



Robin Simmons  
Regional Land Manager

February 20, 2017

Matt Cogburn  
Oklahoma Water Resources Board  
3800 N. Classen  
Oklahoma City, OK 73118

Re: Martin Marietta/Material Producers Davis Quarry Q4 and Annual 2017 Monitoring Report

Dear Mr. Wilkins:

Attached please find the Q4 and Annual 2017 monitoring report and associated data and calculations for Martin Marietta/Material Producers' Davis Quarry.

As is typical at the Davis Quarry, in Q4 we see more precipitation and runoff entering the pit than the total water we use from the pit. Also typically, we do not see a rise in water levels in the pit that correspond to the additional precipitation and runoff that we know is entering the pit and not being used. Thus we still see a net decrease of water within the pit indicating that we continue to augment groundwater through the pit.

Sincerely,

A handwritten signature in cursive script that reads 'Robin L. Simmons'.

Robin L. Simmons  
Regional Land Manager

North Texas/Oklahoma District  
1503 LBJ Parkway Suite 400, Dallas, Texas 75234  
t. (972) 350-8228 f. (972) 647-3363 m. (214) 213-6024 e. [Robin.Simmons@martinmarietta.com](mailto:Robin.Simmons@martinmarietta.com)  
[www.martinmarietta.com](http://www.martinmarietta.com)

### MMM Davis Quarry 2017 Monitoring Report

All volumes are in acre-feet

	Total Groundwater Entering Pit	Total Stormwater Entering Pit	Total Stormwater Diverted from Pit	Total Water Diverted	Water Sent To Holding Basin	Groundwater Augmentation	Streamwater Augmentation	Consumptive Use of Stormwater	Consumptive Use of Groundwater	Groundwater Pumped From Well
January-17		4.81	4.81	4.81	N/A	0.00	0.00	2.68	0.00	0.00
February-17		10.47	10.47	10.47	N/A	0.00	0.00	3.05	0.00	0.00
March-17		5.40	5.40	5.40	N/A	0.00	0.00	3.36	0.00	0.00
1st QTR Totals	0.00	20.68	20.68	20.68	0.00	0.00	0.00	9.09	0.00	0.00
April-17	-4.84	5.66	5.66	0.82	N/A	-4.84	0.00	4.14	0.00	0.00
May-17	1.94	7.43	7.43	9.37	N/A	1.94	0.00	3.35	0.00	0.00
June-17	-3.59	1.55	1.55	-2.05	N/A	-3.59	0.00	3.43	0.00	0.00
2nd QTR Totals	-6.49	14.64	14.64	8.15	0.00	-6.49	0.00	10.93	0.00	0.00
July-17	-40.37	59.78	59.78	19.41	N/A	-40.37	0.00	5.06	0.00	0.00
August-17	-14.40	25.17	25.17	10.76	N/A	-14.40	0.00	6.07	0.00	0.00
September-17	-8.43	13.47	13.47	5.03	N/A	-8.43	0.00	3.45	0.00	0.00
3rd QTR Totals	-63.21	98.41	98.41	35.20	0.00	-63.21	0.00	14.58	0.00	0.00
October-17	-12.28	7.48	7.48	-4.80	N/A	-12.28	0.00	4.24	0.00	0.00
November-17	-2.03	0.11	0.11	-1.93	N/A	-2.03	0.00	2.29	0.00	0.00
December-17	1.26	4.81	4.81	6.07	N/A	1.26	0.00	1.91	0.00	0.00
4th QTR Totals	-13.05	12.40	12.40	-0.66	0.00	-13.05	0.00	8.44	0.00	0.00
2017 Totals	-82.75	146.12	146.12	63.37	0.00	-82.75	0.00	43.03	0.00	0.00

Note: Negative entries for Total Groundwater Entering Pit indicate that stormwater is entering the rock formation via the pit.

