DOLESE

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MASONRY

15 January 2021
21-ED-006

Mr. Jason Tutkowski
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 2020, for Dolese Bros. Co. Davis Quarry, Murray County, Oklahoma

Dear Mr. Tutkowski:

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 2020 and for the year 2020.
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 2020 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 MEPS [1]. 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 2020 summary data collected at the Davis Quarry.

Table 1

Accumulation & Disposition of Pit Water during 4th Quarter 2020

	Groundwater Acre-Feet	Surface Water Acre-Feet	Total Acre-Feet
Water Entering The Mine Pit	**25.12**	**50.71**	**75.83**
Water Diverted From The Mine Pit Into Fresh Water Lake	**25.12**	**50.71**	**75.83**
Water Removed From Fresh Water Lake	**277.56**	**974.97**	**1,252.53**
Water Returned To Fresh Water Lake	**209.84**	**737.10**	**946.94**
Water Returned To Land Surface Overlying ASA[2] Basin	**75.91**	**266.63**	**342.54**
Water Consumptively Used	**6.28**	**(See Table 3 for Calculations)**	

Table 2

Water Fluctuations of Fresh Water Lake during 4th Quarter 2020

Average Size of Lake	**31.57 acres**
Loss in Water Elevation	**1.65 feet**
Loss in Lake Volume	**52.09 acre-feet**

Table 3

Consumptive Use Summary for 4th Quarter 2020

	Activity or Location	Amount of Pit Water Used, Acre-Feet	Groundwater Content Percent	Groundwater Component, Acre-Feet
1	**North Water Well**	**0.00**	**All**	**0.06**
2	**South Water Well**	**0.00**	**All**	**0.10**
3	**Material Moisture Hauled from Site**	**5.33**	**22.16%**	**1.18**
4	**Land Application for Roadway Dust Suppression**	**22.20**	**22.16%**	**4.92**
5	**Evaporation from Mine Pit**	**0.05**	**33.13%**	**0.02**
6	**Offsite Dewatering**	**0.00**	**22.16%**	**0.00**
For 4th Quarter 2020, Total Groundwater Consumption from ASA at Davis Quarry = 6.28 Acre-Feet				

[2] Arbuckle Simpson Aquifer

Below, in Tables 4, 5, and 6, please find the 2020 Annual Summary data collected at the Davis Quarry.

Table 4

Accumulation & Disposition of Pit Water during 2020

	Groundwater Acre-Feet	Surface Water Acre-Feet	Total Acre-Feet
Water Entering The Mine Pit	**1,194.38**	**596.26**	**1,790.64**
Water Diverted From The Mine Pit Into Fresh Water Lake	**1,194.38**	**596.26**	**1,790.64**
Water Removed From Fresh Water Lake	**2,966.41**	**2,769.01**	**5,735.42**
Water Returned To Fresh Water Lake	**3,237.95**	**2,703.96**	**5,941.91**
Water Returned To Land Surface Overlying ASA Basin	**517.35**	**570.69**	**1,088.04**
Water Consumptively Used	**322.73**	**(See Consumptive Use Summary in Table 6)**	

Table 5

Water Fluctuations in Fresh Water Lake during 2020

Estimated Average Size of Lake	**32.36 acres**
Measured Loss in Water Elevation	**2.70 feet**
Estimated Annual Loss in Lake Volume	**87.37 acre-feet**

Table 6

Consumptive Use Summary for 2020

	Activity or Location	Groundwater Component, Acre-Feet
1	North Water Well	1.09
2	South Water Well	1.81
3	Material Moisture Hauled from Site	11.90
4	Land Application for Roadway Dust Suppression	44.44
5	Evaporation from Mine Pit	0.18
6	Offsite Dewatering	263.31
For Calendar Year 2020, Total Groundwater Consumption from ASA at Davis Quarry =		322.73 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 **(1,186 acres on ASA)*(0.2 ac-ft/acre) = 237.2 acre-feet on the ASA**
From Acreage off the Arbuckle-Simpson Aquifer And Excluded from the ASA Groundwater Rights **(1,630 acres off ASA)*(2.0 ac-ft/acre) = 3,260 acre-feet off the ASA** *NOTE: We have acquired some additional property at Davis Quarry that is located off the ASA. We have adjusted the figures above to reflect these changes.*

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 & Annual Report for 2020, 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 2020 was 322.73 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 additionally include other unused groundwater rights that we have at another site (Big Canyon Quarry) that overlies the western lobe of 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. Both the Davis Quarry property and the other land we own are each located within the western lobe of the ASA. Essentially, we have 237.2 + 266.6 = 503.8 acre-feet of groundwater available to us.

