



Robin L. Simmons
Regional Land Manager

December 20, 2019

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Oklahoma Water Resources

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 Q3 2019

Dear Mr. Cogburn:

Attached please find the Q3 2019 Quarterly 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.

Q1 and Q2 2019 data have been updated. Evaporation from the mine pit that did not exceed the amount of direct precipitation and surface runoff into the mine pit was inadvertently included in the calculations in earlier reports.

Please call if you have any questions or comments.

Sincerely,

A handwritten signature in cursive script that reads '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 2019**

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Appendix C : Consumptive use of Pitwater

Q1 2019 Q2 2019 Q3 2019

PIT GROUNDWATER VOLUME					
1	Total volume pumped from producing mine pit(s) (AC-FT)		586.68	659.40	643.45
2	Volume of precipitation that falls onto the surface of producing Mine Pits (AC-FT)		61.90	193.13	112.43
3	Portion of total precipitation that flows over the land surface that drains into the mine pit water (AC-FT)		17.50	67.02	43.17
4	(WATER HELD IN PIT FROM PREVIOUS MONTHS) other non pit waters pumped from the producing mining pit (AC-FT)				
5	add lines 2 through 4		79.40	260.14	155.60
6	Pit Groundwater Volume (AC-FT) (line 1 minus Line 5)		507.28	399.26	487.85
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
8	Vol. of pit groundwater that is carried away with the the mined material transp. off of the mine site (AC-FT)		5.75	3.00	2.99
9	Vol. of pit groundwater that evaporates from producing mine pits, process ponds and lined ponds (excluding structures used for augmentation) (AC-FT)		2.38	3.58	2.89
10	Volume of pit groundwater that is used for other beneficial uses off of the mine site (AC-FT) (includes on-site dust control)		10.09	11.45	26.18
11	DEFINED ELEMENTS OF CONSUMPTIVE USE of Pit groundwater (AC-FT) (add lines 7 through 10)		18.22	18.02	32.06
PIT GROUNDWATER BALANCE					
12	Lines 6 minus 11		489.06	381.25	455.79
13	Groundwater Augmentation Volume of pit water returned to GW Basin or subbasin. (Troy Recharge AC-FT)	Credits	574.32	867.17	614.55
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)		0.00	0.00	0.00
15	PPT and Runoff Volume of Precipitation and surface runoff into a recharge pit or holding pond (AC-FT)		30.98	91.99	53.75
16	Recycled Pit Groundwater - Volume of ground water returned to the mine pit or holding basin (AC-FT)		410.34	371.29	282.18
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)		56.3	44.8	26.7
18	add lines 13 through 17		1071.94	1375.29	977.18
19	OTHER CONSUMPTIVE USE Line 12 minus Line 18		-582.88	-994.05	-521.39
TOTAL REPORTED CONSUMPTIVE USE (AC-FT)					
TOTAL NET CONSUMPTIVE USE (AC-FT) Line 11 plus line 19			-564.66	-976.03	-489.33

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RESULTS FROM RUNOFF MODELLING

2019	PPT. Inches	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
		ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
January	2.70	6.435	20.299	7.433	34.17	4.21	3.54	8.89	3.19	19.53	34.47
February	2.38	5.672	12.756	4.365	22.79	3.71	2.90	7.83	1.95	17.22	21.97
March	1.96	4.671	12.063	5.702	22.44	3.05	4.81	6.45	2.67	14.18	25.25
Q1 Subtotal		16.78	45.12	17.50	79.40	10.97	11.25	23.17	7.81	50.92	81.68
April	7.48	17.827	68.766	32.581	119.17	11.66	26.69	24.62	15.02	64.11	143.08
May	6.14	14.634	52.297	26.544	93.47	9.57	28.16	20.21	12.70	44.41	119.71
June	5.38	12.822	26.779	7.895	47.50	8.38	0.50	17.71	1.73	38.92	36.90
Q2 Subtotal	19.00	45.28	147.84	67.02	260.14	29.61	55.35	62.54	29.45	137.43	299.67
July	1.38	3.29	8.24	2.19	13.72	2.15	0.39	4.54	0.87	9.98	11.70
August	7.89	18.33	75.12	40.12	133.56	11.98	40.06	25.31	19.13	65.82	174.42
September	1.09	2.60	4.85	0.87	8.32	1.70	0.02	3.59	0.31	7.88	6.05
Q3 Subtotal	10.16	24.21	88.21	43.18	155.60	15.83	40.47	33.44	20.31	73.49	182.17

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Water Volume Movements	January	February	March	April	May	June	July	August	September
Pumped from Pit	200.7	179.8	206.2	214.2	248.5	196.7	217.9	211.7	213.9
Groundwater Component of Pitwater	191.5	182.0	208.8	95.0	155.1	292.3	185.7	88.3	92.7
Quarry dust suppression	2.7	2.5	6.0	5.0	5.5	6.7	12.2	12.6	10.7
Q- freshwater pond	198.0	177.3	200.2	209.1	243.1	190.0	205.6	199.2	203.2
To Secondary FM7	415.8	410.2	519.5	513.0	548.3	478.1	618.3	641.3	627.2
To sand Plant FM8	78.9	82.8	108.0	114.5	113.8	105.9	134.1	161.1	125.8
to loadout FM6	277.1	284.7	361.2	377.7	420.4	396.4	371.9	347.3	326.5
to dust control FM9	0.031	0.061	0.675	0.000	0.123	0.031	0.092	0.007	0.000
to Plant FM7+FM8+FM6	771.7	777.8	988.6	1005.2	1082.5	980.4	1124.3	1149.7	1079.5
to stream Augmentation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
bypass discharge			0.47	1.881	1.669	0.47	0	0.47	0.258
To Troy FM3	769.6	785.8	994.6	1015.3	1110.0	982.3	1149.4	1166.5	1119.4
To Booster FM2									
From Troy to Freshwater Pond FM4	554.2	483.3	773.2	768.6	781.5	780.6	937.1	946.0	916.8

