

**Attachment L**  
**Industrial Hygiene Sampling Results (Respirable Dust)**

Date	Job Title	Total Dust (mg/m3)	SiO <sub>2</sub> (%)	Respirable Dust TWA (mg/m3)	Respirable Dust TWA (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	Shift length	SiO <sub>2</sub> Conc. (ug/m3)
10/10/2000	color utility		3.1	0.26	260	1.96		8.06
10/10/2000	kiln operator		2.8	0.18	180	2.08		5.04
10/10/2000	mixer operator		1.9	0.27	270	2.56		5.13
10/10/2000	batch person		1.9	0.26	260	2.56		4.94
10/11/2000	mill operator		3.7	0.98	980	1.75		36.26
10/11/2000	mill & secondary utility		2.9	1.45	1450	2.04		42.05
10/11/2000	screen operator		2.8	1.35	1350	2.08		37.8
10/11/2000	laborer mill		3.1	1.21	1210	1.95		37.51
10/12/2000	A mechanic		3.2	0.38	380	1.92		12.16
10/12/2000	A mechanic		3.3	0.43	430	1.88		14.19
10/12/2000	A mechanic		4.3	0.37	370	1.58		15.91
10/12/2000	A mechanic		2.3	0.4	400	2.32		9.2
11/4/2002	shift laborer		2.1	1.971	1971	2.44	8	41.391
11/4/2002	lead person/truck driver			<0.127		5	8	
11/4/2002	crusher operator			<0.127		5	8	
11/4/2002	truck driver			<0.127		5	8	
11/5/2002	mill operator		3.2	0.733	733	1.92	8	23.456
11/5/2002	chief operator		4.7	0.265	265	1.49	8	12.455
11/5/2002	intermediate operator		3.2	1.219	1219	1.92	8	39.008
11/5/2002	screen operator		3.4	1.178	1178	1.85	8	40.052
11/5/2002	shift laborer		2.6	5.911	5911	2.17	8	153.686
11/6/2002	mixer operator		1.9	0.482	482	2.56	8	9.158
11/6/2002	utility person		2.5	0.831	831	2.22	8	20.775
11/6/2002	laborer		3.5	4.015	4015	1.82	8	140.525
11/6/2002	kiln operator			0.201		5	8	
11/6/2002	batch operations		1.2	0.879	879	3.13	8	10.548
11/7/2002	laborer			0.194		5	8	
11/7/2002	loader operator			<0.151		5	8	
11/7/2002	laborer		2.9	1.044	1044	2.04	8	30.276
11/7/2002	utility person		2.5	0.609	609	2.22	8	15.225
11/7/2002	mechanic		1.1	0.74	740	3.23	8	8.14
10/23/2003	mixer operator		1.9	0.482	482	2.56		9
10/23/2003	laborer		<3.6	0.194	194	1.79		<7
10/23/2003	shift laborer		2.1	1.971	1971	2.44		41
10/23/2003	utility person		2.5	0.831	831	2.22		21

Date	Job Title	Total Dust (mg/m3)	SiO <sub>2</sub> (%)	Respirable Dust TWA (mg/m3)	Respirable Dust TWA (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	Shift length	SiO <sub>2</sub> Conc. (ug/m3)
10/23/2003	mill operator		3.2	0.733	733	1.92		24
10/23/2003	loader operator			<0.151	<151			<8
10/23/2003	laborer		2.9	2.044	2044	2.04		59
10/23/2003	chief operator		4.7	0.265	265	1.49		12
10/23/2003	lead person/truck driver			<0.128	<128			<6
10/23/2003	laborer		3.5	4.015	4015	1.82		142
10/23/2003	intermediate operator		3.2	1.219	1219	1.92		39.008
