DOLESE

CONCRETE
SAND & GRAVEL
STONE
BLOCK
MASONRY

14 September 2015
15-ED-296

Mr. Kent Wilkins, Assistant Chief
Planning and Management Division
Oklahoma Water Resources Board
3800 North Classen Boulevard
Oklahoma City, OK 73118

RE: Water Monitoring Plan Report, 2nd Quarter 2015, for Dolese Bros. Co. Davis Quarry, Murray County, Oklahoma

Dear Mr. Wilkins:

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 2nd Quarter 2015.
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 2nd Quarter 2015 Report. 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

[1] Mine's Equal Proportionate Share

DOLESE BROS. CO.
20 NW 13th Street • P.O. Box 677
Oklahoma City, OK 73101-0677
405.235.2311
dolese.com

monitoring plan and all of the data collected and procedures used to support the calculations and results reported.

- The Davis Quarry is currently 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. Additionally, "example calculations" used in the First Quarterly Monitoring Report for 2013 have already been submitted to the OWRB for review and analysis.

Below, in Tables 1, 2, and 3, please find the 2nd Quarter 2015 summary data collected at the Davis Quarry.

Table 1–2nd Quarter 2015

ACCUMULATION & DISPOSITION OF PIT WATER Acre-Feet	
Water entering the Mine Pit	
Groundwater	198.73
Surface Water	482.47
Total	**681.20**
Water diverted from the Mine Pit into Fresh Water Lake (FWL)	
Groundwater	61.53
Surface Water	213.63
Total	**275.16**
Water removed from Fresh Water Lake (FWL)	
Groundwater	198.30
Surface Water	719.31
Total	**917.61**
Water returned to Fresh Water Lake (FWL)	
Groundwater	222.84
Surface Water	808.35
Total	**1031.19**
Water returned to Land Surface overlying Arbuckle Simpson Aquifer (ASA) basin	
Groundwater	10.22
Surface Water	37.08
Total	**47.30**
Water consumptively used	
Groundwater (See Table 3 for calculations)	**67.26**

Table 2–2nd Quarter 2015

Water Fluctuations in the Fresh Water Lake (FWL)	
Average Size of Lake	32.32 acres
Gain in Water Elevation	2.59 feet
Gain in Lake Volume	83.71 acre-feet

Table 3

Consumptive Use Summary for 2QTR15

	Activity or Location	Amount of Pit Water Used, Acre-Feet	Percent Ground-Water	Groundwater Component, Acre-Feet
1	North Water Well	0.00	All	0.58
2	South Water Well	0.00	All	1.09
3	Material Moisture Hauled from Site	5.03	21.61% *(0.2161)	1.09
4	Land Application for Roadway Dust Suppression	11.09	21.61% *(0.2161)	2.40
5	Evaporation from Mine Pit	16.82	22.36% *(0.2236)	3.76
6	Offsite Dewatering	269.99	21.61% *(0.2161)	58.34

For 2QTR15,
Total Groundwater Consumption from ASA at Davis Quarry =
67.26 Acre-Feet

Below, in Table 4, please find the Groundwater Rights Summary for the Davis Quarry.

Table 4

Groundwater Rights

Davis Quarry Groundwater Rights

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 this Second Quarterly Report for 2015, we believe that the Davis Quarry remains in full compliance with all of the regulations that allow the continuance of its preexisting exemption.

Our calculated estimates show that Davis Quarry's total groundwater consumption for Second Quarter 2015 was 67.26 acre-feet. This amount equates to 31.1% of this quarry's annual Arbuckle Simpson Aquifer (ASA) water rights. We have 216.6 acre-feet of water rights over the ASA at the Davis Quarry location; however, our total available water rights for this site could also include other significant unused water rights that we own at another large site that overlies the ASA in Murray County.

As everyone in this region is aware, the Second Quarter of 2015 (2QTR15) was drastically different, weather-wise, than the First Quarter of 2015 (1QTR15). During 1QTR15, we received 6.3 inches of rainfall at Davis Quarry; whereas, during 2QTR15 we received 39.1 inches of rain.

