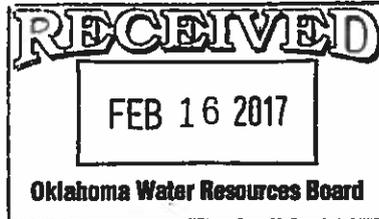




DOLESE

13 February 2017
17-ED-026



CONCRETE

SAND & GRAVEL

STONE

BLOCK

MASONRY

Mr. Anthony Mackey, Permitting Manager
Planning and Management Division
Oklahoma Water Resources Board
3800 North Classen Boulevard
Oklahoma City, OK 73118

RE: Water Monitoring Plan Report, 4th Quarter 2016 and 2016 Annual Summary, for Dolese Bros. Co. Davis Quarry, Murray County, Oklahoma

Dear Mr. Mackey:

According to the Oklahoma Water Resources Board's Title 785, Chapter 30, Subchapter 15, Part 4, *Mines with Preexisting Exemptions*, Dolese Bros. Co. Davis Quarry qualifies as a mine with a preexisting exemption. As part of maintaining this exemption status, the regulations require us to do the following:

1. Adopt and implement a plan to monitor and report to the Board the accumulation and disposition of pit water during the previous calendar year;
 - The Davis Quarry has adopted and implemented such a plan, and the tables below serve to report to the Board the accumulation and disposition of pit water during the 4th Quarter 2016 and for Year 2016.
2. Make quarterly and annual reports of the measured or reasonably estimated groundwater and surface water volumes, separately stated, entering the pit, of the water that is diverted from the pit, of the disposition of the water from the pit, and of the consumptive use of the water from the pit on or before the deadlines provided by Title 82 of Oklahoma Statutes, § 1020.2(E)(1);
 - The Davis Quarry has continued to fulfill this obligation by compiling and submitting this 4th Quarter 2016 Report and 2016 Annual Summary. The specific information requested in this section is outlined in the tables shown below.
3. At any time after March 31, 2015, demonstrate to the satisfaction of the Board within the pertinent report or reports that the mine has not consumptively used during the previous twelve-month period, from the mining site, an amount of groundwater which combined with any amounts used from permitted groundwater wells exceeds the MEPS¹. Such demonstration may require providing to the Board a copy of the mine's monitoring plan and all of the data collected and procedures used to support the calculations and results reported.
 - After 31 March 2015, the Davis Quarry will be willing to demonstrate to the Board that the mine site has not consumptively used during the previous twelve-month period from the mining site, an amount of groundwater which combined with any amounts used from permitted groundwater wells exceeds the MEPS. Example calculations used in the First Quarterly Monitoring Report for 2013 have already been submitted to the OWRB for review and analysis.

¹ Mine's Equal Proportionate Share

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Below, in Tables 1, 2, and 3, is shown the 4th Quarter 2016 summary data collected at the Davis Quarry.

Table 1

Accumulation & Disposition of Pit Water during 4th Quarter 2016

	<u>Groundwater</u> Acre-Feet	<u>Surface Water</u> Acre-Feet	<u>Total</u> Acre-Feet
Water Entering The Mine Pit	102.47	52.57	155.04
Water Diverted From The Mine Pit Into Fresh Water Lake	102.47	52.57	155.04
Water Removed From Fresh Water Lake	420.69	284.45	705.14
Water Returned To Fresh Water Lake	439.96	297.48	737.44
Water Returned To Land Surface Overlying ASA² Basin	51.81	35.04	86.85
Water Consumptively Used	14.58	(See Table 3 for Calculations)	

Table 2

Water Fluctuations in Fresh Water Lake during 4th Quarter 2016

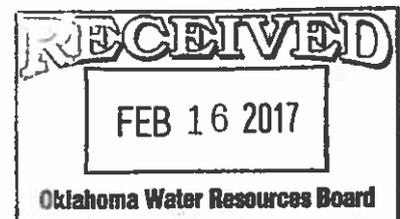
Average Size of Lake	31.31 acres
<u>Gain</u> in Water Elevation	1.09 feet
<u>Gain</u> in Lake Volume	34.13 acre-feet

Table 3

Consumptive Use Summary for 4th Quarter 2016

	Activity or Location	Amount of Pit Water Used, Acre-Feet	Percent Groundwater Content	Groundwater Component, Acre-Feet
1	North Water Well	0.00	All	0.61
2	South Water Well	0.00	All	0.63
3	Material Moisture Hauled from Site	3.86	59.66%	2.31
4	Land Application for Roadway Dust Suppression	18.29	59.66%	10.91
5	Evaporation from Mine Pit	0.19	66.09%	0.12
6	Offsite Dewatering	0.00	59.66%	0.00
For 4th Quarter 2016, Total Groundwater Consumption from ASA at Davis Quarry = 14.58 Acre-Feet				

² Arbuckle Simpson Aquifer



Below, in Tables 4, 5, and 6, please find the 2016 Annual Summary data collected at the Davis Quarry.

