

SBP ASSOCIATES, INC.

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January 15, 2014

Kristina Handt
Administrator, City of Scandia
14727 209th Street North
Scandia, MN 55073

Dear Ms. Handt:

Re: Zavoral Mine Noise Monitoring Results

SBP Associates, Inc (SBP) was contracted by the City of Scandia to conduct noise monitoring near the Zavoral mine to determine compliance with the Minnesota Noise Rules. This letter presents the results of this noise monitoring study.

Noise Descriptors and Minnesota Noise Rules

Minnesota has noise standards that are designed to be consistent with sleep, speech, annoyance, and hearing conservation requirements for receivers within areas grouped according to land use activities. The Minnesota standards are as follows:

	<u>7:00 AM to 10:00 PM</u>		<u>10:00 PM to 7:00 AM</u>	
	L ₁₀	L ₅₀	L ₁₀	L ₅₀
NAC-1 (Residential)	65	60	55	50
NAC-2 (Commercial)	70	65	70	65
NAC-3 (Industrial)	80	75	80	75

L₁₀ means the sound level which is exceeded for 10 percent of the time for a one-hour period. L₅₀ means the sound level which is exceeded 50 percent of the time for a one-hour period. Sound levels are expressed in dBA. A dBA is a unit of sound level expressed in decibels and weighted for the purpose of approximating the human response to sound.

The impact of the Zavoral mine noise on a residential area is limited by the NAC-1 values.

Noise Monitoring Locations

Monitoring locations were chosen to represent sensitive receptors around the mine site perimeter. The monitoring locations are shown in the figure in Attachment A. Sites 1 and 3 are north of the mine site, Site 2 is south of the mine site, Site 4 is southwest of the site entrance and Site 5 is Southeast of the mine site towards the St. Croix River.

Results Summary

The following table presents a summary of the results of the monitoring. Monitoring was conducted on December 18, 2013.

Zavoral Mine Operations

12/18/13 Noise Monitoring Results

Test Site	Test Start Time	L10 (Limit is 65 dBA)	L50 (Limit is 60 dBA)
1	10:29 am	49.5	45.5
2	11:55 am	46.5	41.0
1	1:10 pm	47.0	42.5
3	1:47 pm	48.0	43.5
4	3:14 pm	52.0	47.0
5	4:26 pm	43.5	35.5

Noise levels were within the State Standards at each of the monitored locations. Complete monitoring results are provided in Attachment B.

Test Equipment

Testing was conducted with a Type 1 CEL Model 593 analyzer. The analyzer was field calibrated prior to and after each test period. Testing was conducted according to MPCA rules.

Detailed Monitoring Results

Site 1

Test 1 – 10:29 am-11:29 am

Test Result $L_{10} = 49.5$ dBA, $L_{50} = 45.5$ dBA

This site is on the property adjacent to the southern termination of Quarry Avenue North. Noise source noted at this site were occasional truck noise from Highway 95 and noise from a variable breeze through the trees. Mine noise was not apparent.

Test 2 – 1:10 pm to 1:32 pm

Test Result $L_{10} = 47.0$ dBA, $L_{50} = 42.5$ dBA

The second test at this site was terminated early to move to a monitoring location (Site 3) closer to the mine.

Site 2

11:55 am – 12:55 am

Test Result $L_{10} = 46.5$ dBA, $L_{50} = 41.0$ dBA

This site is along Quinell Road. South Winds of 5-10 mph with occasional stronger gusts were noted. Mine noise was not audible during this test period. Traffic noise from Highway 95 was noted.

Site 3

1:47 pm – 2:47 pm

Test Result $L_{10} = 48.0$ dBA, $L_{50} = 43.5$ dBA

This site is near a cabin/home just south of the mine property. Noise from the mine area was intermittently apparent, with levels generally in the 40 – 45 dBA range. Occasional “hammering” noise was noted with levels in the 53 – 56 dBA range. Winds were calm during the testing.

Site 4

3:14 – 4:14 pm

Test Result $L_{10} = 52.0$ dBA, $L_{50} = 47.0$ dBA

This site is a home/farm west of Highway 95 and southwest of the mine entrance. South winds of 5 mph were noted. Traffic noise from Highway 95 was present and was the dominate noise source during the testing. Noise from the mine operations was intermittently noted when traffic noise was not present. 50 haul trucks were noted either entering or leaving the site during the test period. Noise from the trucks was audible (45 – 46 dBA) as they accelerated when leaving the site or when crossing Highway 95 to enter the site.