As I have reiterated in most of the previous Quarterly Water Monitoring Reports, we still firmly believe and can document that our groundwater percentages and consumptive use figures are overstated, particularly during 2QTR15. One thing we cannot currently quantify is the extent to which these figures are overstated. So, to avoid any controversy, we wanted to use a very conservative approach. Here are the reasons why our groundwater percentages and consumption figures are intentionally overstated:

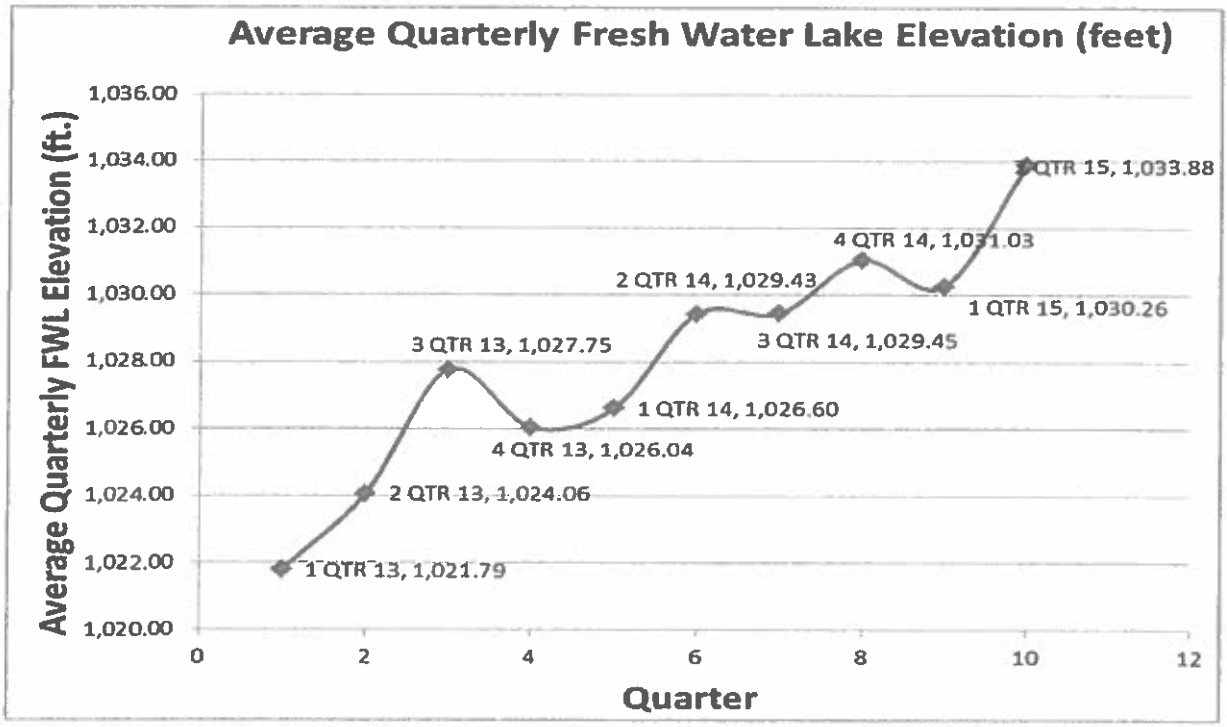
- During 2QTR15, we noticed that the Fresh Water Lake (FWL) was leaking back into the Mine Pit at the fastest rate ever observed. This rate of leakage increased because the water in the FWL reached its highest level ever recorded during 2QTR15; and, the higher the water level in the FWL, the more cracks and crevasses that become available for water to leak back into the Mine Pit. And, since we chose to count all of this leakage as groundwater seepage (because we have no way of "quantifying" this leakage–so, we simply have to "assume" that it is coming from the ground, as groundwater)–we certainly realize that our groundwater concentrations and consumption figures will be significantly inflated. Regardless, the groundwater concentration in the Mine Pit and FWL during Second Quarter 2015 was estimated to be 22.36% and 21.61%, respectively.
    - On a side note, during 1QTR15, when the measured rainfall was only 6.3 inches for the entire quarter, the leakage of the FWL into the Mine Pit caused the groundwater concentration to "appear" to skyrocket to 76.51% and 61.99% for the Mine Pit and FWL, respectively. It is easy to see the relationship between quarterly rainfall amounts and the calculated groundwater concentration. Generally, during quarters with minimal rainfall, the calculated groundwater concentration will increase; and conversely, during quarters with excessive rainfall, the groundwater concentration will decrease. Essentially, the large

volume of rainfall entering the Mine Pit during Second Quarter 2015 far exceeded the amount of leakage from the FWL into the Mine Pit–diluting the calculated concentration of groundwater.

  - If you stop and consider the significance of the change in groundwater concentration between the First and Second Quarter 2015, it is noteworthy. Our conservative calculations show that the groundwater concentration in the Mine Pit went from 76.51% down to 22.36% in one quarter! And, we can even prove that the reported groundwater percentage of 22.36% is too high because we counted all FWL leakage into the Mine Pit as groundwater. It would not be surprising to someday learn that the groundwater concentration was actually less than 10%.