Consumptive Use

	January	February	March	April	May	June	July	August	September	October	November	December
Water Truck Usage	0.37	0.40	0.71	1.99	1.04	0.86	2.38	2.97	0.83	1.60	0.40	0.34
Moisture Content of Product Shipped	2.31	2.65	2.65	2.15	2.31	2.57	2.68	3.10	2.62	2.64	1.89	1.57
Misc on site use	-	-	-	-	-	-	-	-	-	-	-	-
Misc off site	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.68	3.05	3.36	4.14	3.35	3.43	5.06	6.07	3.45	4.24	2.29	1.91

	January	February	March	April	May	June	July	August	September	October	November	December
Shipped Tons												
Base	27,811	40,538	32,314	28,698	22,291	25,813	15,932	29,188	33,720	34,247	18,945	21,368
Coarse Aggregate	50,585	50,566	55,895	48,746	59,184	69,993	61,598	70,293	60,957	53,103	56,659	35,838
Fine Aggregate	25,282	25,771	29,586	20,687	25,743	26,096	40,253	38,837	25,607	29,049	17,030	14,816
Total	103,678	116,875	117,794	98,131	107,218	121,902	117,783	138,318	120,284	116,399	92,634	72,022
Moisture Shipped	2.31	2.65	2.65	2.15	2.31	2.57	2.68	3.10	2.62	2.64	1.89	1.57

## Davis Water Balance

	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17
<b>Monitoring Period, Days</b>		31	28	31	30	31	30	31	31	30	31	30	31
<b>Monthly Production, tons</b>		98,920	115,597	153,589	90,714	92,462	122,847	104,045	93,306	50,580	66,768	66,825	87,122
<b>Product Moisture Content</b>		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
<b>Water Truck Loads</b>		12	13	23	65	34	28	388	308	27	52	13	11
<b>Month End Water Elevs.</b>													
1) Freshwater pond, depth to water				17.769	13.326	19.301	13.15	17.866	14.524	18.617	14.065	10.672	14.323
2) Pit Sump, depth to water				4.762	5.583	4.934	2.304	1.688	7.248	8.246	0.072	2.215	2.145
<b>Pond Surface Acres</b>													
1) Freshwater pond	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937
2) Pit Sump	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322
Total surface acres	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259
<b>Pond Water Volume Change</b>													
1) Freshwater pond					-4.163	5.599	-5.763	4.419	-3.131	3.835	-4.265	-3.179	3.421
2) Pit Sump					0.264	-0.209	-0.847	-0.199	1.791	0.321	-2.632	0.690	-0.023
3) Change in settling pond storage					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Net Volume Change</b>					<b>-3.899</b>	<b>5.390</b>	<b>-6.610</b>	<b>4.220</b>	<b>-1.340</b>	<b>4.156</b>	<b>-6.897</b>	<b>-2.489</b>	<b>3.398</b>
<b>Water Inputs, ac-ft</b>													
Rural Water		0.101	0.000	0.000	0.000	0.000	0.000	0.041	0.201	1.647	1.643	1.774	0.065
Lake Water		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Well Water		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Precipitation		4.809	10.473	5.397	5.664	7.427	1.550	59.777	25.167	13.465	7.481	0.107	4.809
<b>Total Water Input</b>		<b>4.910</b>	<b>10.473</b>	<b>5.397</b>	<b>5.664</b>	<b>7.427</b>	<b>1.550</b>	<b>59.818</b>	<b>25.368</b>	<b>15.112</b>	<b>9.123</b>	<b>1.881</b>	<b>4.874</b>
<b>Water Usage, ac-ft</b>													
Product moisture content		2.547	2.977	3.955	2.336	2.381	3.164	2.679	2.403	1.303	1.771	1.721	2.244
Haul road dust control		0.368	0.399	0.706	1.995	1.043	0.859	11.907	9.452	0.829	1.596	0.399	0.338
Evaporation losses		0.234	0.268	0.399	0.392	0.557	0.542	0.644	0.449	0.390	0.371	0.215	0.158
Misc usage													
<b>Total Water Usage, Ac-ft</b>		<b>3.150</b>	<b>3.643</b>	<b>5.060</b>	<b>4.723</b>	<b>3.982</b>	<b>4.565</b>	<b>15.231</b>	<b>12.304</b>	<b>2.521</b>	<b>3.737</b>	<b>2.335</b>	<b>2.739</b>
<b>Net Water Input</b>		<b>1.760</b>	<b>6.829</b>	<b>0.337</b>	<b>0.941</b>	<b>3.445</b>	<b>-3.015</b>	<b>44.588</b>	<b>13.064</b>	<b>12.591</b>	<b>5.386</b>	<b>-0.454</b>	<b>2.135</b>
<b>emergency storage of precipitation and runoff, ac-ft</b>													
<b>Groundwater Inflow</b>					-4.839	1.944	-3.595	-40.368	-14.404	-8.434	-12.283	-2.035	1.264
<b>Groundwater Inflow, Avg Ac-ft/Day</b>					-0.161	0.063	-0.120	-1.302	-0.465	-0.281	-0.396	-0.068	0.041
<b>Groundwater Inflow, Avg Gallons/Day</b>					-52,562	20,438	-39,047	-424,318	-151,409	-91,612	-129,114	-22,102	13,284