Site 5

4:26 pm - 4:52 pm

Test Result $L_{10} = 43.5$ dBA, $L_{50} = 35.5$ dBA

This site was near the northern termination of Quint Avenue, southeast of the mine site. Winds were calm during the testing. Noise from the direction of the mine was barely apparent at times during the testing. Winds were calm. Noise from a snow plow on 205th Street/Quint Avenue was present during part of the testing. The test was terminated early due to the snow plow operations and because noise from the mine was no longer apparent.

All monitoring results are in compliance with the State of Minnesota noise rules.

Thank you for the opportunity to work with the City of Scandia on this project, and please feel free to contact me with any questions you may have regarding this noise monitoring study.

Sincerely,

Stephen B. Platisha, P.E.

Attachment A

Zavoral Mine Noise Monitoring Locations



Attachment B

Zavoral Mine Noise Monitoring Data

Site 1 - Test 1 - Page 1 of 2

CEL Instruments Ltd.

CEL 593.C1R v 7.21

----- 10:29 am -----
Start 18-DEC-13 10:52:30 Mode -/- ENV A001
End 18-DEC-13 ~~11:52:33~~ 11:29 am
Length 0 days 01:00:03
Mic Free Field 200v OFF Period 5 minutes
Records 12

HEADER	LAST CAL 18-DEC-13
START	18-DEC-13 10:52:30
END	18-DEC-13 11:52:33
LENGTH	0 DAYS 01:00:03
TIMED RECS	12 PER 5min
MIC=FF 200V=OFF TYPE=1	
F	L,A 03 ZENV

F	OL 0.0 %	L	A
70	SPLFMAX , dB	77.4	70.1
	SPLFMIN , dB	50.8	38.4
50	LEQ , dB	59.1	46.8
30			
10			
FLA	LINPEAK , dB	84.1	
10:52:30 CUM ZENV 1			

F	OL 0.0 %	L	A
70	LnF10.0% , dB	61.0	49.5
	LnF50.0% , dB	57.5	45.5
50	LnF90.0% , dB	55.0	42.5
	LnF95.0% , dB	54.5	41.5
30	LnF99.0% , dB	53.5	40.0
10			
FLA			
10:52:30 CUM ZENV 2			

Site 1 - Test 2 - Page 1 of 2

CEL Instruments Ltd.

CEL 593.C1R v 7.21

----- 13:10 -----
Start 18-DEC-13 ~~13:32:54~~ Mode -/- ENV A004
End 18-DEC-13 13:54:44
Length 0 days 00:21:50
Mic Free Field 200v OFF Period 5 minutes
Records 4

HEADER	LAST CAL 18-DEC-13
START	18-DEC-13 13:32:54
END	18-DEC-13 13:54:44
LENGTH	0 DAYS 00:21:50
TIMED RECS	4 PER 5min
MIC=FF 200V=OFF TYPE=1	
F	L,A Q3 ZENV

Site 1 - Test 2 - Page 2 of 2

		L	A
80	SPLFMAX , dB	77.6	58.3
	SPLFMIN , dB	49.5	34.6
60	LEQ , dB	56.2	44.2
40			
20			
FLA	LINPEAK , dB	79.4	
13:32:54 CUM		ZENV 1	

		L	A
80	LnF10.0% , dB	58.0	47.0
	LnF50.0% , dB	55.0	42.5
60	LnF90.0% , dB	53.0	39.0
	LnF95.0% , dB	52.5	38.0
40	LnF99.0% , dB	51.5	36.5
20			
FLA			
13:32:54 CUM		ZENV 2	

Site 2 - Page 1 of 2

CEL Instruments Ltd.

CEL 593.C1R v 7.21

Start 18-DEC-13 12:17:17 Mode -/- ENV A002
End 18-DEC-13 13:17:20 12:55 am
Length 0 days 01:00:03
Mic Free Field 200v OFF Period 5 minutes
Records 12

HEADER	LAST CAL 18-DEC-13
START	18-DEC-13 12:17:17
END	18-DEC-13 13:17:20
LENGTH	0 DAYS 01:00:03
TIMED RECS	12 PER 5min
MIC=FF 200V=OFF TYPE=1	
F	L,A 03 ZENV

Site 2 - Page 2 of 2

↑	OL 0.0 %	L	A
80	SPLFMAX , dB	89.0	76.3
	SPLFMIN , dB	47.1	29.8
60	LEQ , dB	66.3	45.8
40			
20			
FCA	LINPEAK , dB	94.1	
12:17:17	CUM	ZENU 1	

↑	OL 0.0 %	L	A
80	LnF10.0% , dB	65.5	46.5
	LnF50.0% , dB	55.0	41.0
60	LnF90.0% , dB	52.0	36.0
	LnF95.0% , dB	51.0	34.5
40	LnF99.0% , dB	50.0	32.5
20			
FCA			
12:17:17	CUM	ZENU 2	

Site 3 - Page 1 of 2

CEL Instruments Ltd.

