



16-March-2022
22 -ED-029

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 2021 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 2021 and for the year 2021.
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 2021 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 2021 summary data collected at the Davis Quarry.

Table 1

Accumulation & Disposition of Pit Water during 4th Quarter 2021

	<u>Groundwater</u> Acre-Feet	<u>Surface Water</u> Acre-Feet	<u>Total</u> Acre-Feet
Water Entering The Mine Pit	100.25	72.54	172.79
Water Diverted From The Mine Pit Into Fresh Water Lake	100.21	72.52	172.73
Water Removed From Fresh Water Lake	579.64	655.85	1235.49
Water Returned To Fresh Water Lake	520.83	589.30	1110.12
Water Returned To Land Surface Overlying ASA² Basin	122.23	138.29	260.52
Water Consumptively Used	14.46	(See Table 3 for Calculations)	

Table 2

Water Fluctuations of Fresh Water Lake during 4th Quarter 2021

Average Size of Lake	30.67 acres
<u>Loss</u> in Water Elevation	2.88 feet
<u>Loss</u> in Lake Volume	88.32 acre-feet

Table 3

Consumptive Use Summary for 4th Quarter 2021

	Activity or Location	Amount of Pit Water Used, Acre-Feet	Groundwater Content Percent	Groundwater Component, Acre-Feet
1	North Water Well	0.00	All	0.03
2	South Water Well	0.00	All	0.09
3	Material Moisture Hauled from Site	5.58	46.92%	2.62
4	Land Application for Roadway Dust Suppression	24.90	46.92%	11.68
5	Evaporation from Mine Pit	0.06	58.02%	0.04
6	Offsite Dewatering	0.00	46.92%	0.00
For 4th Quarter 2021, Total Groundwater Consumption from ASA at Davis Quarry = 14.46 Acre-Feet				

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² Arbuckle Simpson Aquifer

Below, in Tables 4, 5, and 6, please find the 2021 Annual Summary data collected at the Davis Quarry.

Table 4

Accumulation & Disposition of Pit Water during 2021

	<u>Groundwater</u> Acre-Feet	<u>Surface Water</u> Acre-Feet	<u>Total</u> Acre-Feet
Water Entering The Mine Pit	755.08	353.52	1108.60
Water Diverted From The Mine Pit Into Fresh Water Lake	754.84	353.42	1108.25
Water Removed From Fresh Water Lake	3084.97	2204.35	5289.33
Water Returned To Fresh Water Lake	2976.18	2168.18	5144.36
Water Returned To Land Surface Overlying ASA Basin	629.12	435.54	1,064.66
Water Consumptively Used	94.66	(See Consumptive Use Summary in Table 6)	

Table 5

Water Fluctuations in Fresh Water Lake during 2021

Estimated Average Size of Lake	31.88 acres
Measured <u>Loss</u> in Water Elevation	2.34 feet
Estimated Annual <u>Loss</u> in Lake Volume	70.09 acre-feet

Table 6

Consumptive Use Summary for 2021

Activity or Location	Groundwater Component, Acre-Feet
1 North Water Well	0.16
2 South Water Well	0.37
3 Material Moisture Hauled from Site	13.22
4 Land Application for Roadway Dust Suppression	62.08
5 Evaporation from Mine Pit	0.24
6 Offsite Dewatering	18.58
For Calendar Year 2021, Total Groundwater Consumption from ASA at Davis Quarry = 94.66 Acre-Feet	

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Water Monitoring Plan Report
4th Quarter 2021 and 2021 Annual Summary
for Dolese Bros. Co. Davis Quarry
Murray County, Oklahoma

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 2021, 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 2021 was 94.66 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.
- 2021: Used 94.66 acre-feet of groundwater, or 39.9% of Davis Quarry's EPS.

The amount of groundwater shown that we consumed during 2021 equates to approximately 40% 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 80% of the groundwater consumed pertains to 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 remaining 20% was associated with offsite dewatering during the second quarter of 2021.

Rainfall for 2021 was about average for Murray County. The quarterly rainfall amounts are summarized in the table below. 40.8 inches of rainfall was recorded at Davis Quarry during 2021 and 40.29 inches is the average annual rainfall for Murray County according to the Oklahoma Climatological Survey.

Period	Rainfall	Equivalent Runoff
First Quarter 2021	5.6 inches	1.6 inches
Second Quarter 2021	19.1 inches	9.3 inches
Third Quarter 2021	8.9 inches	2.2 inches
Fourth Quarter 2021	7.2 inches	3.4 inches
Total	40.8 inches	16.5 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 2021	70.35%
Second Quarter 2021	41.69%
Third Quarter 2021	76.27%
Fourth Quarter 2021	46.92%

During 2021, we recorded fluctuating ground water concentrations. In the previous table, you can see the groundwater concentration of the FWL rise and fall through the quarters. It is logical that the concentration of groundwater to surface water in the FWL would fluctuate depending on precipitation. If we get a lot of rain, like in the second quarter, the ground water in the FWL would essentially be diluted by rainwater runoff from the large watershed. However, in quarter four we noticed that the groundwater concentration fell considerably during a period of little rainfall. During this time period, we also noticed a decline in the water coming through the wall between the FWL and mine pit. The level of the FWL dropped to its lowest elevation of the year. This further supports our assumption that the water coming out of the wall into the mine pit is seepage from the FWL and not groundwater from the ASA. When the elevation drops to a certain point, the flow into the mine pit becomes minimum. For a review, a recap of the total rainfall is summarized in the table below.

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Year	Total Rainfall (inches)
2013	34.17
2014	36.20
2015	77.15
2016	40.50
2017	43.50

Year	Total Rainfall (inches)
2018	62.15
2019	47.80
2020	59.10
2021	40.80

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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, P.E.
Environmental Engineer

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
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