Quarter Summary	3rd Qtr
Total Tons Shipped	1,530,000
Total Acre Feet	29.78
Average Moisture %	2.65%

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# for any damages resulting from its use.
#
# 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: 2019-12-02 10:51:15 EST (caww01)
#

```

```

# 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.
#

```

agency_cd	site_no	datetime	111780_00060_00003	111780_00060_00003_cd
5s	15s	20d	14n	10s
USGS	07331200	2019-07-01	9.66	A
USGS	07331200	2019-07-02	9.44	A
USGS	07331200	2019-07-03	8.37	A
USGS	07331200	2019-07-04	7.52	A
USGS	07331200	2019-07-05	7.15	A
USGS	07331200	2019-07-06	7.24	A
USGS	07331200	2019-07-07	7.05	A
USGS	07331200	2019-07-08	7.73	A
USGS	07331200	2019-07-09	6.01	A
USGS	07331200	2019-07-10	5.37	A
USGS	07331200	2019-07-11	5.00	A
USGS	07331200	2019-07-12	4.55	A
USGS	07331200	2019-07-13	4.21	A
USGS	07331200	2019-07-14	3.90	A
USGS	07331200	2019-07-15	3.73	A
USGS	07331200	2019-07-16	3.60	A
USGS	07331200	2019-07-17	3.92	A
USGS	07331200	2019-07-18	4.90	A
USGS	07331200	2019-07-19	6.01	A
USGS	07331200	2019-07-20	6.45	A
USGS	07331200	2019-07-21	6.42	A
USGS	07331200	2019-07-22	6.80	A
USGS	07331200	2019-07-23	7.19	A
USGS	07331200	2019-07-24	7.29	A
USGS	07331200	2019-07-25	6.82	A
USGS	07331200	2019-07-26	6.41	A
USGS	07331200	2019-07-27	5.88	A
USGS	07331200	2019-07-28	4.82	A
USGS	07331200	2019-07-29	4.41	A
USGS	07331200	2019-07-30	3.77	A
USGS	07331200	2019-07-31	3.32	A

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#
# 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: 2019-12-02 11:02:20 EST (caww01)
#

```

```

# 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.
#

```

agency_cd	site_no	datetime	111780_00060_00003	111780_00060_00003_cd
5s	15s	20d	14n	10s
USGS	07331200	2019-08-01	3.17	A
USGS	07331200	2019-08-02	2.89	A
USGS	07331200	2019-08-03	5.78	A
USGS	07331200	2019-08-04	4.71	A
USGS	07331200	2019-08-05	4.00	A
USGS	07331200	2019-08-06	3.33	A
USGS	07331200	2019-08-07	2.77	A
USGS	07331200	2019-08-08	2.27	A
USGS	07331200	2019-08-09	2.29	A
USGS	07331200	2019-08-10	3.97	A
USGS	07331200	2019-08-11	3.33	A
USGS	07331200	2019-08-12	2.90	A
USGS	07331200	2019-08-13	2.64	A
USGS	07331200	2019-08-14	2.86	A
USGS	07331200	2019-08-15	2.40	A
USGS	07331200	2019-08-16	2.40	A
USGS	07331200	2019-08-17	2.24	A
USGS	07331200	2019-08-18	2.11	A
USGS	07331200	2019-08-19	2.00	A
USGS	07331200	2019-08-20	2.14	A
USGS	07331200	2019-08-21	2.19	A
USGS	07331200	2019-08-22	2.21	A
USGS	07331200	2019-08-23	19.2	A
USGS	07331200	2019-08-24	15.4	A
USGS	07331200	2019-08-25	12.3	A
USGS	07331200	2019-08-26	6.40	A
USGS	07331200	2019-08-27	6.55	A
USGS	07331200	2019-08-28	5.63	A
USGS	07331200	2019-08-29	4.67	A
USGS	07331200	2019-08-30	31.1	A
USGS	07331200	2019-08-31	42.8	A

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 # Automated-retrieval info: <https://help.waterdata.usgs.gov/faq/automated-retrievals>
 #
 # Contact: gs-w_support_nwisweb@usgs.gov
 # retrieved: 2019-12-02 11:02:48 EST (caww01)
 #

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.
 #

agency_cd	site_no	datetime	111780_00060_00003	111780_00060_00003_cd
5s	15s	20d	14n	10s
USGS	07331200	2019-09-01	24.0	A
USGS	07331200	2019-09-02	16.8	A
USGS	07331200	2019-09-03	13.7	A
USGS	07331200	2019-09-04	10.7	A
USGS	07331200	2019-09-05	8.92	A
USGS	07331200	2019-09-06	8.02	A
USGS	07331200	2019-09-07	7.74	A
USGS	07331200	2019-09-08	7.61	A
USGS	07331200	2019-09-09	8.06	A
USGS	07331200	2019-09-10	9.95	A
USGS	07331200	2019-09-11	9.74	A
USGS	07331200	2019-09-12	9.32	A
USGS	07331200	2019-09-13	9.00	A
USGS	07331200	2019-09-14	8.79	A
USGS	07331200	2019-09-15	8.91	A
USGS	07331200	2019-09-16	9.04	A
USGS	07331200	2019-09-17	9.06	A
USGS	07331200	2019-09-18	9.47	A
USGS	07331200	2019-09-19	10.0	A
USGS	07331200	2019-09-20	19.0	A
USGS	07331200	2019-09-21	16.7	A
USGS	07331200	2019-09-22	12.4	A
USGS	07331200	2019-09-23	11.2	A
USGS	07331200	2019-09-24	10.1	A
USGS	07331200	2019-09-25	9.48	A
USGS	07331200	2019-09-26	8.75	A
USGS	07331200	2019-09-27	8.10	A
USGS	07331200	2019-09-28	7.62	A
USGS	07331200	2019-09-29	7.31	A
USGS	07331200	2019-09-30	6.99	A