10/23/2003	kiln operator		<2.9	0.201	201	2.04		<6
10/23/2003	batch operations		1.2	0.879	879	3.13		11
10/23/2003	utility person		2.5	0.609	609	2.22		15
10/23/2003	screen operator		3.4	1.178	1178	1.85		40
10/23/2003	loader operator			<0.127	<127			<6
10/23/2003	crusher operator			<0.127	<127			10
10/23/2003	mechanic		1.1	0.74	740	3.23		8
10/23/2003	truck driver			<0.127	<127			7
10/23/2003	shift laborer		2.6	5.911	5911	2.17		151
1/18/2006	drill operator, rotary air	35.32	<1					
1/18/2006	crusher operator	12.77	<1					
1/18/2006	front-end loader operator			<0.1				
1/18/2006	truck driver			<0.1				
1/18/2006	truck driver			<0.1				
3/14/2006	intermediate operator		2.4	1.1	1100	1.89	12	26.4
3/14/2006	screen operator		3.8	0.87	870	1.43	12	33.06
3/14/2006	mechanic		3	0.56	560	2	8	16.8
3/14/2006	mill operator		2	1	1000	2.08	12	20
3/14/2006	mill laborer		2	1.1	1100	2.01	12	22
3/14/2006	chief operator		5.1	0.26	260	1.17	12	13.26
3/15/2006	mixer operator		1.7	0.68	680	2.24	12	11.56
3/15/2006	general operator		2.7	0.66	660	1.8	12	17.82
3/15/2006			2.6	0.46	460	1.8	12	11.96
3/15/2006	headlap operator		3.7	0.47	470	1.75	8	17.39
3/15/2006	batch person		1.5	0.78	780	2.37	12	11.7
3/15/2006	granule utility		1.4	1.5	1500	2.44	12	21
3/16/2006	loader operator		8.6	0.15	150	0.94	8	12.9
3/16/2006	loader operator		5.3	0.24	240	1.37	8	12.72

Date	Job Title	Total Dust (mg/m3)	SiO <sub>2</sub> (%)	Respirable Dust TWA (mg/m3)	Respirable Dust TWA (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	Shift length	SiO <sub>2</sub> Conc. (ug/m3)
3/16/2006	crusher operator		0	0	0	5	8	0
3/16/2006	headlap chief operator		7.2	0.18	180	1.09	8	12.96
3/16/2006	headlap screen person		4.1	0.31	310	1.64	8	12.71
8/20/2007	kiln operator			<0.115	<115	NA		<6
8/20/2007	kiln operator		<3.7	0.16	160	1.75		<6
8/20/2007	batch person	0.5				10		
8/20/2007	mixer operator			<0.112	<112	NA		<6
8/20/2007	general operator		3	0.211	211	1.67		6
8/20/2007	utility person		<3.6	0.152	152	1.78		<6
8/21/2007	mechanic		<1.5	0.395	395	2.86		<6
8/21/2007	shipping loader			<0.127	<127	NA		<6
8/21/2007	chief operator			<0.121	<121	NA		<6
8/21/2007	laborer		2.5	0.628	628	2.22		16
8/21/2007	screen operator		4.3	1.041	1041	1.59		45
8/21/2007	intermediate operator		2	0.364	364	2.5		7
8/22/2007	chief operator			<0.130	<130	NA		<7
8/22/2007	mechanic		<2.8	0.223	223	2.08		<6
8/22/2007	mechanic		<0.8	0.767	767	3.57		<6
8/22/2007	mill operator		3.5	1.93	1930	1.82		67
8/22/2007	mechanic		<2.6	0.243	243	2.19		<6
8/22/2007	utility person		3.3	1.385	1385	1.87		46
8/23/2007	loader operator			<0.126	<126	NA		<6
8/23/2007	utility person			<0.153	<153	NA		<8
