July 6, 2021, ADI Letter #5

Response to questions concerning sound study, blasting, and post-reclamation lakes

1. *Concerning the sound study your firm conducted for this modification, please provide the items below:*
    a. *The reasoning for using a slow response vs a fast response when recording with the sound meters,*
    b. *An explanation of how intrusive noises were differentiated from other background noises, and*
    c. *Data showing the blasts during the noise study were equivalent in size and location to typical production blasts.*

WSC Response

Responses to questions 1.a. and 1.b. were provided verbally during a TEAMS call between NCDEMLR, Wake Stone Corporation, and WSP, USA Inc. on June 25, 2021. Erich Thalheimer of WSP has summarized those responses in the attached memorandum sent to Sam Bratton, President of Wake Stone Corporation on July 8, 2021.

WSC Response to Question 1.c.

Two typical production blasts occurred during the noise study data collection period. The first blast occurred on November 18, 2020 at 1:39PM. This blast was located on the -40'MSL production bench (42' bench height) and consisted of 30 blast holes. A total of 14,617 pounds of explosive agents were utilized to generate approximately 16,000 tons of shot rock for production through the primary and secondary plants. The blast event had a maximum duration/delay of 0.238 seconds. The second production blast occurred on December 9, 2020 at 11:36AM. This blast was conducted on the -40'MSL (42' bench height) production bench and consisted of 33 blast holes loaded with 16,335 pounds of explosive agents. This blast generated 13,798 tons of stone for production through the primary and secondary plants. The blast event had a maximum duration/delay of 0.223 seconds. Copies of the complete blast reports, including wiring/delay diagrams are attached, as are weekly operating summaries for the periods of time during which the blasts were conducted.

Both production blasts conducted during the noise study data collection were "typical" of production blast events occurring at the Triangle Quarry. Wake Stone has previously provided five years (CY 2015-2019) of blast data at the request of David Miller, State Mining Engineer. Comparison of historical blast data and the blast reports for the two production blasts conducted during the noise study period indicates that both blasts were similar in nature to production blasting that typically occurs at the Triangle Quarry.

2. *Reclamation Plan, item 2 of the application, requires that if you plan to reclaim portions of the disturbed area as a lake, to supply an illustration of the location of the body(s) of water on the reclamation map and provide a scaled cross-section(s) through the proposed body(s) of water. Please supply a drawing to meet this requirement.*

WSC Response to Question 2.

In response to question #2 above, Wake Stone has revised its Site Plan set to include Page 13 of 13. This drawing illustrates the anticipated post-mining **Conceptual Reclamation Lakes and** includes a scaled cross-section/profile view illustrating existing ground, proposed ultimate grading, and anticipated water surface elevations across the expansion pit and the original Triangle Quarry pit. The Site Plan set, last-revised August 4, 2021, is included in this response package. This drawing set and the PLD Erosion and Sediment Control Plan drawing set will constitute the final site development drawings to be incorporated in the modified mining permit once issued.

WSP memo in response to Question 1

WSP USA, Inc.
100 Summer Street
Boston, MA 02111
(617) 426 - 7330
www.wsp.com/en-US

MEMORANDUM

To:	Sam Bratton (Wake Stone)
From:	Erich Thalheimer (WSP)
Date:	July 8, 2021
Project Name:	Wake Stone Quarry Noise
Project Number:	31402799.000
Subject:	**Responses to DEMLR ADI Noise Questions 7/6/21**

This memo is intended to respond to recent ADI questions from DEMLR dated 7-6-21 regarding the results of our noise analysis supporting Wake Stone's expansion into Pit 2, and more specifically, our final report of the same dated 3/12/21. The following answers were presented verbally during a conference call with DEMLR on 6/25/21.

Question 1a) *The reasoning for using a slow response vs a fast response when recording with the sound meters.*

Answer 1a) The RMS 'slow' time response for decibel levels was used throughout the entire study and report for consistency with the majority of other noise criteria found for parklands (see Table 1 on page 8 of our report), and for the ability to directly compare "Existing" and "Future" sound levels to determine the relative changes associated with expansion into Pit 2 (which was the primary goal of the study to determine).

The nature of quarry noise, where machinery is operating constantly, is appropriately averaged (Leq) using the 'slow' response. And the 'slow' response can be used to assess loudest (Lmax) blasting noise for the ability to perform direct comparisons to existing levels (see page 22 of our report). It is not possible to directly compare a sound level using 'slow' to one using 'fast' for a transient event such as blasting.

Question 1b) *An explanation of how intrusive noises were differentiated from other background noises.*

Answer 1b) The terms "intrusive" and "background" are not formally defined in acoustics and were not relied upon in our study. In our study's case, Wake Stone has been operating out of Pit 1 for decades, and thus was considered to be part of the existing ambient noise soundscape. Ambient noise measurements were performed using many commonly used environmental noise metrics such as Lmax, Leq, L1, L10, L50, L90, Lmin, and Ldn. Conservative noise model predictions of Wake Stone's future noise contribution was performed using the energy-average Leq metric for continuous noise sources and the Lmax metric to isolate blasting noise.

Professional Certification:

I hereby certify that this plan, specification, or report was prepared or reviewed by me and that I am a duly certified acoustical professional as recognized by the Institute for Noise Control Engineering (INCE).

