Mr. Patrick Lennberg
Environmental Protection Specialist
Department of Natural Resources
Division of Reclamation, Mining and Safety
Room 215
1313 Sherman Street
Denver, CO 80203

Via Email

RE: Additional Information Request No. 2
Lyons Quarry, Permit No. M-1977-208
Y22Q1 Groundwater Monitoring Report, C-Pit

Dear Mr. Lennberg:

On June 6, 2022, CEMEX received a second letter from Division of Reclamation, Mining and Safety (DRMS) titled "AdditionalInfoNeeded_No2_M77208_1Q2022.pdf" related to our 2022 1st Quarter Groundwater Monitoring Report. Below are CEMEX's responses in *italic font* to the requested items 1 and 2:

1. The Operator stated the analytical values are reported as Total values. In Technical Revision 11 the Operator's adequacy review responses date October 11, 2011, the response to comment #3, the Operator committed to analyzing groundwater samples for Selenium and Thallium and comparing those results to Table 1, Drinking Water Standards, of CDPHE Water Quality Control Commission 5 CCR 1002 -41 Regulation No. 41. A review of Table 1 indicates the standards for Selenium and Thallium are based off of dissolved results. The Operator, beginning with second quarter 2022, will be required to field filter the samples using a 0.45 micron filter and provide the dissolved analytical results. Please acknowledge this permit requirement beginning the second quarter 2022 and moving forward.

   CEMEX Response:

   Upon receipt of this June 6th letter, CEMEX had already completed second quarter 2022 Groundwater sampling and analytical as unfiltered. However, CEMEX acknowledges the samples to be filtered beginning with the third quarter 2022 sampling program and hereafter.

2. For CEM-005 the Operator stated water level detection and well purging occur during the quarterly monitoring but groundwater does not recharge in sufficient time to collect a sample. Please provide the field data sheet, forms, or other documentation that clearly demonstrates the well was monitored in first quarter 2022 as stated. Additionally, CEM-005 is a point-of-compliance well for the site. Has the Operator evaluated using other sampling methods, such as passive and no-purge sampling devices, to collect a sample from the well? It is incumbent upon the Operator to collect samples from the point-of-compliance well to document compliance and facilitate eventual release of the permit.

CEMEX Response:

CEMEX has attached a PDF Excerpt of Technical Revision 8 (TR-8) for the CEMEX Lyons Quarry (M1977-208). This includes a description of the CEM-005 well including the Technical Boring Log. In addition, Field Notes from Q1 2022 have been included per the DRMS request.

The point-of-compliance well CEM-005 was sited and completed across both the Carlile Shale and Ft. Hayes Limestone formations with understanding and approval from DRMS. The bottom portion of the 0.01-inch slot well screen (approximately 10 feet in depth) is within the shale whereas the sand filter pack extends up into the limestone (approximately 10 feet above the top of the screen). As designed, the screen and sand pack monitor the Ft. Hays Limestone formation which, historically, has not produced sufficient water for sampling. Furthermore, additional language from TR-11 states the following:

> *"However, well CEM-005 (the dry well), which was completed in the Fort Hays 2,700 feet down dip from CEM-001 at the eastern extent of CEMEX's property, confirmed that this geologic unit does not transmit water."*

and

> *"[Since installation,] CEM-005 was not influenced by changes in C-pit water levels and it was determined that it is extremely unlikely that water from C-pit could connect with the St. Vrain aquifer"*

Passive sampling has been evaluated but would not provide accurate water quality data as the limited volume of water and recharge time following purging is well beyond Standard Operating Procedures for groundwater collection.

If there are any questions regarding this Response Letter, please feel free to contact me at scotta.harcus@cemex.com or via phone at 303-823-2124.

Best Regards,

Scott A. Harcus
Lyons Plant
Environmental Manager

ENCLOSURES:

- M1977-208 TR-8 Excerpt: CEM-005 Summary and Technical Bore Log
- Q1 2022 Groundwater Sampling notes

C-Pit and Wells Monitoring

CEMEX Lyons Plant
Field Notes

Date:							
	Location		Date	Time of Sample	pH		
	C-Pit		3/15/22	15:45	11.41		
	A-Pit		3/15/22	15:30	7.69		
	Well Number	TD (ft below top of casing)	Date	Depth to Water (Decimal Feet)	Time of Measurement	Time of Sample	pH
	CEM-001	144	3/15/22	~~[illegible]~~00	15:30	16:00	8.24
	CEM-004	23.03	3/15/22	11.02	16:30	16:45	7.48
	CEM-005	400	3/15/22	393.98	10:00	--	--
	CEM-002	82.43					
	CEM-003	84.84					
	P-001	17.46					
	P-002	13.44					
	P-003	18.49					
	P-004	12.17					
	P-005	12.4					
	P-006	12.04					

CEM 005 396.6 = Measured Depth

Adjusted water level = 396.6 - 2.62 = 393.98

=> Purge 5.9 gallons

Purged ≈ 4.5 gallons before well dewatered

Water Depth Measure @ 12:00 = 400.65 (-2.62)

Data Logger: Pressure : ft H2O

CEM-004: 11.02'

23.5 - 11 = 12.5 => Purge 5.4 gallons

Monitoring wells CEM-001 (previously installed by others), CEM-002, and CEM-003 were geophysically logged using induced gamma-ray and formation resistivity after completion of the wells. Copies of the logs are in Appendix D.