October Precipitation Data

PIT RUNOFF ASSUMPTIONS		
Hydrologic Soil Group	D	
Land Use	gravel road	
AMC Condition	II (ave)	
CN (pit fringe)	88	area draining into pit
CN (pit)	100	area with direct interception
S (pit fringe)	1.364	area draining into pit
S (pit)	0.000	area with direct interception
Pit - Direct Interception (>95 ft deep)	64.12	subject to refinement
Pit fringe (area drains to pit)	161.49	subject to refinement
Drainage to Pit (total area)	225.61	subject to refinement

Quarry area Fringe area

Date	Precip, in.	Runoff, in.	Runoff, in.	Evapor, In/day
1-Oct	0.00	0.00	0.00	0.14
2-Oct	0.00	0.00	0.00	0.11
3-Oct	0.02	0.02	0.00	0.09
4-Oct	0.12	0.12	0.00	0.05
5-Oct	0.00	0.00	0.00	0.12
6-Oct	0.00	0.00	0.00	0.12
7-Oct	0.05	0.05	0.00	0.13
8-Oct	0.00	0.00	0.00	0.15
9-Oct	0.00	0.00	0.00	0.14
10-Oct	0.00	0.00	0.00	0.11
11-Oct	0.00	0.00	0.00	0.10
12-Oct	0.00	0.00	0.00	0.13
13-Oct	0.00	0.00	0.00	0.13
14-Oct	0.00	0.00	0.00	0.14
15-Oct	0.16	0.16	0.00	0.11
16-Oct	0.00	0.00	0.00	0.11
17-Oct	0.00	0.00	0.00	0.11
18-Oct	0.00	0.00	0.00	0.13
19-Oct	0.00	0.00	0.00	0.11
20-Oct	0.00	0.00	0.00	0.10
21-Oct	0.86	0.86	0.00	0.07
22-Oct	0.19	0.19	0.00	0.10
23-Oct	0.00	0.00	0.00	0.13
24-Oct	0.00	0.00	0.00	0.12
25-Oct	0.00	0.00	0.00	0.15
26-Oct	0.00	0.00	0.00	0.17
27-Oct	0.00	0.00	0.00	0.08
28-Oct	0.00	0.00	0.00	0.09
29-Oct	0.00	0.00	0.00	0.15
30-Oct	0.00	0.00	0.00	0.11
31-Oct	0.00	0.00	0.00	0.04
		1.40	0.00	
<b>Volume, ac-ft</b>		<b>7.48</b>	<b>0.00</b>	<b>3.532</b>
<b>Total Vol, ac-ft</b>		<b>7.48</b>		

November Precipitation Data

**PIT RUNOFF ASSUMPTIONS**

Hydrologic Soil Group	D	
Land Use	gravel road	
AMC Condition	..ll. (ave)	
CN (pit fringe)	88	area draining into pit
CN (pit)	100	area with direct interception
S (pit fringe)	1.364	area draining into pit
S (pit)	0.000	area with direct interception
Pit - Direct Interception (>95 ft deep)	64.12	subject to refinement
Pit fringe (area drains to pit)	161.49	subject to refinement
Drainage to Pit (total area)	225.61	subject to refinement