- The above discussion brings about the debate as to what is truly groundwater entering the Mine Pit versus what is delayed storm water seepage. This debate is somewhat complex. One could argue that if the Mine Pit remained dry as it did during a two-week drought period during a recent summer–that the level of the Mine Pit floor (working area of the quarry) could not have been beneath the water table level of the ASA. And, similarly, one could argue that once a storm event occurs at the site, an initial surge of runoff water would enter the Mine Pit in the first day or so, and then the remainder of the water from the storm (minus losses) would trickle in during the next few weeks–and that this trickle of water was not truly ASA groundwater. Currently, to avoid this debate, we have counted this entire continual trickle of water from recent storm events as groundwater, even though our current Mine Pit is not likely within the ASA at all. Again, we have taken a very conservative approach.
- On 2 June 2015, the FWL reached the highest elevation that we have ever measured, which was 1,037.2 feet. Later in the month, after taking this measurement, we received a few more inches of rain before we were required to discharge some water from the site (explained in detail later in this report); so, the FWL likely went slightly higher than this elevation before offsite discharge began. The average elevation of the FWL for Second Quarter 2015 was 1,033.88 feet, as shown on the graph below. This average is an all-time high for this 40+ year old quarry.

RECEIVED
SEP 14 2015
Oklahoma Water Resources Board



Offsite Discharge

As mentioned above, we were required to discharge some water offsite during Second Quarter. Please find a detailed explanation of the offsite discharge, below.

The groundwater consumption figure reported for 2QTR15 is much higher than any previously reported figure because we were required to discharge water (containing mostly storm water, but with some groundwater) from our facility due to the record-setting rains that fell in this region during May and June 2015. The discharge of this water (particularly the groundwater portion) is counted as a consumptive use according to our current SSWMCP[2]. During these months of extreme rainfall at the quarry, we recorded 19.40 inches and 15.40 inches of rain in May and June 2015, respectively. The measured rainfall at Davis Quarry during this two-month period was approximately 90% of a typical year's rainfall.

During these two months, our Mine Pit gained approximately 406.04 acre-feet of water, and our Fresh Water Lake gained approximately 57.65 acre-feet of water. And, the Fresh Water Lake (FWL) recharged approximately 12.03 acre-feet of water into the aquifer during this timeframe. All combined, the Davis Quarry "retained/recharged" at our site just over 475 acre-feet of water during these periods of record rainfall.

[2] Site Specific Water Management and Conservation Plan

For the first 6.5 weeks of this nearly 9-week period of persistent rains, we retained all of the runoff from these significant storm events on site. And, we had every intention of holding all of this storm water onsite until the following events occurred:

Events causing Davis Quarry to discharge water offsite

- The majority of our Mine Pit (working area of the quarry) became inundated. The rising water was not far from blocking our ramp and travelways that would have caused us to shut-down the Primary Plant completely and cease production. This flooding in the Mine Pit forced us to abandon the area where we had been mining stone, and caused us to move to another higher area to work.
- At the same time the Mine Pit was flooding, the Fresh Water Lake (where we store the water being transferred from the Mine Pit) became so full, that it began to inundate two (2) of our large stationary pumps and our 10,000-gallon holding tank–each of which is very important to our wash plant operation.
- And, the final factor causing us to discharge water offsite beginning on the 15th of June 2015 was that the meteorologists were forecasting another 8+ inches of rain within the next two (2) days.

So, we reluctantly began to discharge water at varying flow rates that ranged from 5.65 to 13.10 cubic feet per second. On the second day of discharging, the very heavy rains began to fall, just as forecasted, except heavier than predicted and more prolonged. During this giant 12.1 inch rain event spanning approximately 24 hours, we estimate the inflow rate of storm water into the watershed of the Mine Pit/FWL rain ranged from 126 cubic feet per second to approximately 500 cubic feet per second. The low-end inflow estimates were based on a uniform rainfall rate of 0.5 inches per hour during the entire 24-hours; whereas, the high-end inflow estimates were based on possible rainfall rates of 2-inches per hour.

During this intensive rainfall event on 17-18 June 2015, we were releasing water at approximately $1/10^{th}$ to $1/39^{th}$ of the storm water inflow rate entering the Mine Pit/FWL. The above-listed figures and calculations plainly show the overall effectiveness of the Davis Quarry as a storm water "detention pond" during the substantial flooding that occurred in this region. Very few properties within the Arbuckle Simpson region and surrounding areas have the ability to detain the majority of the storm water that falls on their sites during extreme storm events as does a typical mining facility. During heavy storm events, most property owners have no choice but to allow storm water to run off their land as quickly as it falls from the sky.

