

3rd Quarter Report 2015
 North Troy Quarry
 Mill Creek, OK
 Vulcan Materials Company

VMC North Troy 2015 Monitoring Report

All volumes are in acre-feet.

	Total Groundwater Entering Pit	Total Stormwater Entering Pit	Total Pit Stormwater Diverted	Total Pit Water Diverted	Pit Water Sent To Holding Basin	Groundwater Augmentation	Streamwater Augmentation	Consumptive Use of Pit Water	Streamwater Pumped From Mill Creek	Groundwater Pumped From Wells	Total Annual Groundwater Allocation, Ac-ft
January-15	182.21	7.10	7.10	158.53	0.00	188.13	0.00	4.21	0.00	0.00	219.50
February-15	155.63	3.41	3.41	162.20	0.00	189.85	0.00	4.55	0.00	0.00	219.50
March-15	179.42	16.17	16.17	176.37	46.28	43.83	105.05	6.91	0.00	0.61	219.50
1st QTR Totals	487.25	26.68	26.68	487.09	46.28	381.91	105.05	15.66	0.00	0.61	N/A
April-15	156.59	36.77	36.77	144.94	0.00	98.42	6.51	0.00	0.00	0.00	219.50
May-15	139.35	225.94	225.94	144.17	0.00	339.76	30.35	5.64	0.00	0.00	219.50
June-15	218.34	104.52	104.52	213.57	0.00	318.09	0.00	8.29	0.00	0.00	219.50
2nd QTR Totals	512.28	387.23	387.23	502.88	0.00	756.27	113.64	20.44	0.00	0.00	N/A
July-15	147.90	144.71	144.71	148.74	38.51	254.93	0.00	9.64	0.00	2.00	219.50
August-15	234.20	1.44	1.44	231.24	49.26	183.42	0.00	9.35	0.00	0.00	219.50
September-15	240.79	7.82	7.82	247.20	105.28	149.76	0.00	9.09	0.00	0.00	219.50
3rd QTR Totals	622.89	153.96	153.96	627.19	183.03	588.11	0.00	28.09	0.00	3.75	N/A
October-15	#VALUE!	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	219.50
November-15	#VALUE!	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	219.50
December-15	#VALUE!	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	219.50
4th QTR Totals	#VALUE!	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
2015 Totals	547.88	547.88	547.88	1626.96	239.31	1726.29	218.69	64.20	0.00	4.36	219.50