Table 4
Accumulation & Disposition of Pit Water during 2016

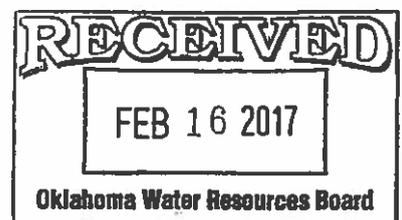
	<u>Groundwater</u> Acre-Feet	<u>Surface Water</u> Acre-Feet	<u>Total</u> Acre-Feet
Water Entering The Mine Pit	459.75	385.47	845.22
Water Diverted From The Mine Pit Into Fresh Water Lake	462.04	385.72	847.76
Water Removed From Fresh Water Lake	1,767.83	1,959.42	3,727.25
Water Returned To Fresh Water Lake	1,832.48	2,032.10	3,864.58
Water Returned To Land Surface Overlying ASA Basin	121.95	125.78	247.73
Water Consumptively Used	183.81	(See Consumptive Use Summary in Table 6)	

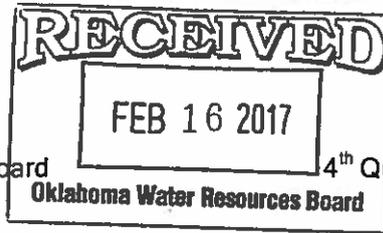
Table 5
Water Fluctuations in Fresh Water Lake during 2016

Average Size of Lake	30.98 acres
Loss in Water Elevation	1.44 feet
Loss in Lake Volume	44.61 acre-feet

Table 6
Consumptive Use Summary for 2016

Activity or Location	Groundwater Component, Acre-Feet
1 North Water Well	3.60
2 South Water Well	3.64
3 Material Moisture Hauled from Site	9.16
4 Land Application for Roadway Dust Suppression	32.86
5 Evaporation from Mine Pit	2.72
6 Offsite Dewatering	131.83
For Calendar Year 2016,	
Total Groundwater Consumption from ASA at Davis Quarry = 183.81 Acre-Feet	





Below, in Table 7, please find the Groundwater Rights Summary for the Davis Quarry.

Table 7
Summary of Groundwater Rights for Davis Quarry

From Acreage on the Arbuckle-Simpson Aquifer And Included in the ASA Groundwater Rights (1,083 acres on ASA)*(0.2 ac-ft/acre) = 216.6 acre-feet on the ASA
From Acreage off the Arbuckle-Simpson Aquifer And Excluded from the ASA Groundwater Rights (937 acres off ASA)*(2.0 ac-ft/acre) = 1,874 acre-feet off the ASA

Based on the plan that we have adopted and implemented to monitor and report the accumulation and disposition of pit water, based on our actual consumptive use of groundwater quantities, and based on the timely submittal of all reports including this 4th Quarter Report for 2016, we believe that the Davis Quarry is in full compliance with all of the regulations that allow us to maintain its preexisting exemption.

General Information

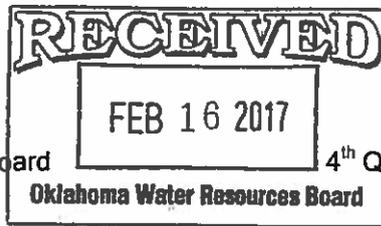
Our calculations show that Davis Quarry's total estimated groundwater consumption for 2016 was 183.81 acre-feet. Annually, the Davis Quarry site has 216.6 acre-feet of groundwater rights available over the ASA, but our total available water rights for this site could also include other unused groundwater rights of significant quantity that we have at another site that overlies the ASA in Murray County.

Below are listed the groundwater consumptive use figures reported for the last few years—

- 2013: Used 36.25 acre-feet of groundwater, or 16.7% of Davis Quarry's EPS.
- 2014: Used 61.66 acre-feet of groundwater, or 28.4% of Davis Quarry's EPS.
- 2015: Used 180.33 acre-feet of groundwater, or 83% of Davis Quarry's EPS.
- 2016: Used 183.81 acre-feet of groundwater, or 84.9% of Davis Quarry's EPS.

The amount of groundwater shown that we consumed during 2016 equates to approximately 84.9% of our Equal Proportionate Share (EPS) at this facility. In order to better understand the activities pertaining to this amount of groundwater consumption, it is important to note that nearly 72% of the water consumed was due to offsite dewatering because of high-water conditions at the site during the first two quarters, caused by rainfall. The remaining amount that we consumed throughout the year (less than 28% of the total consumption) pertains to all other consumptive use activities which include usage from two (2) small water wells, material moisture hauled from site, dust suppression waters, and evaporation of Mine Pit water.

