2018-12-22	0.07	0.11	0.07	0.04	0.09
2018-12-21	0.07	0.11	0.07	0.04	0.09
2018-12-20	0.12	0.19	0.11	0.07	0.18
2018-12-19	0.02	0.02	0.02	0.01	0.02
2018-12-18	0.04	0.06	0.04	0.03	0.05
2018-12-17	0.04	0.06	0.04	0.03	0.05
2018-12-16	0.04	0.06	0.04	0.03	0.05
2018-12-15	0.09	0.14	0.08	0.05	0.12
2018-12-14	0.04	0.06	0.04	0.03	0.06
2018-12-13	0.04	0.06	0.04	0.03	0.06
2018-12-12	0.04	0.06	0.04	0.03	0.05
2018-12-11	0.08	0.12	0.07	0.05	0.10
2018-12-10	0.04	0.06	0.04	0.03	0.05
2018-12-09	0.06	0.09	0.05	0.04	0.07
2018-12-08	0.02	0.02	0.02	0.01	0.02
2018-12-07	0.04	0.05	0.03	0.02	0.05
2018-12-06	0.05	0.07	0.05	0.03	0.06
2018-12-05	0.05	0.07	0.05	0.03	0.06
2018-12-04	0.04	0.06	0.04	0.03	0.06
2018-12-03	0.06	0.09	0.06	0.04	0.08
2018-12-02	0.06	0.09	0.06	0.04	0.08
2018-12-01	0.12	0.19	0.11	0.08	0.17
2018-11-30	0.07	0.10	0.06	0.04	0.09
2018-11-29	0.11	0.16	0.10	0.07	0.14
2018-11-28	0.09	0.14	0.09	0.06	0.12
2018-11-27	0.07	0.10	0.06	0.04	0.08
2018-11-26	0.06	0.08	0.05	0.04	0.07
2018-11-25	0.12	0.19	0.11	0.07	0.18
2018-11-24	0.15	0.25	0.14	0.09	0.21
2018-11-23	0.11	0.17	0.10	0.07	0.15
2018-11-22	0.07	0.11	0.07	0.05	0.09
2018-11-21	0.06	0.08	0.06	0.04	0.07
2018-11-20	0.06	0.08	0.06	0.04	0.07

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2018-11-19	0.05	0.07	0.05	0.03	0.06
2018-11-18	0.04	0.06	0.04	0.02	0.05
2018-11-17	0.10	0.16	0.10	0.06	0.14
2018-11-16	0.08	0.11	0.07	0.05	0.10
2018-11-15	0.09	0.13	0.08	0.05	0.11
2018-11-14	0.06	0.09	0.06	0.04	0.08
2018-11-13	0.06	0.09	0.06	0.04	0.09
2018-11-12	0.04	0.06	0.04	0.02	0.05
2018-11-11	0.06	0.09	0.06	0.04	0.08
2018-11-10	0.08	0.12	0.07	0.05	0.10
2018-11-09	0.08	0.11	0.07	0.05	0.10
2018-11-08	0.05	0.07	0.05	0.03	0.06
