



29 January 2018
19-ED-017

Mr. Matt Cogburn
Planning and Management Division
Oklahoma Water Resources Board
3800 North Classen Boulevard
Oklahoma City, OK 73118

RE: Water Monitoring Plan Report, 4th Quarter and Annual Summary for 2018, for Dolese Bros. Co. Davis Quarry, Murray County, Oklahoma

Dear Mr. Cogburn

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 4th Quarter 2018 and for the year 2018.
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 Report and 2018 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 2018 summary data collected at the Davis Quarry.

Table 1

Accumulation & Disposition of Pit Water during 4th Quarter 2018

	<u>Groundwater</u> Acre-Feet	<u>Surface Water</u> Acre-Feet	<u>Total</u> Acre-Feet
Water Entering The Mine Pit	58.76	217.35	276.11
Water Diverted From The Mine Pit Into Fresh Water Lake	67.41	249.37	316.78
Water Removed From Fresh Water Lake	148.81	870.42	1,019.23
Water Returned To Fresh Water Lake	141.86	829.80	971.66
Water Returned To Land Surface Overlying ASA² Basin	29.89	174.84	204.73
Water Consumptively Used	36.41	(See Table 3 for Calculations)	

Table 2

Water Fluctuations of Fresh Water Lake during 4th Quarter 2018

Average Size of Lake	32.34 acres
Loss in Water Elevation	1.01 feet
Loss in Lake Volume	32.66 acre-feet

Table 3

Consumptive Use Summary for 4th Quarter 2018

	Activity or Location	Amount of Pit Water Used, Acre-Feet	Groundwater Content Percent	Groundwater Component, Acre-Feet
1	North Water Well	0.00	All	0.52
2	South Water Well	0.00	All	1.76
3	Material Moisture Hauled from Site	4.13	14.60%	0.60
4	Land Application for Roadway Dust Suppression	13.16	14.60%	1.92
5	Evaporation from Mine Pit	0.71	21.28%	0.15
6	Offsite Dewatering	215.50	14.60%	31.46
For 4th Quarter 2018,		Total Groundwater Consumption from ASA at Davis Quarry = 36.41 Acre-Feet		

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² Arbuckle Simpson Aquifer

Below, in Tables 4, 5, and 6, please find the 2018 Annual Summary data collected at the Davis Quarry.

Table 4
Accumulation & Disposition of Pit Water during 2018

	<u>Groundwater</u> Acre-Feet	<u>Surface Water</u> Acre-Feet	<u>Total</u> Acre-Feet
Water Entering The Mine Pit	397.28	787.90	1,185.18
Water Diverted From The Mine Pit Into Fresh Water Lake	397.28	787.90	1,185.18
Water Removed From Fresh Water Lake	1,048.26	2,975.30	4,023.56
Water Returned To Fresh Water Lake	1,009.44	2,924.41	3,933.85
Water Returned To Land Surface Overlying ASA Basin	177.12	522.40	699.52
Water Consumptively Used	197.86	(See Consumptive Use Summary in Table 6)	

Table 5
Water Fluctuations in Fresh Water Lake during 2018

Estimated Average Size of Lake	32.42 acres
Measured <u>Gain</u> in Water Elevation	2.78 feet
Estimated Annual <u>Gain</u> in Lake Volume	90.13 acre-feet

Table 6
Consumptive Use Summary for 2018

Activity or Location	Groundwater Component, Acre-Feet
1 North Water Well	1.65
2 South Water Well	6.80
3 Material Moisture Hauled from Site	5.00
4 Land Application for Roadway Dust Suppression	22.78
5 Evaporation from Mine Pit	1.86
6 Offsite Dewatering	159.78
For Calendar Year 2018,	
Total Groundwater Consumption from ASA at Davis Quarry = 197.86 Acre-Feet	

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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 <p style="text-align: center;">(1,186 acres on ASA)*(0.2 ac-ft/acre) = 237.2 acre-feet on the ASA</p>
From Acreage off the Arbuckle-Simpson Aquifer And Excluded from the ASA Groundwater Rights <p style="text-align: center;">(812 acres off ASA)*(2.0 ac-ft/acre) = 1,624 acre-feet off the ASA</p>

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 2018, 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 2018 was 197.86 acre-feet. Annually, the Davis Quarry site has 237.2 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 that we have at another site that overlies the ASA in Murray County. These unused rights equate to approximately 266.6 acre-feet per year of groundwater from 1,333 acres of land that overlie the ASA.