Erich Thalheimer

ERICH THALHEIMER
INCE BOARD CERTIFIED NO. 20104

Blasting data in response to Question 2

Wake Stone Corporation

Shot # 43

Powder Co. Dyno Nobel
Address 1201 H Aversboro Rd.
Garner, NC 27529

Name of Quarry	Triangle	Blast Date	12/09/20
Location of Blast	North Wall	PO#	C20-361
Shot GPS	N 35" 50" 26.308	W -78" 46" 11.191	
Time of Blast	11:36am		
Bench Elev. of Blast	-40		
Seismograph Location #1	Embassy Suites		
Seismograph Operator	Stoney Broadwell		
Dist. from Seis. to Blast	2481 Feet		
Dist. to Nearest Non Quarry Bldg.(Ft.)	2481		
(L) PPV.	0.065	FRQ.	19.2
(T) PPV.	0.053	FRQ.	10.7
(V) PPV.	0.045	FRQ.	55.6
DB.	117		

ATF # N/A

Seismograph Location #1
N 35" 50" 02" W 078" 46" 18"

Seismograph Location #2
N W

Seismograph Location #3
N W

Seismograph Location #4
N W

Scaled Distance Calculations

Ground Vibration
Peak Particle Velocity (V) = 0.17 in/sec.

Air Blast

Unconfined Air Overpressure = U=	0.11	psi
Unconfined Air Overpressure =P=	151.81	dBl
Confined Air Blast/Overpressure=	116.81	dBl

Weather: Partly cloudy 45

SHOT PARAMETERS

Type of Shot	Production
Shot Conditions	Wet
Hole Dia.(In.)	5.75
No. of Holes	33
Face Ht. (Ft.)	42
Subdrilling (Ft.)	3
Burden (Ft.)	10
Spacing (Ft.)	12
Stemming (Ft.)	11
Tons per Cubic Yd.	2.24
TOTAL TONS	13798
POWDER FACTOR	0.84
COST PER TON	0.5598
Series in Blast	1
No. of Holes per Delay	3
Max pounds per Delay	1154
Distance Scaled	73

EXPLOSIVES USED

Cartridge

Blastgel 1070 4x20	
Dynosplit C 1-1/4x16	
Dynosplit C 7/8x16	

Boosters

Trojan Spartan SR 3/4 lb	33
SR Trojan 1 lb	
Trojan Spartan 900G 18/CS	33

Free Running

Dyno Mix - 50 lb bagged	
Titan 1000 G (QR740) (Bulk)	16269
Density/Gas Emulsion	1.10
TOTAL POUNDS	16335

DIGISHOT DETONATORS

80 Ft.	60 Ft.	30 Ft.
	33	33

ELEC. DETONATORS USED

	85 Ft.	60 Ft.	24 Ft.
# 4			
# 5			
# 6			
# 7			
# 8			
# 9			
# 10			
# 11			
# 12			
# 13			
# 14			
# 15			
# 16			
# 17			
# 18			
# 19			
# 20			

85' TOTAL	0
60' TOTAL	0
24' TOTAL	0
TOTAL DETONATORS USED	66

Accessories/Services

Shot Bag Unlined 3-1/2	
Shot Bag Unlined 4	
Bore Trak Monitor	
Delivery Only Charge	1
Laser Profile 2D	
Shot Service	
Technical Service	
Digishot Surface Wire 1000ft	
Digishot Surface Wire 1000ft	1

Shot checked by Hunter Bratton

Superintendent Hunter Bratton

Pit Foreman Alvin George

Blaster in Charge Alvin George

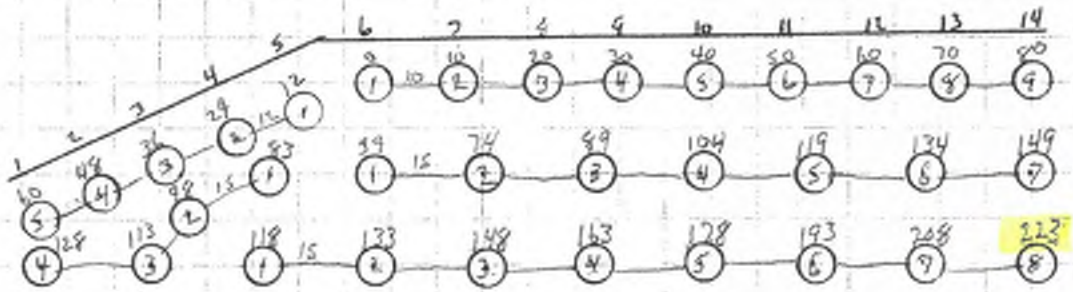
	DL	HL	HR	DR
1	10	5	9	18
2	8	4	7	14
3			8	16

Total Dets = 66

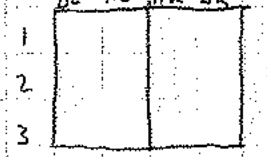
check holes on 13-11-10

N

Triangle quarry 2481
-40 ELEV North wall
33=5.75 vert holes 45 Deep
10x12 Post GPS 35° 50' 26.308
42 Face -78° 46' 11.191