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

- 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.
- 2019: Used 165.44 acre-feet of groundwater, or 69.75% of Davis Quarry's EPS.
- 2020: Used 322.73 acre-feet of groundwater, or 64.06% of Davis Quarry's and Big Canyon Quarry's combined EPS.

The amount of groundwater shown that we consumed during 2020 equates to approximately 64% of our Equal Proportionate Share (EPS) available to this facility. In order to better understand the activities related to this amount of groundwater consumption, it is important to note that roughly 82% of the groundwater consumed was associated with offsite dewatering because of high-water conditions in the FWL during the first three quarters, caused by rainfall. The remaining amount that we consumed throughout the year (approximately 18% 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 the 1st, 2nd, and 3rd Quarters of 2020 was very significant, and definitely considered above-average rainfalls. Here is a summary of the rainfalls recorded during 2020, along with the estimated equivalent runoff amounts.

Period	Rainfall	Equivalent Runoff
First Quarter 2020	14.0 inches	5.47 inches
Second Quarter 2020	20.1 inches	11.04 inches
Third Quarter 2020	17.5 inches	9.14 inches
Fourth Quarter 2020	7.5 inches	2.39 inches
Total	**59.10 inches**	**28.04 inches**

The calculated groundwater content percentages of the Fresh Water Lake (FWL) during each of the quarters are as follows.

Period	Groundwater Concentration in FWL
First Quarter 2020	51.22%
Second Quarter 2020	64.16%
Third Quarter 2020	52.41%
Fourth Quarter 2020	22.16%

One interesting thing we noticed this year was the effects of the quarterly rainfall totals on the calculated groundwater percentages of the FWL had the opposite effect than observed in previous years. In previous years, when we've had significant rain totals during a given quarter, the calculated groundwater concentration of the FWL usually decreased. And, conversely, when the rain totals were lower in a given quarter, the calculated groundwater concentration in the FWL typically became higher. We are uncertain what exactly has caused this trend to differ this year. We noticed the calculated groundwater percentages of the FWL were actually higher during quarters when we received higher rainfall amounts. We will continue to monitor this trend in the coming quarters to see if it continues. Our first thought was that by mining deeper it has caused us to truly enter the ASA groundwater. You will recall in previous reports that we did not believe that we were mining below the groundwater. However, the very low, calculated groundwater concentration (22.16%) in the FWL during the 4th Quarter 2020 makes us believe that we still could be above the ASA water table–because typically when we get less than 8 inches of rain in a quarter, the groundwater concentration is rather high. The following paragraph recaps the reason we believed that we had seen the trend of the groundwater percentage in the FWL significantly increasing when we have had quarters with minimal rainfall in the past:

> *During quarters in which the storm water inflow to the Mine Pit is minimal, 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, 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–

Year	Total Rainfall (inches)
2013	34.17
2014	36.20
2015	77.15
2016	40.50

Year	Total Rainfall (inches)
2017	43.50
2018	62.15
2019	47.80
2020	59.10

The 59.10 inches of annual rainfall measured (using rain gauges) at Davis Quarry during 2020 was considerably above the average annual rainfall of 37 inches per year for Davis, Oklahoma. During this year of significant precipitation, we were required to discharge 263.31 acre-feet of groundwater blended with another 210.80 acre-feet of storm water. The reason for these offsite discharges is 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 over 935 acre-feet of storm water was captured at the site in storage ponds overlying the ASA during 2020. Because it is unavoidable that the water in these ponds contain blended water, we estimate 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. Please note that no water was discharged from the site during Fourth Quarter 2020 when we received only 7.5 inches of rain, and our FWL level actually dropped during this timeframe. This leads us to believe we weren't pumping much groundwater from the Mine Pit or the FWL would have continued to rise.

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 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 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 part of the Mine Pit (located in the eastern part of our Quarry Area) relatively dry so our employees can work in this area, we pump most of the rainfall runoff (and any potential 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 and visibly 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 uncontrollable leakage of the FWL is that every gallon that leaks into the mine pit (and 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. Every gallon that we draw from this FWL to use in our operations, or every gallon that we discharge offsite from it, reflects the higher groundwater concentration and causes our reported groundwater consumption to be artificially higher than actual.

- Now, and in the past, we have never claimed any augmentation credits for the discharge of 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).

We conclude this report as we did the last few 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 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

Daniel E. Becker, P.E.
Environmental Engineer
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cc: Mr. Matt Cogburn, Oklahoma Water Resources Board, 3800 North Classen Boulevard, Oklahoma City, OK 73118
Mr. Chris Neel, Oklahoma Water Resources Board, 3800 North Classen Boulevard, Oklahoma City, OK 73118