2018-11-07	0.07	0.11	0.07	0.04	0.10
2018-11-06	0.11	0.16	0.11	0.07	0.15
2018-11-05	0.11	0.16	0.10	0.07	0.14
2018-11-04	0.08	0.11	0.07	0.05	0.10
2018-11-03	0.11	0.16	0.10	0.07	0.14
2018-11-02	0.10	0.14	0.09	0.06	0.12
2018-11-01	0.08	0.12	0.08	0.05	0.11
2018-10-31	0.05	0.07	0.05	0.03	0.06
2018-10-30	0.10	0.14	0.09	0.06	0.13
2018-10-29	0.13	0.18	0.12	0.08	0.16
2018-10-28	0.11	0.14	0.10	0.07	0.13
2018-10-27	0.10	0.12	0.09	0.06	0.12
2018-10-26	0.09	0.12	0.08	0.06	0.11
2018-10-25	0.04	0.05	0.04	0.02	0.05
2018-10-24	0.04	0.05	0.03	0.02	0.04
2018-10-23	0.09	0.11	0.08	0.05	0.10
2018-10-22	0.07	0.09	0.07	0.05	0.09
2018-10-21	0.09	0.11	0.08	0.06	0.11
2018-10-20	0.08	0.11	0.08	0.05	0.10
2018-10-19	0.03	0.03	0.03	0.02	0.03
2018-10-18	0.07	0.10	0.07	0.05	0.09
2018-10-17	0.08	0.11	0.07	0.05	0.10
2018-10-16	0.09	0.13	0.08	0.06	0.12
2018-10-15	0.05	0.08	0.05	0.03	0.07
2018-10-14	0.02	0.02	0.02	0.01	0.03
2018-10-13	0.02	0.03	0.02	0.01	0.03
2018-10-12	0.03	0.04	0.03	0.02	0.04
2018-10-11	0.12	0.16	0.11	0.08	0.15
2018-10-10	0.10	0.12	0.10	0.06	0.13
2018-10-09	0.03	0.04	0.03	0.02	0.04
2018-10-08	0.09	0.12	0.09	0.06	0.12
2018-10-07	0.08	0.10	0.08	0.05	0.10
2018-10-06	0.13	0.17	0.13	0.08	0.17
2018-10-05	0.16	0.21	0.15	0.10	0.20
2018-10-04	0.15	0.19	0.14	0.09	0.19
2018-10-03	0.17	0.21	0.16	0.10	0.21
2018-10-02	0.10	0.11	0.09	0.06	0.11

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2018-10-01	0.12	0.14	0.11	0.07	0.14
2018-09-30	0.13	0.16	0.12	0.08	0.16
2018-09-29	0.05	0.05	0.04	0.03	0.06
2018-09-28	0.05	0.06	0.05	0.03	0.06
2018-09-27	0.14	0.16	0.13	0.08	0.17
2018-09-26	0.11	0.16	0.10	0.07	0.14
2018-09-25	0.15	0.18	0.14	0.10	0.18
2018-09-24	0.08	0.09	0.07	0.05	0.09