1	15-12
2	15-12
3	15-12
4	18-15-12
5	18-15-12
6	18-15-12
7	15-12
8	15-12
9	15-12
10	15-12
11	15-12
12	24-18-12
13	24-18-12
14	24-18-12

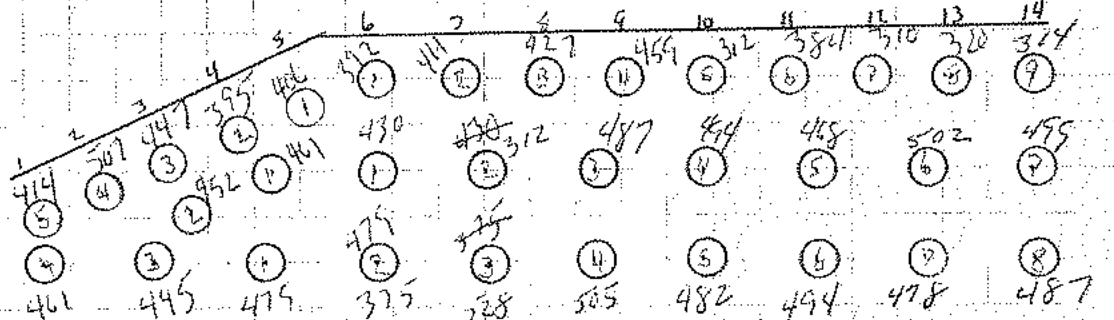


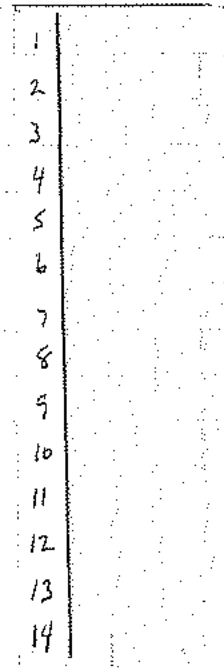
Total Dets = 66

check holes on 13-11-10

N

Triangle quarry 2481
-40ELEV North wall
33=5.25 vert holes 45 deep
10x12 Patt APS 35° 50' 26.308
42 Face -78° 48' 11.191





Noise Study Operating Summaries
Wake Stone Triangle Quarry - Dec. 7 - 12, 2020

Legend: Blue = Primary or Secondary Plant in Production and Processing Stone
Red = Primary or Secondary Plant Down for Start-up/Lunch/Repairs

Monday Dec. 7

Primary

Tons Produced	2,440
Net Hours	2.25
Tons Per Hour	1,084
Pit Loads	40
Loading Shot	6:45 am to 11:30 am
Shot was detonated at 11:39 pm	
Fixing Roads/Maintenance	12:45 pm to 2:15 pm
Crushing Time	2:10 pm to 4:30 pm

Secondary

Tons Produced	1,788
Net Hours	3.00
Tons Per Hour	596
Maintenance	6:45 am to 12:00 pm
Lunch/Plant Check	12:00 pm to 12:55
Crushing Time	12:55 pm to 3:00 pm
'2A' Screen Timing Belt Broke	3:00 pm to 3:35 pm
Crushing Time	3:35 pm to 3:50 pm
Chute at N, F, G Clogged	3:50 pm to 4:15 pm
Crushing Time	4:15 pm to 4:45 pm
Total Tons Shipped	1,121.36
Total Customer Trucks Loaded	54

Tuesday Dec. 8

Primary

Tons Produced	3,904
Net Hours	3.75
Tons Per Hour	1,041
Pit Loads	64
Start Up	6:45 am to 7:40 am
Crushing Time	7:40 to 11:45 am
Lunch/Plant Check	11:45 am 12:45 pm
Moving Materials	12:45 pm to 5:00 pm

Secondary

Tons Produced	-
Net Hours	-
Tons Per Hour	-
Start Up	6:45 am to 7:15 am
7' Std. Crusher Breaker Replaced	7:15 am to 6:30 pm
Total Tons Shipped	2,551.98
Total Customer Trucks Loaded	142

Wednesday Dec. 9

Primary

Tons Produced	6,588
Net Hours	6.00
Tons Per Hour	1,098
Pit Loads	108
Start Up	6:45 am to 7:30 am
Crushing Time	7:30 am to 11:45 am
Shot was detonated at 11:36 am	
Lunch/Plant Check	11:45 am to 1:15 pm
Crushing Time	1:15 pm to 3:00 pm
Moving Rip-Rap	3:00 pm to 5:00 pm

Secondary

Tons Produced	6,760
Net Hours	7.50
Tons Per Hour	901.35
Start Up	6:45 am to 7:10
Crushing Time	7:10 am to 7:20 am
7' Std. Crusher Breaker Tripped	7:20 am to 7:40 am
Crushing Time	7:40 am to 7:55 am
Metal Detector	7:55 am to 8:05 am
Crushing Time	8:05 am to 8:20 am
'2A' Screen Center Strap/Screen Cloth Change	8:20 am to 9:45 am
Crushing Time	9:45 am to 4:45 pm
Total Tons Shipped	4,674.45
Total Customer Trucks Loaded	255

Thursday Dec. 10

Primary

Tons Produced	-
Net Hours	-
Tons Per Hour	-
Pit Loads	-
Scheduled Maintenance	6:45 am to 5:00 pm