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Date	Daily Rainfall Total	Total Daily Evaporation
7/1/2019	0	0.216
7/2/2019	0	0.245
7/3/2019	0	0.239
7/4/2019	0	0.189
7/5/2019	0	0.156
7/6/2019	1.17	0.112
7/7/2019	0	0.051
7/8/2019	0	0.236
7/9/2019	0	0.24
7/10/2019	0	0.169
7/11/2019	0	0.233
7/12/2019	0	0.255
7/13/2019	0	0.242
7/14/2019	0	0.195
7/15/2019	0	0.183
7/16/2019	0	0.269
7/17/2019	0	0.272
7/18/2019	0	0.289
7/19/2019	0	0.28
7/20/2019	0	0.278
7/21/2019	0	0.248
7/22/2019	0.01	0.231
7/23/2019	0	0.244
7/24/2019	0	0.219
7/25/2019	0	0.217
7/26/2019	0	0.009
7/27/2019	0	0.012
7/28/2019	0	0.009
7/29/2019	0.2	0.13
7/30/2019	0	0.236
7/31/2019	0	0.297
8/1/2019	0	0.222
8/2/2019	0	0.174
8/3/2019	1.1	0.1
8/4/2019	0.01	0.071
8/5/2019	0	0.154
8/6/2019	0	0.219
8/7/2019	0	0.297
8/8/2019	0	0.225
8/9/2019	0.06	0.134
8/10/2019	0	0.243
8/11/2019	0	0.249
8/12/2019	0	0.129
8/13/2019	0	0.141
8/14/2019	0.08	0.089
8/15/2019	0	0.152

8/16/2019	0	0.165
8/17/2019	0	0.174
8/18/2019	0	0.164
8/19/2019	0	0.164
8/20/2019	0	0.145
8/21/2019	0	0.148
8/22/2019	0	0.134
8/23/2019	2.42	0.595
8/24/2019	1.27	0.773
8/25/2019	0	0.636
8/26/2019	0	0.176
8/27/2019	1.75	1
8/28/2019	0	0.012
8/29/2019	0	0.16
8/30/2019	1	0.536
8/31/2019	0	0.811
9/1/2019	0	0.068
9/2/2019	0	0.267
9/3/2019	0	0.298
9/4/2019	0	0.251
9/5/2019	0	0.258
9/6/2019	0	0.267
9/7/2019	0	0.28
9/8/2019	0	0.316
9/9/2019	0	0.229
9/10/2019	0	0.177
9/11/2019	0	0.093
9/12/2019	0	0.126
9/13/2019	0	0.066
9/14/2019	0	0.061
9/15/2019	0	0.082
9/16/2019	0	0.127
9/17/2019	0	0.13
9/18/2019	0	0.09
9/19/2019	0	0.061
9/20/2019	0.84	0.169
9/21/2019	0	0.081
9/22/2019	0.04	0.141
9/23/2019	0.21	0.101
9/24/2019	0	0.091
9/25/2019	0	0.179
9/26/2019	0	0.295
9/27/2019	0	0.274
9/28/2019	0	0.19
9/29/2019	0	0.117
9/30/2019	0	0.037
10/1/2019	0	0.083