2018-09-23	0.05	0.06	0.05	0.03	0.07
2018-09-22	0.04	0.05	0.04	0.03	0.06
2018-09-21	0.03	0.03	0.02	0.02	0.03
2018-09-20	0.19	0.24	0.18	0.12	0.24
2018-09-19	0.18	0.21	0.17	0.11	0.22
2018-09-18	0.17	0.20	0.16	0.11	0.21
2018-09-17	0.15	0.16	0.14	0.09	0.18
2018-09-16	0.15	0.16	0.14	0.09	0.18
2018-09-15	0.13	0.14	0.12	0.08	0.15
2018-09-14	0.16	0.18	0.15	0.10	0.19
2018-09-13	0.12	0.14	0.11	0.07	0.14
2018-09-12	0.09	0.11	0.09	0.06	0.11
2018-09-11	0.12	0.14	0.11	0.07	0.14
2018-09-10	0.09	0.11	0.09	0.06	0.11
2018-09-09	0.07	0.08	0.06	0.04	0.08
2018-09-08	0.06	0.07	0.05	0.03	0.07
2018-09-07	0.11	0.13	0.10	0.07	0.13
2018-09-06	0.13	0.15	0.12	0.08	0.16
2018-09-05	0.10	0.11	0.10	0.06	0.12
2018-09-04	0.15	0.18	0.14	0.09	0.19
2018-09-03	0.10	0.13	0.10	0.06	0.13
2018-09-02	0.20	0.24	0.18	0.12	0.25
2018-09-01	0.22	0.27	0.21	0.14	0.28
2018-08-31	0.22	0.28	0.21	0.14	0.29
2018-08-30	0.23	0.28	0.21	0.14	0.28
2018-08-29	0.23	0.28	0.21	0.14	0.29
2018-08-28	0.26	0.34	0.24	0.16	0.34
2018-08-27	0.27	0.35	0.25	0.17	0.36
2018-08-26	0.23	0.29	0.21	0.14	0.29
2018-08-25	0.24	0.31	0.23	0.15	0.31
2018-08-24	0.26	0.33	0.24	0.16	0.34
2018-08-23	0.22	0.28	0.21	0.14	0.28
2018-08-22	0.18	0.21	0.17	0.11	0.22
2018-08-21	0.19	0.23	0.18	0.12	0.24
2018-08-20	0.20	0.23	0.18	0.12	0.25
2018-08-19	0.15	0.17	0.14	0.09	0.17
2018-08-18	0.18	0.21	0.17	0.11	0.22
2018-08-17	0.24	0.29	0.22	0.15	0.30
2018-08-16	0.22	0.27	0.21	0.14	0.27
2018-08-15	0.23	0.29	0.22	0.15	0.30
2018-08-14	0.13	0.15	0.12	0.08	0.16
2018-08-13	0.04	0.04	0.04	0.03	0.05

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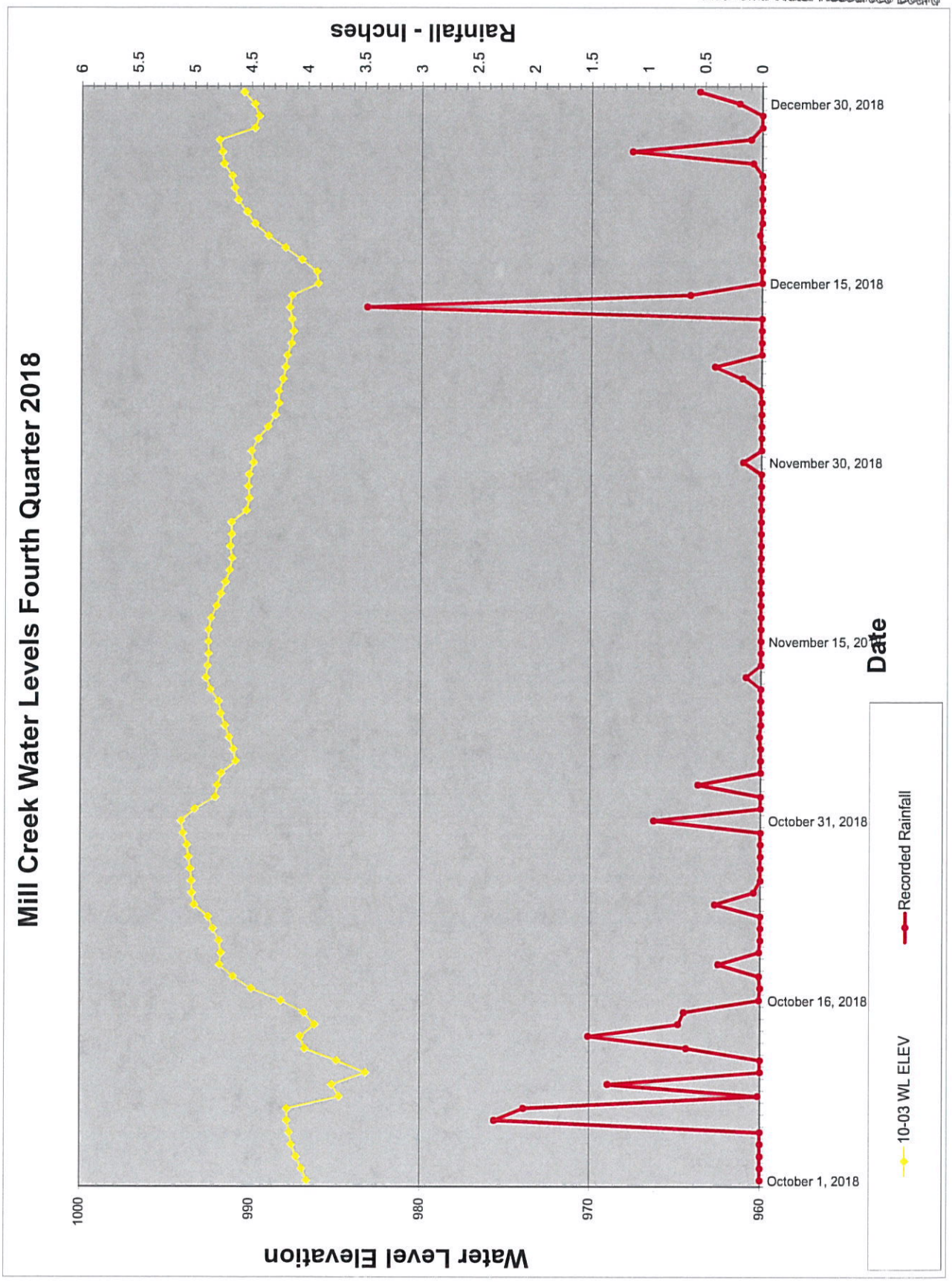
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