CEL 593.C1R v 7.21

Start 18-DEC-13 ~~14:10:27~~ ^{14:47} Mode -/- ENV A005
End 18-DEC-13 ~~15:10:32~~ ^{14:47}
Length 0 days 01:00:05
Mic Free Field 200v OFF Period 5 minutes
Records 12

HEADER	LAST CAL 18-DEC-13
START	18-DEC-13 14:10:27
END	18-DEC-13 15:10:32
LENGTH	0 DAYS 01:00:05
TIMED RECS	12 PER 5min
MIC=FF 200V=OFF TYPE=1	
F	L,A Q3 ZENV

F	OL 0.0 %	L	A
80	SPLFMAX , dB	90.5	78.5
	SPLFMIN , dB	48.7	34.0
60	LEQ , dB	61.6	49.7
40			
20			
FLA	LINPEAK , dB	94.1	
14:10:27	CUM	ZENV 1	

F	OL 0.0 %	L	A
80	LnF10.0% , dB	60.0	48.0
	LnF50.0% , dB	56.0	43.5
60	LnF90.0% , dB	54.0	40.0
	LnF95.0% , dB	53.5	38.5
40	LnF99.0% , dB	52.5	37.0
20			
FLA			
14:10:27	CUM	ZENV 2	

CEL Instruments Ltd.

CEL 593.C1R v 7.21

-----15:14-----
Start 18-DEC-13 15:37:21 Mode -/- ENV A006
End 18-DEC-13 ~~16:37:23~~ 16:14
Length 0 days 01:00:02
Mic Free Field 200v OFF Period 5 minutes
Records 12

HEADER	LAST CAL 18-DEC-13
START	18-DEC-13 15:37:21
END	18-DEC-13 16:37:23
LENGTH	0 DAYS 01:00:02
TIMED RECS	12 PER 5min
MIC=FF 200V=OFF TYPE=1	
F	L,A Q3 ZENU

Site 4 - Page 2 of 2

f	OL 0.0 %	L	A
80	SPLFMAX , dB	84.0	81.6
	SPLFMIN , dB	51.7	36.0
60	LEQ , dB	61.8	49.2
40			
20			
FLA	LINPEAK , dB	93.7	
15:37:21	CUM	ZENU 1	

f	OL 0.0 %	L	A
80	LnF10.0% , dB	64.0	52.0
	LnF50.0% , dB	60.0	47.0
60	LnF90.0% , dB	57.0	42.0
	LnF95.0% , dB	56.0	40.5
40	LnF99.0% , dB	55.0	39.0
20			
FLA			
15:37:21	CUM	ZENU 2	

CEL Instruments Ltd.

CEL 593.C1R v 7.21

----- 16:26 -----
Start 18-DEC-13 ~~16:50:54~~ Mode -/- ENV A007
End 18-DEC-13 ~~17:16:35~~ 16:52
Length 0 days 00:25:41
Mic Free Field 200v OFF Period 5 minutes
Records 5

HEADER	LAST CAL 18-DEC-13
START	18-DEC-13 16:50:54
END	18-DEC-13 17:16:35
LENGTH	0 DAYS 00:25:41
TIMED RECS	5 PER 5min
MIC=FF 200V=OFF TYPE=1	
F	L,A Q3 ZENV

		L	A
80	SPLFMAX , dB	84.8	64.9
	SPLFMIN , dB	46.4	30.7
60	LEQ , dB	54.5	40.8
40			
20			
FLA	LINPEAK , dB	92.9	
16:50:54 CUM ZENU 1			

		L	A
80	LnF10.0% , dB	55.5	43.5
	LnF50.0% , dB	52.0	35.5
60	LnF90.0% , dB	49.5	33.0
	LnF95.0% , dB	49.0	32.5
40	LnF99.0% , dB	48.0	32.0
20			
FLA			
16:50:54 CUM ZENU 2			