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MESONET CLIMATOLOGICAL DATA SUMMARY				July 2019				Time Zone: Midnight-Midnight CST														
(TISH) Tishomingo				Nearest City: 6.0 N Tishomingo				County: Johnston														
Latitude: 34-19-57				Longitude: 96-40-44				Elevation: 879 feet														
DAY	TEMPERATURE (F)				DEG DAYS		HUMIDITY (%)			PRESSURE (in)		WIND SPEED (mph)			SOLAR				4" SOIL TEMPERATURES			
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG	RAIN (in)	STN	MSL	DIR	AVG	MAX	(MJ/m2)	SOD	BARE	MAX	MIN		
1	88	70	77.1	70.8	0	14	100	52	83	0.00	29.06	30.01	ESE	5.0	23.2	23.58	83.9	85.9	97	77		
2	90	70	80.1	71.7	0	15	100	55	78	0.00	29.01	29.95	SSE	7.7	20.4	27.48	84.4	87.6	99	78		
3	89	69	79.7	71.7	0	14	99	58	78	0.00	28.97	29.91	SSE	8.7	21.3	26.03	84.4	87.8	99	79		
4	91	74	81.6	73.9	0	18	94	57	79	0.00	28.99	29.93	SSE	9.4	21.7	20.67	84.3	87.9	97	81		
5	89	73	81.0	74.2	0	16	99	58	81	0.00	29.09	30.03	S	6.4	17.4	18.91	84.0	87.5	96	80		
6	91	71	77.1	73.3	0	16	100	60	90	0.08	29.12	30.07	S	4.3	20.4	14.84	83.1	85.7	95	80		
7	92	70	80.3	73.8	0	16	100	56	82	0.00	29.05	29.99	E	3.2	17.1	24.28	83.6	87.2	101	77		
8	88	72	78.1	72.4	0	15	100	64	84	0.00	29.00	29.94	SSE	4.8	19.4	19.06	83.9	88.1	95	81		
9	95	70	83.0	75.0	0	17	100	55	79	0.00	28.97	29.91	SSE	7.5	23.4	27.74	84.8	90.2	102	80		
10	94	72	81.2	74.9	0	18	100	60	83	0.00	29.05	29.99	E	4.8	18.9	17.04	85.0	89.9	101	83		
11	91	67	79.6	69.8	0	14	98	46	75	0.00	29.06	30.00	NNE	8.0	19.4	27.34	84.5	89.7	101	80		
12	89	63	76.7	64.5	0	11	98	42	69	0.00	28.99	29.93	NE	6.8	17.7	28.98	83.6	89.1	101	78		
13	91	66	80.5	69.1	0	14	97	44	71	0.00	28.99	29.93	NNE	8.6	21.6	27.03	84.0	89.8	100	80		
14	87	69	77.9	70.3	0	13	96	59	79	0.01	29.00	29.94	NE	9.1	29.0	19.70	83.5	88.0	95	82		
15	92	64	78.5	69.0	0	13	100	48	75	0.00	28.96	29.90	NW	5.4	18.8	23.33	83.1	87.7	98	78		
16	98	69	83.8	74.3	0	19	100	47	76	0.00	28.98	29.92	SSE	6.3	19.4	26.89	85.4	91.8	103	81		
17	96	75	84.5	72.8	0	20	96	39	70	0.00	29.03	29.97	S	9.8	23.7	28.15	86.9	93.1	103	84		
18	96	77	85.0	71.4	0	22	91	39	66	0.00	29.00	29.94	S	11.9	28.6	28.46	87.3	93.0	103	84		
19	96	73	84.8	71.6	0	20	96	40	67	0.00	28.98	29.92	SSE	10.5	25.9	28.31	87.6	93.1	104	84		
20	96	73	84.8	71.8	0	20	96	44	67	0.00	28.97	29.91	SSE	10.5	26.0	28.14	88.1	93.4	104	84		
21	97	71	84.3	71.0	0	19	97	42	67	0.00	28.99	29.93	SSE	6.9	19.7	26.73	88.1	93.6	104	84		
22	88	68	79.1	68.6	0	13	98	48	72	0.02	29.09	30.03	N	9.8	29.7	21.37	86.6	90.6	97	85		
23	88	65	75.5	59.9	0	12	89	34	62	0.00	29.20	30.15	NNE	9.2	22.8	27.51	85.1	88.1	99	79		
24	87	59	73.6	59.1	0	8	95	37	64	0.00	29.20	30.14	SE	4.1	15.8	27.16	84.5	88.1	100	77		
25	87	57	73.8	58.1	0	7	99	35	63	0.00	29.18	30.13	ESE	5.0	23.7	27.59	84.2	87.7	99	77		
26	89	57	74.6	59.4	0	8	97	37	63	0.00	29.20	30.15	SE	5.3	22.7	27.69	84.5	87.8	100	77		
27	92	63	78.0	62.8	0	12	93	34	63	0.00	29.20	30.14	SSE	6.4	22.4	27.18	85.5	88.8	100	79		
28	97	68	82.2	67.7	0	17	92	35	65	0.00	29.09	30.03	SSE	7.7	24.1	25.48	86.8	90.3	101	81		
29	86	75	79.3	74.0	0	15	99	64	85	0.13	29.04	29.98	SSE	7.2	20.5	14.78	85.1	86.6	90	83		
30	96	72	81.7	72.0	0	19	100	41	77	0.01	29.07	30.01	ENE	4.7	17.0	23.55	85.9	88.8	101	80		
31	96	72	83.9	70.3	0	19	97	40	67	0.00	29.09	30.03	SSE	6.4	21.3	27.30	87.3	91.9	103	82		
	92	69	80.0	69.7	-<- Monthly Averages ->						29.05	29.99	SSE	7.1	29.7	24.59	85.1	89.3	100	80		
Temperature - Highest: 98				Degree Days - Total HDD: 0				Number of Days With:				Tmax >= 90: 19				Rainfall >= 0.01 inch: 5						
Lowest: 57				Total CDD: 473				Tmax < 32: 0				Rainfall >= 0.10 inch: 1										
Rainfall: Monthly Total: 0.25 in.				Humidity - Highest: 100				Tmin < 32: 0				Avg Wind Speed >= 10 mph: 3										
Greatest 24 Hr: 0.13 in.				Lowest: 34				Tmin < 0: 0				Max Wind Speed >= 30 mph: 0										