Figures 3, 4 and 5 depict three cross sections taken through the C-Pit area, oriented as indicated on Figure 2. These sections display the geology in and around the C-Pit site, based upon interpreting the information obtained during the drilling program, aerial photography and the mining history of the site. As shown on Figure 5 (Section C-C'), two additional bore holes were made at the haul road intersection immediately northeast of C-Pit to determine the depth to bedrock in this area. The drilling indicated that a block of residual bedrock (Smokey Hill Shale) separates the water in C-Pit from the St. Vrain Creek alluvial system to the north.

2.5 Compliance Well CEM-005

Compliance Well CEM-005 was located after consultation with DRMS at a February 22, 2007 meeting at the CEMEX Plant. CEM-005 was designed to monitor the Fort Hays Limestone unit approximately 2,700 feet southeast (down-dip) of monitoring well CEM-001. Figure 2 shows the location of CEM-005 relative to C-Pit and the monitoring well network established around C-Pit.

CEM-005 is a 4-inch well with PVC casing, drilled to a total depth of 401 feet below ground surface (bgs) on May 14 and 15, 2007. Prior to setting the screen and casing, the open borehole was geophysically logged using induced gamma-ray and formation resistivity to determine the elevations of the contacts between the Fort Hays Limestone, the Smoky Hill Shale above the Fort Hays, and the Carlile Shale unit below. The 10-foot screen was set from 388 to 398 feet bgs and sand packed with 10-20 washed silica sand to 378 feet bgs. The annulus above the sand pack was grouted with bentonite grout from 378 feet bgs to the ground surface. Together, the screen and sand pack monitor the Fort Hays Limestone at the approximate elevations 4836 to 4816 feet amsl (378 to 398 feet bgs) at this location.

Figure 9 shows the well construction details and lithology of CEM-005.

CEM-005 was first sampled on May 22, 2007, after the well had been completed, grouted, and developed five days previously. Prior to obtaining the sample, the water in the well was removed by the driller through bailing with a 4-inch bailer, from an initial level at approximately 20 feet bgs down to 390 feet bgs, at which time the water level was allowed to recover to 389.75 feet bgs over the course of one hour. Prior to sampling, the well was bailed again and was allowed to recover for another hour before collecting a final bailer volume for the sample. The analytical results are summarized on Table 2.

CEMEX personnel gauged the depth to water at CEM-005 on June 19, 2007 and determined the water level was 394.85 feet below the top of casing (btoc), or elevation 4822.38 amsl, confirming that very little recharge had occurred since the initial sampling of May 22, 2007. The water elevation in C-Pit and potentiometric head elevation at well CEM-001 on June 15, 2007 were approximately 5211 and 5213 amsl, respectively.

On July 3, 2007, Brown and Caldwell personnel returned to CEM-005 and determined the water level was 394.32 feet btoc, or elevation 4822.91 amsl. The water level was lowered to 395.99 feet btoc by hand bailing, and after approximately three hours only 0.03 feet of recovery in the water level was noted. On July 10, 2007, Brown and Caldwell personnel returned and measured the depth to water in CEM-005 to be 395.69 feet below the top of casing, or elevation 4821.54 amsl.

Log of Borehole: CEM-005

Figure 9

Project Name: CEMEX Lyons Plant
Project Location: Lyons, CO

Project Number: 129142.005

Drilling Method: Mud Rotary
Drilling Rig Type: Star 30 KDH
Dilling Fluid: Water
Boring Diameter: 12.75/6.0 inches
Boring Depth: 410 feet bgs
Well Depth: 398 feet
Well Completion: Stick-up

Well Casing Material: 4" Scheduel 40 PVC
Well Screen Material: 4" PVC, 0.01-inch slot
Depth to Groundwater at Time of Drilling: N/A
Depth to Groundwater 06/19/2007:
394.85 feet bTOC
TOC Elevation: 5217.23 feet AMSL
Groundwater Elevation: 4822.38 feet AMSL

AMSL - Above mean sea level
bgs - below the ground surface
bTOC - below Top of Casing Elevation

Logged By: T. Van Arsdale
Checked By: A. Notary

Depth (feet)	Graphic Log	Lithologic Description	Monitoring Well Construction
350			
355			
360			
365			
370			
375			
380	Limestone	**Limestone;** light brown to light gray, moderately to strongly indurated , blocky, interbedded with shale (approximately 20% shale).	Sand filter pack from 378 feet bgs.
385			
390	392		0.01-inch slot screen from 398 feet bgs.
395	Shale	**Shale;** dark gray to black, hard, moderately indurated, calcareous.	

Drilling Company: Ingram

Date Started: 5/14/2007 Date Completed: 5/17/2007

BROWN AND CALDWELL

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