1st Qtr Notes

Weather Station - Battery failed

Pond Transducer cable corroded

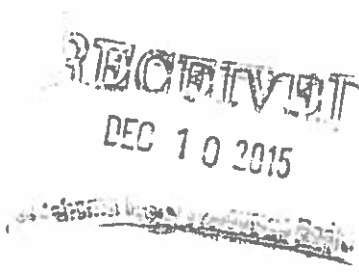
2nd Qtr Notes

New weather station installed

3rd Qtr Notes

Corrected Data Typo on March 2015 Pit diversion total

Well transducer pinched by Well cable



MILL CREEK 2015 AUGMENTATION and GAUGE DATA

Start Date	Start Time	Stop Date	Stop Time	Begin Reading	End Reading	Ac - Ft pumped	Mill Creek Stream gauge Reading	Time Read	Stream height	Stream flow
3/4/2015	7:40 AM	3/6/2015	3:15 PM	572490000	579700000	22.13	USGS 7331200	7:30 AM	< 6	2.8
3/9/2015	6:30 AM	3/11/2015	1:30 PM	579700000	585830000	18.81	USGS 7331200	6:00 AM	< 6	3.7
3/12/2015	6:55 AM	3/14/2015	1:10 PM	585830000	593240000	22.74	USGS 7331200	6:00 AM	< 6	4.2
3/18/2015	8:30 AM	3/18/2015	9:05 AM	593240000	593330000	0.28	USGS 7331200	8:00 AM	< 6	5.1
3/26/2015	4:45 PM	3/29/2015	9:00 PM	617010000	626960000	30.54	USGS 7331200	4:00 PM	6.13	9.7
Note: Flowrate dropped to 8.7 cfs by 6pm on March 26, 2015. Flowrate stayed below 9.0 for duration of augmentation.										
3/30/2015	1:00 PM	3/31/2015	3:30 PM	626960000	630400000	10.56	USGS 7331200	12:30 PM	6.01	5.6
4/4/2015	7:50 AM	4/11/2015	8:20 AM	630400000	652340000	67.33	USGS 7331200	7:00 AM	< 6	5.1
4/13/2015	12:05 PM	4/14/2015	12:00 AM	652340000	656570000	12.98	USGS 7331200	11:30 AM	8.2	318
4/15/2015	7:15 AM	4/15/2015	1:50 PM	656570000	657540000	2.98	USGS 7331200	7:00 AM	6.3	17
5/1/2015	7:50 AM	5/2/2015	8:00 PM	693210000	695160000	5.98	USGS 7331200	7:30 AM	6.14	9.8
5/4/2015	6:10 AM	5/5/2015	8:00 AM	695160000	700340000	15.90	USGS 7331200	5:30 AM	6.03	6.3
5/6/2015	11:30 AM	5/7/2015	8:55 AM	700340000	703100000	8.47	USGS 7331200	11:00 AM	6.67	40
June 2015		No Augmentation this month								
July 2015		No Augmentation this month								
August 2015		No Augmentation this month								
September 2015		No Augmentation this month								

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 WATER RESOURCES DIVISION

July Precipitation/Evaporation Data

PIT RUNOFF ASSUMPTIONS	
Hydrologic Soil Group	D
Land Use	gravel road
AMC Condition	II (ave)
CN (pit fringe)	88
CN (pit)	100
S (pit fringe)	136886
S (pit)	0
Pit - Direct Interception (>95 ft deep)	53.91
Pit fringe (area drains to pit)	122.04
Drainage to Pit (total area)	176.95
	area with direct interception
	area draining into pit
	area with direct interception
	area draining into pit
	subject to refinement
	subject to refinement

Date	Quarry area		Fringe area		Daily
	Precip, in.	Runoff, in.	Runoff, in.	Evaporation, in.	
1-Jul	0.00	0.00	0.00	0.34	Runoff formula
2-Jul	0.08	0.08	0.00	0.24	Pe = (P-0.2S) ² /(P+0.8S)
3-Jul	5.57	5.57	4.21	0.23	S = (1000/CN)-10
4-Jul	0.06	0.06	0.00	0.27	
5-Jul	0.00	0.00	0.00	0.31	Blue cells contain form
6-Jul	0.00	0.00	0.00	0.31	
7-Jul	2.87	2.87	1.76	0.07	
8-Jul	4.01	4.01	2.74	0.07	
9-Jul	0.03	0.03	0.00	0.16	
10-Jul	0.00	0.00	0.00	0.31	
11-Jul	0.00	0.00	0.00	0.36	
12-Jul	0.00	0.00	0.00	0.33	
13-Jul	0.00	0.00	0.00	0.35	
14-Jul	0.00	0.00	0.00	0.33	
15-Jul	0.00	0.00	0.00	0.34	
16-Jul	0.00	0.00	0.00	0.34	
17-Jul	0.00	0.00	0.00	0.36	
18-Jul	0.00	0.00	0.00	0.114	
19-Jul	0.00	0.00	0.00	0.175	
20-Jul	0.00	0.00	0.00	0.173	
21-Jul	0.00	0.00	0.00	0.09	
22-Jul	0.00	0.00	0.00	0.159	
23-Jul	0.00	0.00	0.00	0.15	
24-Jul	0.00	0.00	0.00	0.08	
25-Jul	0.00	0.00	0.00	0.17	
26-Jul	0.00	0.00	0.00	0.17	
27-Jul	0.00	0.00	0.00	0.16	
28-Jul	0.00	0.00	0.00	0.175	
29-Jul	0.00	0.00	0.00	0.17	
30-Jul	0.00	0.00	0.00	0.128	
31-Jul	0.00	0.00	0.00	0.1	
sum	12.62	12.62	8.65	6.73	6.734

6.734

Volume, ac-ft 56.70
Total Vol, ac-ft 144.71

2015 JULY PRECIPITATION

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August Precipitation/Evaporation Data