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MESONET CLIMATOLOGICAL DATA SUMMARY				August 2019				Time Zone: Midnight-Midnight CST													
(TISH) Tishomingo				Nearest City: 6.0 N Tishomingo				County: Johnston													
Latitude: 34-19-57				Longitude: 96-40-44				Elevation: 879 feet													
DAY	TEMPERATURE (F)				DEG DAYS		HUMIDITY (%)			RAIN (in)		PRESSURE (in)		WIND SPEED (mph)			SOLAR	4" SOIL TEMPERATURES			
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG		STN	MSL	DIR	AVG	MAX	(MJ/m2)	SOD	BARE	MAX	MIN	
1	94	70	82.3	70.8	0	17	97	45	71	0.00	29.09	30.03	SSE	6.3	21.4	21.44	87.2	90.9	100	83	
2	92	72	81.5	72.6	0	17	97	50	76	0.00	29.05	29.99	ESE	6.1	18.7	16.24	86.4	89.2	97	84	
3	82	71	76.1	73.0	0	12	100	71	90	2.69	29.03	29.97	ENE	5.7	20.0	8.88	81.6	83.1	88	79	
4	90	72	79.3	73.4	0	16	100	55	84	0.00	29.05	29.99	ENE	3.6	15.1	16.80	82.6	82.9	89	78	
5	90	72	79.5	73.9	0	16	100	56	85	0.80	29.03	29.97	ESE	3.1	32.4	17.05	82.6	83.1	89	78	
6	96	74	84.1	74.2	0	20	100	37	76	0.00	28.99	29.93	SSE	3.0	13.7	23.76	84.3	85.1	93	79	
7	98	75	85.8	75.1	0	21	100	44	73	0.00	28.95	29.88	SSE	5.8	16.4	25.89	86.0	85.8	93	80	
8	94	74	84.0	75.3	0	19	98	56	76	0.00	28.95	29.89	SSE	6.5	17.0	19.30	85.6	84.5	90	79	
9	93	76	82.3	77.0	0	19	97	61	85	0.11	28.97	29.91	E	5.5	18.3	18.35	85.6	84.6	91	80	
10	96	75	85.3	75.0	0	21	99	47	74	0.00	28.97	29.91	SE	6.2	16.4	24.45	86.5	85.9	93	79	
11	96	73	84.8	73.3	0	19	100	46	71	0.00	29.00	29.94	SSE	6.5	19.3	25.29	86.2	87.5	98	79	
12	98	72	84.9	73.6	0	20	98	45	72	0.00	28.95	29.88	SSE	6.2	19.3	25.90	85.8	89.1	101	79	
13	92	72	82.4	72.9	0	17	99	50	75	0.00	29.00	29.94	NE	7.0	18.5	20.84	84.8	88.8	97	81	
14	92	75	82.5	73.6	0	18	99	48	77	0.07	29.07	30.01	NNE	5.2	20.7	23.02	85.3	89.2	100	81	
15	93	71	82.2	70.8	0	17	99	44	71	0.00	29.05	29.99	SSE	5.8	19.7	25.85	84.7	90.0	101	80	
16	96	68	83.3	70.5	0	17	98	43	68	0.00	28.98	29.91	SSE	8.0	21.9	25.96	84.2	90.2	102	80	
17	95	72	84.9	73.2	0	19	98	50	70	0.00	28.91	29.85	SSE	9.0	22.6	25.62	84.8	91.2	102	82	
18	94	76	85.0	73.1	0	20	94	51	69	0.00	28.93	29.86	SE	8.9	23.8	21.84	85.0	91.7	100	84	
19	97*	74*	85.4*	72.6*	0*	20*	96*	40*	68*	0.00*	29.02*	29.96*	SSE*	6.1*	18.6*	NA	85.6*	92.3*	103*	84*	
20	98	71	85.3	72.6	0	19	99	41	69	0.00	29.06	30.00	SSE	5.2	17.5	25.29	86.2	92.9	103	84	
21	97	71	84.6	72.6	0	19	99	45	70	0.00	29.03	29.97	SSE	5.0	19.1	24.79	86.7	93.1	103	84	
22	95	72	83.0	71.3	0	19	96	41	70	0.00	28.97	29.91	SSE	5.4	21.6	21.21	86.5	92.0	101	84	
23	79	68	72.3	70.8	0	9	100	73	95	3.53	29.01	29.95	NE	7.0	26.5	3.22	78.3	81.1	90	78	
24	87	71	75.5	73.0	0	14	100	69	93	0.21	29.00	29.94	ENE	4.9	32.0	13.36	79.0	80.3	87	77	
25	88	71	78.2	73.6	0	14	100	63	87	0.00	28.91	29.85	E	5.7	17.0	16.61	80.6	80.5	86	76	
26	96	74	84.6	75.6	0	20	100	56	76	0.00	28.81	29.74	SSE	8.7	22.8	23.82	83.1	82.4	89	77	
27	85	69	76.0	70.5	0	12	99	52	84	0.80	29.03	29.96	NNE	6.4	51.9	13.82	81.6	80.6	87	76	
28	89	70	78.4	71.0	0	15	99	53	80	0.00	29.11	30.05	NE	4.0	12.8	22.41	82.6	82.0	90	76	
29	92	72	81.4	73.3	0	17	99	56	78	0.00	29.07	30.01	SE	6.1	18.1	22.80	84.0	82.5	89	77	
30	78	67	71.7	69.4	0	7	100	77	93	3.19	29.11	30.05	NE	7.1	29.9	3.80	79.5	76.5	80	74	
31	87	67	76.3	71.0	0	12	100	59	85	0.01	29.12	30.06	NE	4.2	13.4	21.80	79.6	79.4	88	72	
92* 72* 81.4* 72.9*				<- Monthly Averages ->				29.01* 29.95*		SSE* 5.9* 51.9*			19.98*		83.9* 86.1* 94* 79*						
Temperature - Highest: 98* Lowest: 67*				Degree Days - Total HDD: 0* Total CDD: 523*				Number of Days With: Tmax >= 90: 23* Tmax <= 32: 0* Tmin <= 32: 0* Tmin <= 0: 0*				Rainfall >= 0.01 inch: 9* Rainfall >= 0.10 inch: 7* Avg Wind Speed >= 10 mph: 0* Max Wind Speed >= 30 mph: 3*									
Rainfall: Monthly Total: 11.41* in. Greatest 24 Hr: 3.53* in.				Humidity - Highest: 100* Lowest: 37*																	