Secondary

Tons Produced	-
Net Hours	-
Tons Per Hour	-
Scheduled Maintenance	6:45 am to 5:00 pm
Total Tons Shipped	4,220.56
Total Customer Trucks Loaded	233

Friday Dec. 11

Primary

Tons Produced	7,808
Net Hours	7.75
Tons Per Hour	1,007
Pit Loads	128
Start Up	6:45 am to 7:15 am
Crushing Time	7:15 am to 11:50 am
Lunch/Plant Check	11:50 am to 1:15 pm
Crushing Time	1:15 pm to 4:30 pm

Secondary

Tons Produced	9,222
Net Hours	7.75
Tons Per Hour	1,190
Start Up	6:45 am to 7:10 am
Crushing Time	7:10 am to 7:45 am
'2A' Screen Gate Leak	7:45 am to 8:15 am
Crushing Time	8:15 am to 11:45 am
Lunch/Plant Check	11:45 am to 12:55 pm
Crushing Time	12:55 pm to 4:40 pm
Total Tons Shipped	4,898.45
Total Customer Trucks Loaded	256

Saturday Dec. 12

Primary

Tons Produced	-
Net Hours	-
Tons Per Hour	-
Pit Loads	-
No Crushing	
Drilling and Projects	6:30 am to 12:30 pm

Secondary

Tons Produced	-
Net Hours	-
Tons Per Hour	-
Total Tons Shipped	-
Total Customer Trucks Loaded	-

Wake Stone Corporation

Shot # 40

Powder Co. Dyno Nobel
Address 1201 H Aversboro Rd.
Garner, NC 27529
ATF # N/A

Name of Quarry	Triangle	Blast Date	11/18/20
Location of Blast	West Wall	PO#	C20-339
Shot GPS	N 35° 50' 21.762	W	-78° 46' 9.324
Time of Blast	1:39pm		
Bench Elev. of Blast	-40		
Seismograph Location #1	Embassy Suites		
Seismograph Operator	Stoney Broadwell		
Dist. from Seis. to Blast	2087 Feet		
Dist. to Nearest Non Quarry Bldg.(Ft.)	2087		
(L) PPV.	0.063	FRQ.	9.6
(T) PPV.	0.060	FRQ.	13.5
(V) PPV.	0.045	FRQ.	1.4
DB.	118		

Seismograph Location #1 N 35° 50' 02" W 078° 46' 18"
Seismograph Location #2 N W
Seismograph Location #3 N W
Seismograph Location #4 N W

Scaled Distance Calculations

Ground Vibration
Peak Particle Velocity (V) = 0.20 in/sec.

Air Blast

Unconfined Air Overpressure = U=	0.13	psi
Unconfined Air Overpressure =P=	153.28	dBl
Confined Air Blast/Overpressure=	118.28	dBl

Weather: Sunny 49

SHOT PARAMETERS

Type of Shot	Production
Shot Conditions	Wet
Hole Dia.(In.)	5.75
No. of Holes	30
Face Ht. (Ft.)	42
Subdrilling (Ft.)	3
Burden (Ft.)	11
Spacing (Ft.)	14
Stemming (Ft.)	9
Tons per Cubic Yd.	2.24
TOTAL TONS	16098
POWDER FACTOR	1.10
COST PER TON	0.4319
Series in Blast	1
No. of Holes per Delay	2
Max pounds per Delay	1047
Distance Scaled	64

EXPLOSIVES USED

Cartridge

Blastgel 1070 4x20	
Dynosplit C 1-1/4x16	
Dynosplit C 7/8x16	

Free Running

Dyno Mix - 50 lb bagged	
Titan 1000 G (QR740) (Bulk)	14557

Boosters

Trojan Spartan SR 3/4 lb	30
SR Trojan 1 lb	
Trojan Spartan 900G 18/CS	30

Density/Gas Emulsion: 1.08

TOTAL POUNDS 14617

DIGISHOT DETONATORS

80 Ft.	60 Ft.	30 Ft.
	31	29

ELEC. DETONATORS USED

	85 Ft.	60 Ft.	24 Ft.
# 4			
# 5			
# 6			
# 7			
# 8			
# 9			
# 10			
# 11			
# 12			
# 13			
# 14			
# 15			
# 16			
# 17			
# 18			
# 19			
# 20			

85' TOTAL	0
60' TOTAL	0
24' TOTAL	0

TOTAL DETONATORS USED 60

Accessories/Services

Shot Bag Unlined 3-1/2	
Shot Bag Unlined 4	
Bore Trak Monitor	
Delivery Only Charge	1
Laser Profile 2D	
Shot Service	
Technical Service	
Digishot Surface Wire 1000ft	
Digishot Surface Wire 1000ft	1