8/23/2007	crusher operator		<3.5	0.17	170	1.82		<6
8/23/2007	truck driver			<0.130	<130	NA		<6
8/23/2007	utility person		4.7	0.815	815	1.49		38
8/23/2007	electrician		<4.5	0.145	145	1.54		<6
1/15/2009	utility work		4.4	1.38	1380	1.55		60.72
1/15/2009	utility work		4	1.16	1160	1.67		46.4
1/15/2009	utility work		3.7	1.41	1410	1.77		52.17
1/15/2009	utility man		>1	1.41	1410	1.77		14.1
1/15/2009	utility man		>1	1.37	1370	1.55		13.7
1/15/2009	utility man		>1	1.16	1160	1.66		11.6
3/18/2009	laborer, bullgang		>1	1.9	1900	1.65		19
3/18/2009	mechanic		>1	0.66	660	1.81		6.6

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3/18/2009	cleanup man		>1	0.57	570	2.7		5.7
3/18/2009	kiln/dryer operator		<1	0.14				
3/18/2009	truck loader			<0.1				
3/19/2009	electrician		>1	0.42	420	2.04		4.2
3/19/2009	mechanic		<1	0.31				
3/19/2009	mechanic			0.13				
3/19/2009	utility man			<0.1				
3/19/2009	laborer, bullgang			<0.1				

Date	Sample	Location	Job Title	Time on	Time off	Total Time (min.)	Volume (liters)	Flow Rate (L/min.)	Volume (m3)	Dust Mass (mg)	Respirable Dust TWA (mg/m3)	Quartz Mass (mg)	Quartz (%)	Quartz (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	MSHA Respirable Dust TLV +20% (mg/m3)	% MSHA TLV	OSHA Proposed SiO2 PEL (mg/M3)	% OSHA Proposed Quartz PEL
5/11/2010	172489	Mill	Chief Operator			403	705	1.7	0.705	0.1	0.142	0.005	5	0.007	1.429	1.714	8	0.05	14.2
5/11/2010	172478		Intermediate Utility			376	658	1.8	0.658	0.39	0.593	0.016	4.1	0.024	1.639	1.966	30	0.05	48.6
5/11/2010	172484	Mill	Mill Laborer			375	641	1.7	0.641	0.328	0.512	0.017	5.2	0.027	1.392	1.671	31	0.05	53
5/11/2010	172479		Intermediate Utility			381	678	1.8	0.678	0.501	0.739	0.02	4	0.029	1.669	2.003	37	0.05	59
5/11/2010	172482		Screen Person			377	671	1.8	0.671	0.556	0.829	0.02	3.6	0.03	1.787	2.144	39	0.05	59.6
5/11/2010	172487	Mill	Mill Operator			376	654	1.7	0.654	0.438	0.67	0.024	5.5	0.037	1.337	1.604	42	0.05	73.4
5/11/2010	172490		Waste Unit Operator			391	704	1.8	0.704	0.758	1.077	0.024	3.2	0.034	1.936	2.323	46	0.05	68.2
5/11/2010	172488		Laborer			380	650	1.7	0.65	0.7	1.077	0.023	3.3	0.035	1.892	2.27	47	0.05	70.8
5/11/2010	172477		Headlap Utility			380	669	1.8	0.669	0.607	0.907	0.028	4.6	0.042	1.512	1.815	50	0.05	83.7
5/11/2010	172499		HeadLap Utility			325	562	1.7	0.562	0.594	1.057	0.032	5.4	0.057	1.354	1.624	65	0.05	113.9
5/11/2010	172493		Screen Person			385	658	1.7	0.658	0.83	1.261	0.036	4.3	0.055	1.578	1.894	67	0.05	109.4
5/11/2010	172486		Waste Unit Operator			360	626	1.7	0.626	1.269	2.027	0.048	3.8	0.077	1.729	2.075	98	0.05	153.4