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.
- 2017: Used 188.83 acre-feet of groundwater, or *78.94% of Davis Quarry's EPS.
- 2018: Used 197.86 acre-feet of groundwater, or *83.41% of Davis Quarry's EPS.

**Our EPS increased during 2017 because of the purchase of additional land at the facility, and there was a very slight decrease of our EPS in 2018 when a small lease was terminated.*

The amount of groundwater shown that we consumed during 2018 equates to approximately 83% of our Equal Proportionate Share (EPS) at this facility. In order to better understand the activities related to this amount of groundwater consumption, it is important to note that over 67% of the groundwater consumed was due to offsite dewatering because of high-water conditions at the site during all four quarters, caused by rainfall. The remaining amount that we consumed throughout the year (approximately 33% 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 (stone product sales), dust suppression waters (land application and wet sprays for dust suppression), and evaporation of Mine Pit water.

The amount of rainfall we received during 2018 was significant every quarter. We received 12.30 inches of rain during the First Quarter, 12.75 inches during the Second Quarter, 18.6

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inches during Third Quarter, and 18.5 inches during the Fourth Quarter. Overall, we logged 62.15 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 8.15 inches, 6.15 inches, 12.39 inches, and 10.27 inches; totaling 36.96 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, 18.50%
- Second Quarter, 47.76%
- Third Quarter, 19.43%
- Fourth Quarter, 14.60%

The effects of the quarterly rainfall totals on the calculated groundwater percentages of the Fresh Water Lake, shown above, are very apparent. It is important to mention that during quarters in which the storm water inflow to the Mine Pit is minimal, like the Second Quarter when we received 12.75 inches of rain and only 6.15 inches of runoff, the calculated percentage of groundwater in 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 runoff into the Mine Pit is more substantial, like the First, Third, and Fourth Quarters, the Fresh Water Lake seepage amount is proportionally less significant—thereby not affecting the groundwater percentage of the Fresh Water Lake as much.

For a review, here is a recap of the annual rainfall amounts at Davis Quarry for the last few years—

- 2013: Received 34.17 inches
- 2014: Received 36.20 inches
- 2015: Received 77.15 inches
- 2016: Received 40.50 inches
- 2017: Received 43.50 inches
- 2018: Received 62.15 inches

The 62-plus inches of annual rainfall measured using rain gauges at Davis Quarry during 2018 was drastically above the average annual rainfall of roughly 37 inches per year for Davis, Oklahoma. During this year of significant precipitation, second to only year 2015, we were required to discharge 159.78 acre-feet of groundwater that was blended with 459.02 acre-feet of storm water because our Fresh Water Lake, which serves as our water storage lake, became too full. This combined total quantity of "blended water" (groundwater plus storm water) discharged offsite might seem fairly high by some until it is realized that 1,180 acre-feet of storm water was captured at the site in storage ponds overlying the ASA during 2018. Because it is unavoidable that the water in these ponds contains blended water, we always determine the percentage of groundwater of the water being discharged offsite to know how much groundwater is being released. On a side note—if we could have somehow separated the two waters, and then discharged only the storm water portion, we would not have been required to discharge any groundwater during the year. Most importantly, this

shows that the rainfall, particularly heavy rains, are the cause for having to discharge any water from the site.

We continue to use the least controversial methods (very conservative approach) of calculating groundwater concentrations in the Mine Pit and the Fresh Water Lake, even though it causes our calculated 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, we acquired some additional land during 2017, 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 some conservative assumptions that we have always used in our calculations:

- In trying to keep the lower portion of the Mine Pit located in the eastern part of the Quarry Area relatively dry so our employees can work in this area, we pump most of the rainfall (and any minimal “true” 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 the leakage of the FWL is that every gallon that leaks into the mine pit (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. Therefore, every gallon that we draw from this lake to use in our operations, or every gallon that we discharge offsite, reflects the higher groundwater concentration and causes our reported groundwater consumption to be artificially higher than actual.
- 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. One 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 outfall(s), installing monitoring wells near outfall(s), 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.

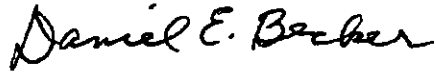
We conclude this report as we did last couple years by stating the following: Dolese Bros. Co. will continue to manage the waters of the Arbuckle Simpson Aquifer in compliance with all rules and regulations that apply to us. We will continue to analyze our water management techniques to make sure we 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 waters are as important to us as they are to the people in our community.

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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

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cc: Mr. Chris Neel, Oklahoma Water Resources Board, 3800 North Classen Boulevard, Oklahoma City, OK 73118

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