The amount of rainfall that we received during each quarter of 2016 varied significantly from quarter to quarter. We received 5.0 inches of rain during the First Quarter, 21.60 inches during the Second Quarter, 8.0 inches during Third Quarter, and 5.90 inches during the Fourth Quarter. Overall, we logged 40.5 inches of rainfall in our rain gauge throughout the year. The estimated quarterly runoff estimated to have reached our Mine Pit from these storms was 1.79 inches, 11.02 inches, 2.69 inches, and 2.09 inches; totaling 17.59 inches of storm water runoff for the year.



The calculated percentages of groundwater content in the Fresh Water Lake during each of the quarters are as follows:

- First Quarter, 72.17%
- Second Quarter, 26.14%
- Third Quarter, 42.56%
- Fourth Quarter, 59.66%

The effects of the quarterly rainfall amounts on the calculated groundwater percentages of the Fresh Water Lake, shown above, are very apparent. Notice that significant quarterly rainfall amounts, like those during the Second Quarter, cause the groundwater percentages to appear to decrease, and minimal amounts of quarterly rainfall cause the groundwater percentages to appear to increase. It is important to mention that during quarters in which the storm water inflow to the Mine Pit is minimal, the amount of groundwater calculated to enter the Mine Pit is proportionally exaggerated because we count all of the Fresh Water Lake seepage that returns to the Mine Pit as groundwater - even though it is not. During periods when the quarterly rainfall is substantial, the Fresh Water Lake seepage amount is proportionally less significant—thereby reducing the groundwater percentage.

For the record, here is a recap of the annual rainfall amounts for the last four (4) years at Davis Quarry.

- 2013: Received 34.17 inches
- 2014: Received 36.20 inches
- 2015: Received 77.15 inches
- 2016: Received 40.50 inches

The annual rainfall during 2016 was only slightly above the average annual rainfall for Murray County, but it is important to note that over half of 2016's rainfall (21.60 inches) was received during the Second Quarter. During this quarter of heavy precipitation, we were required to discharge about 74 acre-feet of groundwater (based on the calculated groundwater concentration) because our Fresh Water Lake, which serves as our water storage lake, became too full. We were also required to discharge water during the first quarter because of high water conditions in the Fresh Water Lake caused by the rains at the end of 2015. This First Quarter discharge included approximately 58 acre-feet of groundwater.

We continue to use the least controversial methods (a very conservative approach) of calculating groundwater concentrations in the Mine Pit and the Fresh Water Lake, even though it causes our "apparent" groundwater consumption figures to be much higher than we believe they are. We are able to use these conservative assumptions only because we own a significant amount of land in the region, and we have the necessary water rights available. The primary drawback to using these very conservative assumptions and calculation methods is that we appear to be consuming more groundwater than is actually being consumed at our water-efficient operation. However, we hope that our frequent documentation of our assumptions used in these calculations clarify our reported water usage and explain why our reported consumptive groundwater use is so high. Here are a couple of the conservative assumptions that we have always used in our calculations:

- In trying to keep the lower elevations of the Mine Pit (located in the eastern part of the Quarry Area) relatively dry so that our employees can work in this area, we

pump most of the rainfall (and any minimal groundwater seepage) from the Mine Pit into our adjacent Fresh Water Lake (FWL) for storage and reuse. If this FWL were water-tight, our water balance calculations would be rather simple and more accurate. However, this lake continually leaks back into the same Mine Pit that we just pumped it from, causing us to pump considerably more water than if the FWL didn't leak. The worst part about this leakage of the FWL is that every gallon that leaks into the FWL, and that has to be pumped again and again back into the FWL, is all reported as newly infiltrating groundwater—causing our groundwater concentration figures in the FWL to appear to increase significantly above actual levels.

- In the past, we have never claimed any augmentation credits for the discharge of any water to adjacent streams—even though we know this water benefitted downstream users and fish/wildlife during many of the dry times. We simply counted the calculated groundwater portion of the water being discharged as groundwater consumption. The reason that we are not seeking augmentation credits at this time is that the regulations became too complex for us to ensure compliance (e.g., stationing a stream gauge at outfalls, installing monitoring wells near outfalls, and monitoring the daily levels of the receiving streams during each discharge). If we would have accepted augmentation credits, our reported groundwater consumption figures for the last few years would have dropped significantly.

Dolese Bros. Co. will continue to manage the waters of the Arbuckle Simpson Aquifer in compliance with all rules and regulations that apply to us. We will continue to analyze our water management techniques to make sure we are utilizing any waters we encounter at our operation as efficiently and appropriately as possible—both during drought periods, and during periods of flooding. We recognize that these water are as important to us as they are to the neighbors in our community.

Please contact me if you have any questions or comments concerning this submittal. Thank you.

Sincerely,

DOLESE BROS. CO.

Daniel E. Becker, P.E.
Environmental Engineer

dh

cc: - Mr. Matt Cogburn, Oklahoma Water Resources Board, 3800 North Classen Boulevard,
Oklahoma City, OK 73118