Shot checked by Hunter Bratton

Superintendent Hunter Bratton

Pit Foreman Alvin George

Blaster in Charge Alvin George

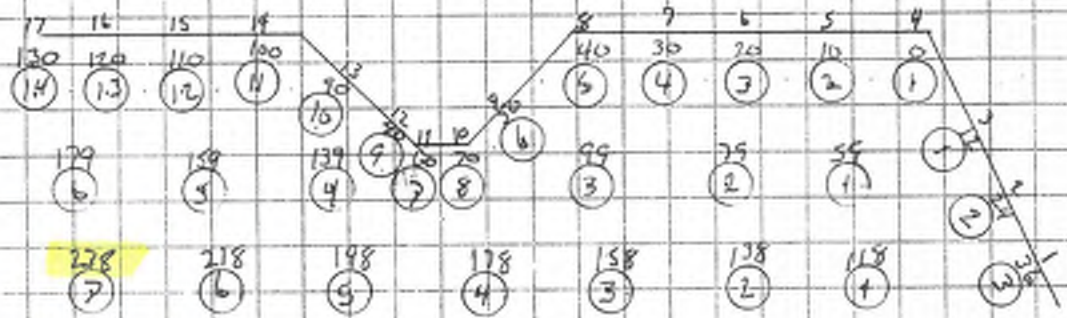
	OL	HL	HR	OR
1	28	14	3	6
2	12	6		
3	14	7		

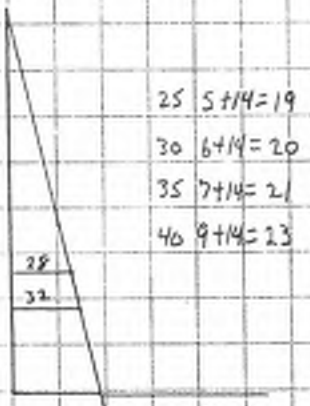
Total Defs = 60

check holes on 13-11-10

N

Triangle Quarry
-40E/EV west wall
29 = 5.75 vert holes 45 Deep
1 = 12° angle hole 42 Deep
11x14 Feet GPS 39° 50' 21.762
42 Face -78° 46' 9.324





25 5+14=19
30 6+14=20
35 7+14=21
40 9+14=23

1	12	9
2	12	9
3	18	15
4	12	9
5	12	9
6	12	9
7	12	9
8	18	15
9	18	15
10	12	9
* 11	35	32
12	12	9
13	12	9

14	12	9
15	15	12
16	18	12
17	12	9

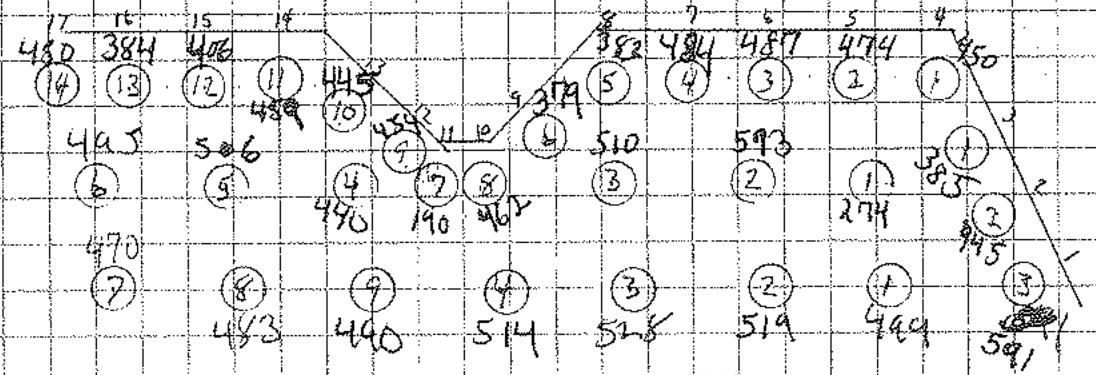
	OL	HL	HR	OR
1				
2				
3				

check holes on 13-11-10

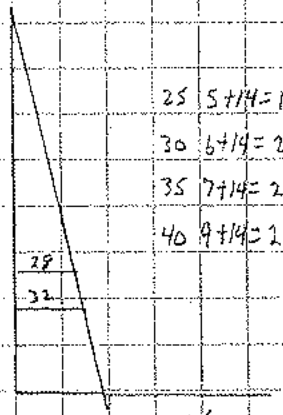
Total Defs = 60

N

Triangle Quarry
-40 E/E W wall
29 = 5.75 vert holes 45 deep
1 = 12° angle hole 42 deep
11x14 Part GPS 38° 50' 21.762
42 Face -78° 46' 9.324



25	5+14=19
30	6+14=20
35	7+14=21
40	9+14=23



walkout 9' Toe 27'

1	455
2	455
3	380
4	455
5	455
6	455
7	455
8	380
9	380
10	455
* 11	183
12	455
13	455

14	455
15	419
16	380
17	455

Noise Study Operating Summaries
Wake Stone Triangle Quarry - Nov. 16 - 21, 2020

Legend: Blue = Primary or Secondary Plant in Production and Processing Stone
Red = Primary or Secondary Plant Down for Start-up/Lunch/Repairs

Monday Nov. 16

Primary

Tons Produced	1,647
Net Hours	1.50
Tons Per Hour	1,098
Pit Loads	27
Loading Shot/Setting Pump	6:45 am to 3:30 pm
Shot was detonated at 12:39 pm	
Crushing Time	3:30 pm to 4:45 pm

Secondary

Tons Produced	3,908
Net Hours	8.25
Tons Per Hour	474
Start Up	6:45 am to 7:10 am
Crushing Time	7:10 am to 11:45 am
Lunch/Plant Check	11:45 am to 12:55 pm
Crushing Time	12:55 pm to 4:45 pm
Total Tons Shipped	5,160.32
Total Customer Trucks Loaded	275