PIT RUNOFF ASSUMPTIONS	
Hydrologic Soil Group	D
Land Use	gravel road
AMC Condition	II (ave)
CN (pit fringe)	88
CN (pit)	100
S (pit fringe)	1.863636
S (pit)	0
Pit - Direct Interception (>95 ft deep)	53.91
Pit fringe (area drains to pit)	122.04
Drainage to Pit (total area)	176.95

Date	Quarry area		Daily
	Precip, in.	Runoff, in.	
1-Aug	0.00	0.00	0.15
2-Aug	0.00	0.00	0.12
3-Aug	0.00	0.00	0.12
4-Aug	0.20	0.28	0.04
5-Aug	0.00	0.00	0.17
6-Aug	0.00	0.00	0.149
7-Aug	0.00	0.00	0.14
8-Aug	0.00	0.00	0.141
9-Aug	0.00	0.00	0.13
10-Aug	0.00	0.00	0.164
11-Aug	0.00	0.00	0.158
12-Aug	0.00	0.00	0.15
13-Aug	0.00	0.00	0.16
14-Aug	0.00	0.00	0.096
15-Aug	0.00	0.00	0.151
16-Aug	0.00	0.00	0.157
17-Aug	0.00	0.00	0.128
18-Aug	0.00	0.00	0.09
19-Aug	0.12	0.12	0.05
20-Aug	0.00	0.00	0.137
21-Aug	0.00	0.00	0.14
22-Aug	0.00	0.00	0.129
23-Aug	0.00	0.00	0.116
24-Aug	0.00	0.00	0.128
25-Aug	0.00	0.00	0.128
26-Aug	0.00	0.00	0.147
27-Aug	0.00	0.00	0.137
28-Aug	0.00	0.00	0.121
29-Aug	0.00	0.00	0.09
30-Aug	0.00	0.00	0.132
31-Aug	0.00	0.00	0.154
sum	0.32	0.32	4.02

4.023

Volume, ac-ft
Total Vol, ac-ft

1.44
1.44

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Blue cells contain form

September Precipitation/Evaporation Data

PIT RUNOFF ASSUMPTIONS	
Hydrologic Soil Group	D
Land Use	gravel road
AMC Condition	II (ave)
CN (pit fringe)	88
CN (pit)	100
S (pit fringe)	1.368686
S (pit)	0
Pit - Direct Interception (>95 ft deep)	53.91
Pit fringe (area drains to pit)	122.04
Drainage to Pit (total area)	175.95

Date	Quarry area		Daily
	Precip. in.	Runoff, in.	
1-Sep	0.00	0.00	0.148
2-Sep	0.00	0.00	0.152
3-Sep	0.00	0.00	0.153
4-Sep	0.00	0.00	0.137
5-Sep	0.00	0.00	0.129
6-Sep	0.00	0.00	0.132
7-Sep	0.00	0.00	0.149
8-Sep	0.75	0.75	0.11
9-Sep	0.59	0.59	0.065
10-Sep	0.00	0.00	0.106
11-Sep	0.00	0.00	0.145
12-Sep	0.00	0.00	0.127
13-Sep	0.00	0.00	0.147
14-Sep	0.00	0.00	0.106
15-Sep	0.00	0.00	0.098
16-Sep	0.00	0.00	0.128
17-Sep	0.00	0.00	0.11
18-Sep	0.00	0.00	0.102
19-Sep	0.00	0.00	0.06
20-Sep	0.40	0.40	0
21-Sep	0.00	0.00	0.11
22-Sep	0.00	0.00	0.11
23-Sep	0.00	0.00	0.135
24-Sep	0.00	0.00	0.121
25-Sep	0.00	0.00	0.115
26-Sep	0.00	0.00	0.107
27-Sep	0.00	0.00	0.107
28-Sep	0.00	0.00	0.07
29-Sep	0.00	0.00	0.107
30-Sep	0.00	0.00	0.102
sum	1.74	1.74	3.39