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MESONET CLIMATOLOGICAL DATA SUMMARY (TISH) Tishomingo Latitude: 34-19-57				September 2019 Nearest City: 6.0 N Tishomingo Longitude: 96-40-44				Time Zone: Midnight-Midnight CST County: Johnston Elevation: 879 feet																
DAY	TEMPERATURE (F)				DEG DAYS		HUMIDITY (%)			RAIN (in)		PRESSURE (in)		WIND SPEED (mph)			SOLAR (MJ/m2)				4" SOIL TEMPERATURES			
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG		STN	MSL	DIR	AVG	MAX		SOD	BARE	MAX	MIN				
1	90	69	78.8	71.9	0	14	100	49	82	0.00	29.12	30.07	NE	3.5	12.7	23.18	82.2	81.9	89	75				
2	91	71	80.0	71.2	0	16	100	47	78	0.00	29.12	30.06	ENE	2.9	11.5	23.88	83.1	83.0	91	76				
3	91	71	80.3	71.4	0	16	99	43	77	0.00	29.07	30.01	ENE	3.4	18.6	23.27	83.4	83.1	90	76				
4	92	69	80.0	70.3	0	16	100	43	76	0.00	29.13	30.08	NNW	2.9	11.5	23.97	83.4	83.5	92	76				
5	93	68	79.3	68.8	0	15	100	34	75	0.00	29.14	30.08	SSW	2.9	13.4	23.61	83.1	82.8	91	76				
6	94	67	79.4	69.1	0	15	99	40	75	0.00	29.10	30.04	SSW	3.4	12.9	23.31	82.6	82.1	91	74				
7	94	67	80.1	69.9	0	16	99	42	75	0.00	29.04	29.98	SSW	3.9	16.3	22.79	82.6	82.4	91	75				
8	93	66	80.2	67.1	0	15	99	36	68	0.00	29.01	29.95	SSW	5.7	21.0	23.47	82.1	82.7	92	74				
9	90	66	79.6	68.5	0	13	99	50	71	0.00	29.04	29.98	SSE	7.2	22.6	22.75	81.7	83.3	93	75				
10	91	69	79.5	69.3	0	15	95	50	73	0.00	29.11	30.05	SE	7.3	22.2	19.55	81.7	83.6	93	76				
11	91	69	79.6	69.9	0	15	97	50	74	0.00	29.13	30.07	S	8.2	24.1	20.94	81.4	84.0	93	76				
12	91	69	79.6	69.8	0	15	98	50	74	0.00	29.12	30.06	S	7.4	22.2	20.61	81.5	84.8	94	77				
13	88	69	76.8	68.7	0	14	97	56	77	0.00	29.21	30.15	NE	5.5	23.7	18.80	81.6	85.5	94	79				
14	93	68	79.5	68.9	0	16	96	38	73	0.00	29.19	30.14	ESE	4.5	15.6	21.72	81.4	86.0	96	78				
15	93	67	79.2	69.1	0	15	97	41	75	0.00	29.14	30.08	NE	2.9	11.0	21.28	81.1	86.4	97	78				
16	94	70	80.9	68.8	0	17	95	40	70	0.00	29.10	30.04	ESE	4.3	17.0	21.05	81.4	87.2	98	79				
17	93	68	79.9	68.4	0	16	97	42	71	0.00	29.04	29.98	SE	4.7	19.4	20.27	81.1	86.8	96	79				
18	91	68	79.2	70.3	0	15	100	50	77	0.00	29.00	29.94	E	4.2	16.5	20.69	81.3	87.2	97	79				
19	88	70	76.4	69.7	0	14	100	54	82	0.01	28.99	29.93	E	6.7	22.3	11.99	80.4	84.7	91	80				
20	74	70	71.4	71.3	0	7	100	95	100	1.53	29.03	29.96	SE	5.5	24.6	1.78	77.7	78.5	82	76				
21	88	72	78.4	71.9	0	15	100	58	82	0.00	29.07	30.01	SSE	9.9	25.9	16.57	78.4	79.1	85	75				
22	88	74	77.8	72.2	0	16	99	61	84	0.07	29.04	29.98	S	8.8	22.5	10.89	79.0	78.6	84	75				
23	83	73	76.4	73.8	0	13	100	74	92	0.28	29.07	30.01	SE	4.2	16.6	10.86	79.7	80.0	85	76				
24	87	72	76.5	73.3	0	15	100	65	91	0.00	28.96	29.90	SE	5.3	19.2	12.20	80.1	79.7	86	76				
25	91	70	80.0	73.2	0	16	100	60	81	0.00	28.90	29.83	S	6.4	15.8	19.93	80.5	80.6	89	74				
26	88	69	78.3	67.9	0	13	92	51	72	0.00	28.95	29.89	ESE	7.9	29.0	19.69	80.5	80.9	89	75				
27	89	70	79.2	69.0	0	15	91	53	72	0.00	28.86	29.79	S	10.2	24.9	20.41	79.9	79.5	87	74				
28	89	74	80.0	72.4	0	17	97	56	79	0.00	28.95	29.89	SSE	8.9	21.2	15.60	80.1	80.1	87	75				
29	90	73	79.7	72.0	0	16	96	58	78	0.00	29.05	29.99	SE	9.6	23.2	12.44	79.8	79.9	86	75				
30	86	70	77.8	71.2	0	13	96	65	81	0.00	29.06	30.00	SE	8.0	22.6	12.13	79.4	79.3	85	74				
	90	70	78.8	70.3	<- Monthly Averages ->							29.06	30.00	SE	5.9	29.0	18.65	81.1	82.6	90	76			
Temperature - Highest: 94 Lowest: 66				Degree Days - Total HDD: 0 Total CDD: 442				Number of Days With: Tmax >= 90: 19 Tmax <= 32: 0 Tmin >= 32: 0 Tmin <= 0: 0				Rainfall >= 0.01 inch: 4 Rainfall >= 0.10 inch: 2 Avg Wind Speed >= 10 mph: 1 Max Wind Speed >= 30 mph: 0												
Rainfall: Monthly Total: 1.89 in. Greatest 24 Hr: 1.53 in.				Humidity - Highest: 100 Lowest: 34																				