6/6/2011	185551		Primary Crusher Oper.			432	747	1.7	0.747	0.116	0.155	0.006	5.2	0.008	1.394	1.673	9	0.05	16.1
6/6/2011	185549		Utility Color Plant			407	704	1.7	0.704	0.148	0.21	0.005	3.4	0.007	1.859	2.231	9	0.05	14.2
6/6/2011	185539		Maintenance Mechanic			424	721	1.7	0.721	0.163	0.226	0.005	3.1	0.007	1.973	2.368	10	0.05	13.9
6/6/2011	185557		laborer Color Plant			427	734	1.7	0.734	0.24	0.327	0.007	2.9	0.01	2.034	2.441	13	0.05	19.1
6/6/2011	185544		Batchperson Color Plant			401	682	1.7	0.682	0.345	0.506	0.005	1.4	0.007	2.899	3.479	15	0.05	14.7
6/6/2011	185541	Mill	Chief Operator			338	592	1.8	0.592	0.237	0.401	0.006	2.5	0.01	2.207	2.648	15	0.05	20.3
6/6/2011	185545		Mechanic			372	632	1.7	0.632	0.282	0.446	0.006	2.1	0.009	2.423	2.907	15	0.05	19
6/6/2011	185535	Mill	Mill Laborer			393	668	1.7	0.668	0.298	0.446	0.011	3.7	0.016	1.757	2.108	21	0.05	32.9
6/6/2011	185537		Mechanic			375	645	1.7	0.645	0.595	0.922	0.006	1	0.009	3.324	3.989	23	0.05	18.6
6/6/2011	185546		Screen Person			460	773	1.7	0.773	0.345	0.446	0.015	4.3	0.019	1.575	1.89	24	0.05	38.8
6/6/2011	185538	Mill	Mill Operator			456	789	1.7	0.789	0.47	0.596	0.021	4.5	0.027	1.546	1.855	32	0.05	53.2
6/6/2011	185547		Waste Unit Operator			424	721	1.7	0.721	0.352	0.488	0.022	6.3	0.031	1.212	1.455	34	0.05	61
6/6/2011	185542		Intermediate Utility			452	782	1.7	0.782	0.529	0.676	0.023	4.3	0.029	1.575	1.89	36	0.05	58.8
6/6/2011	185536		Head Lap Utility Oper.			431	728	1.7	0.728	0.733	1.006	0.035	4.8	0.048	1.476	1.771	57	0.05	96.1
6/6/2011	185548		Waste Unit Operator			420	718	1.7	0.718	1.128	1.571	0.044	3.9	0.061	1.695	2.034	77	0.05	122.5
6/6/2011	185540		HeadLap Mechanic			397	687	1.7	0.687	1.22	1.776	0.064	5.2	0.093	1.38	1.656	107	0.05	186.4
7/9/2012	110567		Headlap Chief			503	890	1.8	0.89	0.116	0.13	0.005	4.3	0.006	1.585	1.902	7	0.05	11.2
7/9/2012	110572		Quarry, Operator			477	844	1.8	0.844	0.126	0.149	0.006	4.8	0.007	1.479	1.775	8	0.05	14.2
7/9/2012	110569		Central Control Room			400	708	1.8	0.708	0.108	0.153	0.005	4.6	0.007	1.508	1.81	8	0.05	14.1
7/9/2012	110573		Color Utility			407	712	1.7	0.712	0.141	0.198	0.005	3.5	0.007	1.803	2.164	9	0.05	14
7/9/2012	110568		Quarry Utility			479	838	1.7	0.838	0.21	0.251	0.007	3.3	0.008	1.875	2.25	11	0.05	16.7
7/9/2012	110574		Mill Operating Room			394	690	1.8	0.69	0.185	0.268	0.008	4.3	0.012	1.581	1.897	14	0.05	23.2
7/9/2012	110579		Ro-tap Testing Room			391	673	1.7	0.673	0.322	0.478	0.007	2.2	0.01	2.396	2.875	17	0.05	20.8
7/9/2012	110564	Waste Unit	Waste Unit Operator			380	646	1.7	0.646	0.366	0.567	0.009	2.5	0.014	2.243	2.691	21	0.05	27.9