**Quarry area Fringe area**

Date	Precip, in.	Runoff, in.	Runoff, in.	Evapor, in/day
1-Nov	0.00	0.00	0.00	0.08
2-Nov	0.00	0.00	0.00	0.17
3-Nov	0.00	0.00	0.00	0.05
4-Nov	0.00	0.00	0.00	0.10
5-Nov	0.00	0.00	0.00	0.12
6-Nov	0.00	0.00	0.00	0.01
7-Nov	0.00	0.00	0.00	0.02
8-Nov	0.02	0.02	0.00	0.01
9-Nov	0.00	0.00	0.00	0.06
10-Nov	0.00	0.00	0.00	0.07
11-Nov	0.00	0.00	0.00	0.04
12-Nov	0.00	0.00	0.00	0.04
13-Nov	0.00	0.00	0.00	0.03
14-Nov	0.00	0.00	0.00	0.06
15-Nov	0.00	0.00	0.00	0.04
16-Nov	0.00	0.00	0.00	0.03
17-Nov	0.00	0.00	0.00	0.11
18-Nov	0.00	0.00	0.00	0.07
19-Nov	0.00	0.00	0.00	0.08
20-Nov	0.00	0.00	0.00	0.11
21-Nov	0.00	0.00	0.00	0.07
22-Nov	0.00	0.00	0.00	0.06
23-Nov	0.00	0.00	0.00	0.08
24-Nov	0.00	0.00	0.00	0.10
25-Nov	0.00	0.00	0.00	0.07
26-Nov	0.00	0.00	0.00	0.08
27-Nov	0.00	0.00	0.00	0.09
28-Nov	0.00	0.00	0.00	0.08
29-Nov	0.00	0.00	0.00	0.06
30-Nov	0.00	0.00	0.00	0.06
		0.00	0.00	
		0.02	0.00	
<b>Volume, ac-ft</b>		<b>0.11</b>	<b>0.00</b>	<b>2.053</b>
<b>Total Vol, ac-ft</b>		<b>0.11</b>		

December Precipitation Data

PIT RUNOFF ASSUMPTIONS		
Hydrologic Soil Group	D	
Land Use	gravel road	
AMC Condition	II (ave)	
CN (pit fringe)	88	area draining into pit
CN (pit)	100	area with direct interception
S (pit fringe)	1.364	area draining into pit
S (pit)	0.000	area with direct interception
Pit - Direct Interception (>95 ft deep)	64.12	subject to refinement
Pit fringe (area drains to pit)	161.49	subject to refinement
Drainage to Pit (total area)	225.61	subject to refinement

Quarry area Fringe area

Date	Precip, in	Runoff, in	Runoff, in	Evapor, in/day
1-Dec	0.00	0.00	0.00	0.06
2-Dec	0.00	0.00	0.00	0.06
3-Dec	0.00	0.00	0.00	0.07
4-Dec	0.00	0.00	0.00	0.11
5-Dec	0.00	0.00	0.00	0.04
6-Dec	0.00	0.00	0.00	0.06
7-Dec	0.00	0.00	0.00	0.05
8-Dec	0.00	0.00	0.00	0.06
9-Dec	0.00	0.00	0.00	0.07
10-Dec	0.00	0.00	0.00	0.12
11-Dec	0.00	0.00	0.00	0.11
12-Dec	0.00	0.00	0.00	0.06
13-Dec	0.00	0.00	0.00	0.11
14-Dec	0.00	0.00	0.00	0.06
15-Dec	0.00	0.00	0.00	0.07
16-Dec	0.06	0.06	0.00	0.07
17-Dec	0.00	0.00	0.00	0.01
18-Dec	0.01	0.01	0.00	0.02
19-Dec	0.60	0.60	0.00	0.01
20-Dec	0.01	0.01	0.00	0.02
21-Dec	0.00	0.00	0.00	0.09
22-Dec	0.18	0.18	0.00	0.00
23-Dec	0.02	0.02	0.00	0.04
24-Dec	0.01	0.01	0.00	0.04
25-Dec	0.00	0.00	0.00	0.03
26-Dec	0.01	0.01	0.00	0.02
27-Dec	0.00	0.00	0.00	0.02
28-Dec	0.00	0.00	0.00	0.01
29-Dec	0.00	0.00	0.00	0.02
30-Dec	0.00	0.00	0.00	0.01
31-Dec	0.00	0.00	0.00	0.02
		0.90	0.00	
<b>Volume, ac-ft</b>		<b>4.81</b>	<b>0.00</b>	<b>1.508</b>
<b>Total Vol, ac-ft</b>		<b>4.81</b>		