Tuesday Nov. 17

Primary

Tons Produced	8,296
Net Hours	7.00
Tons Per Hour	1,185
Pit Loads	136
Start Up	6:45 am to 7:45 am
Crushing Time	7:45 am to 10:15 am
Metal Detector	10:15 am to 10:35 am
Crushing Time	10:35 am to 11:30 am
Lunch/Plant Check	11:30 am to 1:10 pm
Crushing Time	1:10 pm to 4:45 pm

Secondary

Tons Produced	5,697
Net Hours	9.25
Tons Per Hour	616
Start Up	6:45 am to 7:05 am
Crushing Time	7:05 am to 12:50 pm
Unclog Dust Sprayer	12:50 pm to 1:10 pm
Crushing Time	1:10 pm to 5:00 pm
Total Tons Shipped	5,905.43
Total Customer Trucks Loaded	304

Wednesday Nov. 18

Primary

Tons Produced	3,904
Net Hours	4.25
Tons Per Hour	919
Pit Loads	64
Start Up	6:45 am to 7:25 am
Crushing Time	7:25 am to 9:35 am
Feeder Motor Base	9:35 am to 12:45 pm
Electrical Controls	12:45 pm to 1:15 pm
Crushing Time	1:15 pm to 3:30 pm
Shot was detonated at 1:39 pm	
Feeder Motor Base	3:30 pm to 5:00 pm

Secondary

Tons Produced	5,434
Net Hours	10.25
Tons Per Hour	530
Crushing Time	6:40 am to 2:40 pm
Metal Detector	2:40 pm to 2:45 pm
Crushing Time	2:45 pm to 4:45 pm
Total Tons Shipped	5,748.03
Total Customer Trucks Loaded	307

Thursday Nov. 19

Primary

Tons Produced	7,686
Net Hours	6.75
Tons Per Hour	1,139
Pit Loads	126
Start Up	6:45 am to 7:30 am
Crushing Time	7:30 am to 7:45 am
Feeder Motor Base	7:45 am to 10:15 am
Crushing Time	10:15 am to 4:30 pm

Secondary

Tons Produced	4,819
Net Hours	8.25
Tons Per Hour	584
Start Up	6:45 am to 7:15 am
Crushing Time	7:15 am to 11:45 am
Lunch/Plant Check	11:45 am to 12:55 pm
Crushing Time	12:55 pm to 4:45 pm
Total Tons Shipped	6,087.51
Total Customer Trucks Loaded	317

Friday Nov. 20

Primary

Tons Produced	8,052
Net Hours	7.25
Tons Per Hour	1,111
Pit Loads	132
Start Up	6:45 am to 7:45 am
Crushing Time	7:45 am to 11:45 am
Lunch/Plant Check	11:45 am to 1:05 pm
Crushing Time	1:05 pm to 4:45 pm

Secondary

Tons Produced	5,573
Net Hours	9.75
Tons Per Hour	572
Start Up	6:45 am to 7:00 am
Crushing Time	7:00 am to 4:45 pm
Total Tons Shipped	5,919.43
Total Customer Trucks Loaded	302

Saturday Nov. 21

Primary

Tons Produced	-
Net Hours	-
Tons Per Hour	-
Pit Loads	-

No Crushing
Drilling and Moving Materials 6:30 am to 2:30 pm

Secondary

Tons Produced	-
Net Hours	-
Tons Per Hour	-
Total Tons Shipped	-
Total Customer Trucks Loaded	-

Blast Data 2019

Date	# of holes	Max Delay	Shot #	Elevation
01/03/19	44	258	1	0
01/11/19	37	248	2	-40
01/18/19	38	248	3	-40
01/29/19	46	348	4	-40
02/08/19	33	228	5	-40
02/18/19	36	243	6	-40
02/26/19	31	233	7	-40
03/01/19	31	223	8	-40
03/07/19	33	218	9	-40
03/13/19	36	298	10	0
03/22/19	26	198	11	0
03/29/20	38	258	12	0
04/05/19	36	277	13	-40
04/16/19	29	218	14	-40
04/24/19	30	238	15	0
05/08/19	34	346	16	-40
05/17/19	41	238	17	0
05/22/19	57	177	18	-80 to -130
06/04/19	41	268	19	-40
06/07/19	53	192	20	-80 to -130
06/18/19	37	278	21	-40
06/25/19	46	444	22	-40
07/01/19	50	192	23	-80 to -130
07/08/19	49	337	24	-40
07/12/19	53	192	25	-80 to -130
07/19/19	23	218	26	0
07/30/19	45	337	27	-40
08/07/19	37	277	28	0
08/13/19	26	228	29	-40
08/22/19	39	317	30	0
08/29/19	36	297	31	0
08/30/19	49	177	32	-80 to -130
09/10/19	25	218	33	0
09/13/19	28	208	34	-80 to -130
09/19/19	26	218	35	-40
09/24/19	31	238	36	-80 to -130
09/27/19	1	0	37	-40
10/03/19	31	204	38	-80- to -130
10/11/19	20	184	39	0
10/15/19	30	262	40	-80 to -130
10/18/19	27	209	41	-40
10/29/19	28	262	42	-80 to -130
11/06/19	28	213	43	-80 to -130
11/11/19	19	208	44	-40
11/14/19	46	478	45	-40
11/25/19	28	296	46	-130
12/05/19	20	278	47	-40
12/05/19	13	145	48	0
12/18/19	28	274	49	-130