Volume, ac-ft	7.82
Total Vol, ac-ft	7.82

Runoff formula
 $Pe = (P - 0.2S)^2 / (P + 0.8S)$
 $S = (1000/CN) - 10$

Blue cells contain form

Evap data from Sulphur Mesonet

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Monthly Water Data, ac-ft

Month	Water Diverted From Pit	Storm Water Entering Pit	Net Sump Volume Change	Groundwater Sent To Holding Basin	Groundwater Sent To Infiltration Areas	Groundwater Used For Stream Augmentation	Evaporation	Moisture Content of Product Shipped	Water Truck Usage	Misc Pit Water Use On Site	Misc Pit Water Use Off Site	Production Well Permit 2002-502	North Well Permit 20060601A
January-15	165.63	7.10	3.87	0.00	165.63	0.00	1.87	1.90	0.44	0.00	0.00	0.00	0.00
February-15	165.61	3.41	-6.52	0.00	165.61	0.00	1.94	2.22	0.39	0.00	0.00	0.00	0.00
March-15	182.54	16.17	3.05	46.28	41.22	105.05	2.94	3.36	0.61	0.00	0.00	0.61	0.00
April-15	181.71	36.77	11.35	98.42	83.29	0.00	4.23	2.28	0.00	0.00	0.00	0.00	0.00
May-15	370.11	225.84	-4.82	0.00	339.76	30.36	4.03	1.62	0.00	0.00	0.00	0.00	0.00
June-15	318.09	104.52	2.78	0.00	318.09	0.00	6.22	1.30	0.77	0.00	0.00	0.00	0.00
July-15	293.45	144.71	-0.94	38.51	254.93	0.00	5.14	3.83	0.86	0.00	0.00	2.00	0.00
August-15	232.68	1.44	2.96	49.26	183.42	0.00	3.07	4.84	1.44	0.00	0.00	0.00	0.00
September-15	255.02	7.82	6.41	105.26	149.76	0.00	2.59	4.41	2.10	0.00	0.00	1.75	0.00
October-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
November-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
December-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pit Sump Volumes

Month	Month End Depth-to-Water, Ft	West Sump			905 Sump			New Freshwater Pond			Pond Volume Change, Ac-ft	Evaporation, ac-ft	Total Evaporation, ac-ft	
		Width, Ft	Length, Ft	Sump Volume Change, Ac-ft	Month End Depth-to-Water, Ft	Width, Ft	Length, Ft	Sump Volume Change, Ac-ft	Month End Depth-to-Water, Ft	Width, Ft				Length, Ft
January-15	15.295	125	325	3.67	4	50	50	0.00	4.3	475	750	-10.63	1.87	2.10
February-15	22.34	125	325	-4.61	4	50	50	0.00	6.41	475	750	-17.23	1.94	2.18
March-15	19.07	125	325	-3.06	4	50	50	0.00	5.98	475	750	-3.62	2.94	3.38
April-15	6.58	125	325	11.55	4	50	50	0.00	8.42	475	750	-18.95	0.77	4.23
May-15	11.747	125	325	-4.82	4	50	50	0.00	5.7	475	750	-22.25	3.59	4.03
June-15	8.77	125	325	2.78	4	50	50	0.00	6.11	475	750	-3.13	3.55	5.72
July-15	8.674	125	325	-0.94	4	50	50	0.00	5.344	475	750	-8.94	4.74	5.14
August-15	6.505	125	325	2.96	4	50	50	0.00	6.437	475	750	-15.81	2.31	2.59
September-15	13.382	125	325	-4.41	4	50	50	0.00	4.496	475	750	0.00	0.00	0.00
October-15	0.00	125	325	0.00	4	50	50	0.00	0.00	475	750	0.00	0.00	0.00
November-15	0.00	125	325	0.00	4	50	50	0.00	0.00	475	750	0.00	0.00	0.00
December-15	0.00	125	325	0.00	4	50	50	0.00	0.00	475	750	0.00	0.00	0.00

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	July Shipments		August Shipments		September Shipments	
	Tons Shipped	Ac-ft of water shipped	Tons Shipped	Ac-ft of water shipped	Tons Shipped	Ac-ft of water shipped
Base Products	3,484	0.085	2,215	0.054	1,549	0.098
Coarse Aggregates	261,633	8.145	321,221	3.861	240,166	2.887
Fine Aggregates	18,881	0.600	29,271	0.930	46,665	1.488
	288,998	8.830	552,707	4.845	288,380	4.407

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