Date	Reference ET: Short [in]	Reference ET: Tall [in]	Cool Season Grass ET [in]	Warm Season Grass ET [in]	Pan Evaporation [in]
2019-11-10	0.10	0.14	0.09	0.06	0.13
2019-11-09	0.07	0.09	0.07	0.04	0.09
2019-11-08	0.06	0.09	0.06	0.04	0.08
2019-11-07	0.09	0.14	0.08	0.06	0.12
2019-11-06	0.03	0.03	0.03	0.02	0.03
2019-11-05	0.08	0.08	0.05	0.04	0.07
2019-11-04	0.09	0.13	0.09	0.06	0.12
2019-11-03	0.10	0.15	0.09	0.06	0.13
2019-11-02	0.09	0.13	0.08	0.06	0.12
2019-11-01	0.08	0.12	0.08	0.05	0.10
2019-10-31	0.08	0.11	0.07	0.05	0.10
2019-10-30	0.02	0.03	0.02	0.01	0.03
2019-10-29	0.02	0.03	0.02	0.01	0.03
2019-10-28	0.03	0.03	0.03	0.02	0.04
2019-10-27	0.12	0.17	0.11	0.08	0.15
2019-10-26	0.09	0.12	0.08	0.05	0.11
2019-10-25	0.02	0.02	0.02	0.01	0.03
2019-10-24	0.05	0.07	0.04	0.03	0.06
2019-10-23	0.15	0.22	0.14	0.09	0.20
2019-10-22	0.11	0.16	0.11	0.07	0.15
2019-10-21	0.14	0.20	0.13	0.08	0.18
2019-10-20	0.15	0.20	0.14	0.09	0.18
2019-10-19	0.13	0.18	0.12	0.08	0.16
2019-10-18	0.13	0.19	0.12	0.08	0.17
2019-10-17	0.11	0.14	0.10	0.07	0.13
2019-10-16	0.13	0.19	0.12	0.08	0.17
2019-10-15	0.16	0.23	0.15	0.10	0.20
2019-10-14	0.11	0.14	0.10	0.07	0.13
2019-10-13	0.12	0.17	0.12	0.08	0.15
2019-10-12	0.10	0.13	0.09	0.06	0.12
2019-10-11	0.13	0.20	0.13	0.08	0.19
2019-10-10	0.09	0.12	0.08	0.05	0.11
2019-10-09	0.13	0.19	0.12	0.08	0.17
2019-10-08	0.13	0.17	0.12	0.08	0.16
2019-10-07	0.18	0.26	0.17	0.11	0.24
2019-10-06	0.18	0.26	0.17	0.11	0.24
2019-10-05	0.15	0.19	0.14	0.09	0.18
2019-10-04	0.13	0.16	0.12	0.08	0.16
2019-10-03	0.14	0.16	0.13	0.08	0.16
2019-10-02	0.18	0.23	0.17	0.11	0.23
2019-10-01	0.17	0.22	0.16	0.11	0.21
2019-09-30	0.12	0.15	0.11	0.07	0.15
2019-09-29	0.15	0.20	0.14	0.09	0.19
2019-09-28	0.16	0.21	0.15	0.10	0.20
2019-09-27	0.19	0.25	0.18	0.12	0.25
2019-09-26	0.17	0.22	0.16	0.11	0.22
2019-09-25	0.16	0.19	0.15	0.10	0.19
2019-09-24	0.11	0.13	0.10	0.07	0.13
2019-09-23	0.09	0.10	0.09	0.06	0.11
2019-09-22	0.13	0.18	0.12	0.08	0.17
2019-09-21	0.16	0.21	0.15	0.10	0.21