Blast Data 2018

Date	# of holes	Max Delay	Shot #	Elevation
1/9/2018	27	193	1	-40 to -80
1/11/2018	31	198	2	0
1/16/2018	42	245	3	-40 to -80
1/24/2018	32	317	4	0
1/31/2018	32	327	5	0
2/12/2018	36	160	6	-40 to -80
2/19/2018	33	229	7	0
2/27/2018	59	219	8	-40 to -80
3/6/2018	31	189	9	0
3/9/2018	33	164	10	-40
3/13/2018	40	317	11	0
3/26/2018	38	287	12	-40
4/3/2018	34	223	13	-40
4/10/2018	29	208	14	-40
4/17/2018	33	228	15	-40
4/20/2018	27	238	16	0
4/24/2018	24	237	17	-40
4/27/2018	36	228	18	-40
5/4/2018	32	208	19	-40
5/11/2018	39	288	20	-40
5/22/2018	46	268	21	-40
5/30/2018	33	237	22	-40
6/5/2018	29	258	23	0
6/11/2018	36	278	24	-40
6/18/2018	37	228	25	-40
6/25/2018	40	238	26	-40
6/28/2018	28	238	27	0
7/2/2018	21	198	28	0
7/10/2018	40	258	29	-40
7/20/2018	44	238	30	-40
7/26/2018	41	318	31	-40
8/7/2018	38	282	32	-40
8/14/2018	35	238	33	-40
8/29/2018	29	258	34	0
9/11/2018	38	253	35	-40
10/3/2018	46	278	36	-40
10/16/2018	42	238	37	0
10/22/2018	46	338	38	-40
10/30/2018	45	278	39	-40
11/7/2018	44	318	40	-40
11/21/2018	46	338	41	-40
12/7/2018	41	298	42	-40
12/19/2018	42	318	43	-40
12/19/2018	32	228	44	-40

Blast Data 2017

Date	# of holes	Max Delay	Shot #	Elevation
1/6/2017	34	247	1	40
1/16/2017	32	231	2	40
1/18/2017	28	208	3	0
1/20/2017	34	233	4	40
1/26/2017	17	178	5	40
1/27/2017	51	357	6	0
2/1/2017	36	277	7	0
2/7/2017	20	227	8	0
2/10/2017	41	336	9	0
2/16/2017	43	307	10	0
2/20/2017	24	247	11	40
2/27/2017	47	311	12	0
3/3/2017	33	268	13	0
3/7/2017	30	287	14	40
3/8/2017	44	165	15	40
3/13/2017	37	265	16	0
3/17/2017	42	258	17	0
3/17/2017	40	120	18	40 to 80 (ramp development)
3/23/2017	27	247	19	40
3/27/2017	40	272	20	0
3/28/2017	44	120	21	40 to 80 (ramp development)
4/3/2017	17	168	22	40
4/7/2017	32	208	23	40 to 80 (ramp development)
4/10/2017	34	307	24	0
4/12/2017	44	276	25	0
4/19/2020	33	217	26	0
4/19/2017	22	155	27	40 to 80 (ramp development)
4/27/2017	29	218	28	40 to 80 (ramp development)
5/2/2017	34	267	29	40
5/9/2017	29	238	30	40
5/16/2017	30	247	31	40 to 80 (ramp development)
5/19/2017	41	278	32	0
5/22/2017	41	248	33	0
5/26/2017	31	238	34	40
6/2/2017	32	238	35	0
6/13/2017	96	288	36	40 to 80 (ramp development)
6/15/2017	33	228	37	40
6/22/2017	29	238	38	40
6/29/2017	38	248	39	0
7/6/2017	32	218	40	40
7/11/2017	49	258	41	0 to 40 (ramp development)
7/17/2017	50	267	42	0
7/20/2017	25	188	43	40
7/26/2017	36	415	44	40
8/1/2017	37	267	45	0
8/4/2017	39	184	46	0 to 40 (ramp development)
8/11/2017	32	208	47	0
8/16/2017	47	274	48	0 to 40 (ramp development)
8/22/2017	21	237	49	40
8/25/2017	38	248	50	0
8/25/2017	6	80	51	0 to 40 (ramp development)
9/1/2017	48	241	52	0
9/6/2017	21	178	53	40
9/14/2017	50	291	54	0
9/20/2017	34	232	55	0
10/4/2017	50	318	56	0
10/11/2017	39	278	57	3
10/17/2017	62	236	58	-40 to -80 (sink)
10/18/2017	48	377	59	0
10/20/2017	18	179	60	0
10/25/2017	64	195	61	-40 to -80 (sink)
10/26/2017	29	169	62	0
10/31/2017	34	268	63	0
11/6/2017	31	268	64	0
11/9/2017	52	298	65	0
11/14/2017	44	273	66	0
11/17/2017	36	268	67	0
11/28/2017	15	119	68	0
11/28/2017	32	298	69	0
11/30/2017	42	161	70	-40 to -80 (sink)
12/5/2017	32	229	71	0
12/8/2017	34	190	72	-40 to -80 (sink)
12/8/2017	31	283	73	0
12/14/2017	21	149	74	0
12/19/2017	38	193	75	-40 to -80 (sink)
12/22/2017	30	139	76	0