Also, during this large storm that occurred on 17-18 June 2015, the Washita River's resulting peak flow rate was estimated to be over 100,000 cubic feet per second at the Dickson, Oklahoma, monitoring station (nearest known USGS monitoring station located downstream of the Davis Quarry). And, during this time, Davis Quarry was discharging from our site at rates of only 5.65 to 13.10 cubic feet per second. The maximum flow rate of water that we

discharged during this period equated to roughly 1/10,000th of the flow rate of water in the Washita River near Dickson during peak flow during this period.

In Davis Quarry's *Site Specific Water Management and Conservation Plan for an Exempt Mine* (SSWMCP) submitted to the Oklahoma Water Resources Board on 19 December 2012, we outlined our procedures for water management at the site. In part, these included the following procedures (emphasis added, by underlining):

- *Maintaining "near-full" water conditions in the Fresh Water Lake is a high priority of Dolese Bros. Co. for numerous reasons.*
  - *One reason includes the fact that this lake has been determined to be a "recharging pond" that beneficially recharges the Arbuckle Simpson Aquifer (ASA). Most of the water that enters this fresh water lake is comprised of storm water runoff that has been captured in our Mine Pit and pumped to the Fresh Water Lake so that it can be detained on site to allow a continual recharge of the aquifer.*
  - *Maintaining near-full water conditions in our lake also allows us to have an adequate supply of water to operate our facility, which is highly dependent upon these waters.*
  - *And, our last reason for keeping this lake nearly full is to allow us to have sufficient water storage available to pump to downstream users in times of need, in the form of stream augmentation.*

- *Stream augmentation or <u>offsite discharge typically occurs at this facility under two (2) circumstances</u>.*
  - *<u>(1) When heavy and/or prolonged rains occur at the facility, such that retention of storm water is no longer a feasible option because the recharge pond(s) would be full, the mine pit would be full, and we would have no additional storage capacity available at the site.</u>*
  - *(2) When we learn that downstream area users could use some additional water in the stream network.*
- *It is important to note that during the first circumstance outlined above, the Davis Quarry <u>will make every effort</u> to avoid the discharge of water during "flooding conditions."*
  - *<u>If possible</u>, we will delay our discharge until the levels of flood waters in the creeks are reduced.*

As one can see, we have always followed the water management procedures outlined in our SSWMCP, particularly during Second Quarter 2015. On 15 June 2015, when the rising waters began to inundate two (2) of our electric motors, two (2) pumps, and one (1) large water tank on the bank of the Fresh Water Lake (FWL); and, when our Mine Pit (working area) became so flooded that water had nearly shut-down the quarrying operation–we were forced to discharge water offsite. As documented in our SSWMCP submitted to OWRB in 2012, we stated that we would make every effort to avoid the discharge of water during flooding conditions–and, this is exactly what we did. We made every effort to avoid any discharge as long as possible; that is, until our operation and equipment were in jeopardy. Unfortunately, we waited too long to begin pumping, and these pumps were submerged by

the high water level in our FWL. The bearings and packing were damaged in one of the pumps, new parts had to be ordered, and the pump was inoperable for a period of time.

Additionally, we spent tens of thousands of dollars this year preparing our FWL so that it could hold the maximum amount of water possible. This work involved rebuilding the catwalk (walkway, with handrails) that provide safe access to two (2) different large floating pumps, filling and leveling a very large area 6-7 feet deep with crushed stone located north of these large fresh water pumps so that we would have access to these floating pumps as the water levels were rising, and we conducted a re-routing on the electric wiring to these pumps so they would be accessible during periods of high waters. We also elevated and re-routed the large diameter pipes that carry water from these floating fresh water pumps to the bank. All of this work was conducted only so that we could store larger quantities of water at our facility.

And, finally, since we needed to conduct some equipment changes near where the pumps and tank flooded, we decided during this process to raise all of this equipment to higher land so that we can hold even more water in the FWL during extreme flood events–in hopes that we can store more valuable water at our site, and completely avoid any discharge during future flooding events.

Dolese Bros. Co. has been an integral part of Southern Oklahoma since early statehood. We were operating in Murray County at our Big Canyon Quarry along the Washita River in 1910 until it became inactive in 1993. During this time, we have always tried to assist our neighboring communities, and we will continue to assist them as long as we exist. We have observed numerous floods and droughts during this time, and we have learned to work with our neighbors and communities so that we may all persevere throughout these difficult times. We look forward to working with the residents of Southern Oklahoma in the years to come, as many of these people are part of our workforce. Dolese has always been very open and transparent concerning how we manage water at Davis Quarry–as we are very proud of this facility.

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

dh