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2019-09-20	0.03	0.03	0.02	0.02	0.03
2019-09-19	0.13	0.16	0.12	0.08	0.16
2019-09-18	0.17	0.19	0.15	0.10	0.20
2019-09-17	0.17	0.20	0.16	0.11	0.21
2019-09-16	0.17	0.20	0.16	0.11	0.21
2019-09-15	0.16	0.18	0.15	0.10	0.19
2019-09-14	0.18	0.20	0.17	0.11	0.21
2019-09-13	0.17	0.20	0.15	0.10	0.20
2019-09-12	0.19	0.23	0.17	0.12	0.23
2019-09-11	0.19	0.23	0.18	0.12	0.24
2019-09-10	0.19	0.23	0.17	0.12	0.23
2019-09-09	0.19	0.23	0.18	0.12	0.24
2019-09-08	0.20	0.23	0.18	0.12	0.24
2019-09-07	0.19	0.21	0.17	0.12	0.22
2019-09-06	0.19	0.21	0.17	0.12	0.22
2019-09-05	0.18	0.19	0.17	0.11	0.22
2019-09-04	0.18	0.19	0.17	0.11	0.22
2019-09-03	0.18	0.20	0.17	0.11	0.22
2019-09-02	0.18	0.19	0.17	0.11	0.22
2019-09-01	0.18	0.19	0.16	0.11	0.21
2019-08-31	0.17	0.18	0.16	0.10	0.20
2019-08-30	0.06	0.07	0.05	0.03	0.07
2019-08-29	0.20	0.23	0.19	0.12	0.24
2019-08-28	0.19	0.21	0.17	0.11	0.22
2019-08-27	0.13	0.16	0.12	0.08	0.16
2019-08-26	0.23	0.29	0.22	0.14	0.30
2019-08-25	0.14	0.16	0.13	0.09	0.17
2019-08-24	0.12	0.14	0.12	0.08	0.15
2019-08-23	0.05	0.06	0.05	0.03	0.06
2019-08-22	0.20	0.24	0.19	0.13	0.25
2019-08-21	0.22	0.26	0.21	0.14	0.28
2019-08-20	0.23	0.27	0.22	0.14	0.29
2019-08-19	0.24	0.29	0.22	0.15	0.30
2019-08-18	0.23	0.30	0.22	0.14	0.30
2019-08-17	0.25	0.31	0.23	0.15	0.32
2019-08-16	0.25	0.31	0.23	0.15	0.32
2019-08-15	0.23	0.26	0.21	0.14	0.28
2019-08-14	0.21	0.24	0.19	0.13	0.25
2019-08-13	0.20	0.24	0.18	0.12	0.25
2019-08-12	0.25	0.29	0.23	0.15	0.31
2019-08-11	0.24	0.28	0.22	0.15	0.30
2019-08-10	0.23	0.27	0.22	0.14	0.29
2019-08-09	0.17	0.20	0.16	0.11	0.21
2019-08-08	0.19	0.23	0.18	0.12	0.23
2019-08-07	0.24	0.28	0.23	0.15	0.30
2019-08-06	0.21	0.23	0.19	0.13	0.25
2019-08-05	0.15	0.16	0.14	0.09	0.17
2019-08-04	0.15	0.17	0.14	0.09	0.18
2019-08-03	0.09	0.11	0.08	0.06	0.11
2019-08-02	0.17	0.21	0.16	0.11	0.21
2019-08-01	0.21	0.26	0.20	0.13	0.26

RECEIVED

DEC 20 2019

Klahoma Water Resources

2019-07-31	0.25	0.30	0.24	0.16	0.32
2019-07-30	0.21	0.24	0.20	0.13	0.25
2019-07-29	0.14	0.17	0.13	0.09	0.18
2019-07-28	0.26	0.33	0.24	0.16	0.34
2019-07-27	0.24	0.30	0.23	0.15	0.31
2019-07-26	0.23	0.27	0.21	0.14	0.28
2019-07-25	0.22	0.27	0.21	0.14	0.28
2019-07-24	0.21	0.25	0.20	0.13	0.27
2019-07-23	0.27	0.35	0.25	0.17	0.35
2019-07-22	0.21	0.26	0.19	0.13	0.27
2019-07-21	0.26	0.32	0.24	0.16	0.33
2019-07-20	0.29	0.37	0.27	0.18	0.39
2019-07-19	0.29	0.37	0.27	0.18	0.39
2019-07-18	0.31	0.41	0.29	0.19	0.42
2019-07-17	0.28	0.35	0.26	0.18	0.37
2019-07-16	0.25	0.29	0.23	0.15	0.31
2019-07-15	0.21	0.24	0.19	0.13	0.25
2019-07-14	0.19	0.23	0.17	0.11	0.24
2019-07-13	0.24	0.30	0.23	0.15	0.31
2019-07-12	0.24	0.29	0.22	0.15	0.30
2019-07-11	0.25	0.30	0.23	0.15	0.31
2019-07-10	0.17	0.19	0.16	0.10	0.20
2019-07-09	0.25	0.29	0.23	0.15	0.31
2019-07-08	0.17	0.20	0.16	0.11	0.21
2019-07-07	0.20	0.22	0.19	0.13	0.24
2019-07-06	0.14	0.16	0.13	0.09	0.17
2019-07-05	0.18	0.21	0.16	0.11	0.22
2019-07-04	0.21	0.26	0.19	0.13	0.27
2019-07-03	0.22	0.26	0.21	0.14	0.28
2019-07-02	0.24	0.27	0.22	0.15	0.29
2019-07-01	0.20	0.23	0.19	0.12	0.24
2019-06-30	0.19	0.22	0.18	0.12	0.23
2019-06-29	0.25	0.27	0.23	0.15	0.30
2019-06-28	0.24	0.28	0.23	0.15	0.30
2019-06-27	0.22	0.25	0.20	0.14	0.27
2019-06-26	0.23	0.28	0.22	0.14	0.29
2019-06-25	0.23	0.27	0.22	0.14	0.29
2019-06-24	0.21	0.23	0.19	0.13	0.25
2019-06-23	0.16	0.21	0.15	0.10	0.21
2019-06-22	0.23	0.30	0.21	0.14	0.31
2019-06-21	0.29	0.37	0.27	0.18	0.39
2019-06-20	0.24	0.28	0.22	0.15	0.30
2019-06-19	0.21	0.24	0.20	0.13	0.26
2019-06-18	0.21	0.23	0.20	0.13	0.25
2019-06-17	0.19	0.22	0.18	0.12	0.23
2019-06-16	0.07	0.09	0.07	0.04	0.09
2019-06-15	0.23	0.29	0.21	0.14	0.30
2019-06-14	0.22	0.28	0.20	0.13	0.28
2019-06-13	0.22	0.25	0.20	0.13	0.27
2019-06-12	0.23	0.28	0.21	0.14	0.29
2019-06-11	0.18	0.22	0.17	0.11	0.23
2019-06-10	0.24	0.31	0.22	0.15	0.33

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DEC 20 2019

Klathoma Water Resources

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DEC 20 2019

Oklahoma Water Resources

Mill Creek Water Levels 3rd Quarter 2019