Blast Data 2016

Date	# of holes	Max Delay	Shot #	Elevation	
1/6/2016	36	247	1		40
1/12/2016	28	208	2		40
1/20/2016	27	257	3		80
1/28/2016	43	297	4		0
2/1/2016	31	208	5		40
2/3/2016	21	188	6		80
2/10/2016	44	257	7		0
2/22/2016	46	248	8		0
2/25/2016	17	237	9		80
3/1/2016	31	188	10		40
3/8/2016	43	277	11		0
3/14/2016	49	258	12		0
3/21/2016	34	208	13		80
3/24/2016	29	247	14		40
3/31/2016	46	288	15		0
4/5/2016	23	244	16		80
4/11/2016	44	378	17		40
4/14/2016	45	334	18		80
4/20/2016	46	333	19		40
4/27/2016	44	278	20		0
5/5/2016	44	268	21		80
5/12/2016	50	321	22		40
5/19/2016	43	237	23		40
5/26/2016	85	181	24	40 to 80 (ramp development)	
6/1/2016	28	275	25	40 to 80 (ramp development)	
6/7/2016	41	289	26		40
6/21/2016	43	268	27		0
6/22/2016	73	186	28	40 to 80 (ramp development)	
6/27/2016	23	237	29	40 to 80 (ramp development)	
7/6/2016	36	228	30		40
7/12/2016	26	168	31		40
7/14/2016	40	258	32		40
7/19/2016	24	227	33	40 to 80 (ramp development)	
7/25/2016	29	208	34		40
7/25/2016	21	168	35	40 to 80 (ramp development)	
8/1/2016	39	228	36		0
8/3/2016	25	124	37	40 to 80 (ramp development)	
8/5/2016	43	258	38		0
8/10/2016	24	188	39		40
8/17/2016	26	147	40	40 to 80 (ramp development)	
8/19/2016	35	248	41		0
8/25/2016	36	238	42		0
8/25/2016	24	143	43	40 to 80 (ramp development)	
9/1/2016	27	228	44		40
9/1/2016	32	162	45	40 to 80 (ramp development)	
9/12/2016	34	290	46		40
9/16/2016	40	247	47		0
9/22/2016	25	257	48		40
9/19/2016	52	177	49	40 to 80 (ramp development)	
9/29/2016	38	307	50		40
10/4/2016	36	231	51		0
10/7/2016	22	208	52		40
10/13/2016	42	297	53		0
10/19/2016	36	231	54		0
10/21/2016	24	247	55		40
10/25/2016	31	261	56		0
11/1/2016	35	336	57		40
11/7/2016	34	218	58		0
11/14/2016	33	231	59		40
11/17/2016	34	335	60		0
11/28/2016	34	277	61		40
12/1/2016	31	208	62		0
12/7/2016	37	247	63		0
12/13/2016	33	198	64		40
12/15/2016	29	208	65		0
12/21/2016	23	305	66		40
12/28/2016	28	208	67		0

Blast Data 2015

Date	# of holes	Max Delay	Shot #	Elevation
1/6/2015	41	277	1	40
1/15/2015	42	277	2	80
1/22/2015	40	257	3	80
2/4/2015	32	306	4	80
2/11/2015	38	247	5	40
3/4/2015	28	257	6	80
3/11/2015	25	257	7	40
3/18/2015	31	257	8	80
3/24/2015	41	277	9	40
4/2/2015	53	315	10	40
4/8/2015	32	237	11	80
4/15/2015	33	297	12	40
4/20/2015	38	267	13	80
4/24/2015	13	207	14	40
5/5/2015	42	243	15	40
5/7/2017	40	297	16	40
5/14/2017	32	228	17	40
5/20/2015	31	267	18	80
5/27/2015	36	198	19	40
6/1/2015	14	215	20	40
6/3/2015	32	286	21	80
6/10/2015	30	277	22	40
6/16/2015	38	238	23	0
6/24/2015	39	238	24	80
7/1/2015	32	297	25	40
7/8/2015	36	238	26	80
7/13/2015	44	302	27	40
7/17/2015	36	238	28	80
7/24/2015	30	250	29	80
7/30/2015	38	332	30	40
8/6/2015	43	313	31	80
8/13/2015	33	238	32	40
8/18/2015	33	228	33	40
8/25/2015	32	228	34	40
9/3/2015	29	218	35	80
9/10/2015	36	307	36	40
9/16/2015	32	228	37	40
9/22/2015	29	218	38	80
9/28/2015	35	286	39	40
10/1/2015	28	316	40	
10/7/2015	28	208	41	
10/13/2015	31	267	42	
10/19/2015	24	286	43	
10/22/2015	24	199	44	
10/27/2015	24	247	45	
10/29/2015	31	321	46	
11/5/2015	32	218	47	40
11/11/2015	26	296	48	80
11/16/2015	13	178	49	40
11/24/2015	47	277	50	40
12/3/2015	57	307	51	80
12/9/2015	34	247	52	40
12/15/2015	40	267	53	40
12/18/2015	28	225	54	0