7/9/2012	110559		310/320 Crusher 2			145	247	1.7	0.247	0.123	0.498	0.005	4.1	0.02	1.649	1.979	25	0.05	40.5
7/9/2012	110604		310/320 Crusher			240	408	1.7	0.408	0.228	0.559	0.011	4.8	0.027	1.465	1.758	32	0.05	53.9
7/9/2012	110577		Mill Operator			461	784	1.7	0.784	0.591	0.754	0.019	3.2	0.024	1.918	2.301	33	0.05	48.5
7/9/2012	110583		BF103 (Headlap Plant)			143	242	1.7	0.242	0.182	0.752	0.007	3.8	0.029	1.711	2.053	37	0.05	57.9
7/9/2012	110565		Utility			370	644	1.7	0.644	0.55	0.854	0.018	3.3	0.028	1.897	2.276	38	0.05	55.9
7/9/2012	110571	Mill	Mill Operator			416	736	1.8	0.736	0.763	1.037	0.03	3.9	0.041	1.686	2.023	51	0.05	81.5
7/9/2012	110580		BF103 (Headlap Plant)			250	423	1.7	0.423	0.41	0.969	0.018	4.4	0.043	1.565	1.878	52	0.05	85.1
7/9/2012	110561		Mill Sceneperson			455	805	1.8	0.805	1.038	1.289	0.041	3.9	0.051	1.681	2.017	64	0.05	101.9
7/9/2012	110575	Headlap	Laborer			407	712	1.7	0.712	1.096	1.539	0.035	3.2	0.049	1.926	2.311	67	0.05	98.3
7/9/2012	110566		Mill Basement			229	389	1.7	0.389	0.586	1.506	0.023	3.9	0.059	1.688	2.025	74	0.05	118.3
7/9/2012	110605	Intermediate	Utility Intermediate			405	713	1.8	0.713	1.46	2.048	0.051	3.5	0.072	1.82	2.185	94	0.05	143.1
7/9/2012	110563		Mill Basement 2			145	247	1.7	0.247	0.623	2.522	0.023	3.7	0.093	1.757	2.108	120	0.05	186.2
7/9/2012	110562		Headlap Utility			479	843	1.8	0.843	2.076	2.463	0.087	4.2	0.103	1.615	1.938	127	0.05	206.4
7/9/2012	110588		Waste Worm Floor			148	258	1.7	0.258	4.361	16.903	0.195	4.5	0.756	1.545	1.854	912	0.05	1511.6
7/9/2012	110570		Waste Worm Floor			246	428	1.7	0.428	12.055	28.166	0.552	4.6	1.29	1.52	1.824	1544	0.05	2579.4
2/21/2013	111076		Headlap/Maintenance			328	564	1.7	0.564	0.1	0.177	0.005	5	0.009	1.429	1.714	10	0.05	17.7

Date	Sample	Location	Job Title	Time on	Time off	Total Time (min.)	Volume (liters)	Flow Rate (L/min.)	Volume (m3)	Dust Mass (mg)	Respirable Dust TWA (mg/m3)	Quartz Mass (mg)	Quartz (%)	Quartz (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	MSHA Respirable Dust TLV +20% (mg/m3)	% MSHA TLV	OSHA Proposed SiO2 PEL (mg/M3)	% OSHA Proposed Quartz PEL
2/21/2013	111059		Headlap/Utility			353	621	1.8	0.621	0.23	0.37	0.009	3.9	0.014	1.691	2.029	18	0.05	29
2/21/2013	200949		Waste Unit Operator			406	723	1.8	0.723	0.475	0.657	0.007	1.5	0.01	2.879	3.455	19	0.05	19.4
2/21/2013	111073		Headlap/Maintenance			314	565	1.8	0.565	0.22	0.389	0.012	5.5	0.021	1.341	1.61	24	0.05	42.5
2/21/2013	111060		Screenperson			417	742	1.8	0.742	0.503	0.678	0.02	4	0.027	1.673	2.008	34	0.05	53.9
2/21/2013	111063		Intermediate Operator			335	576	1.7	0.576	0.436	0.757	0.019	4.4	0.033	1.573	1.887	40	0.05	66
2/21/2013	200938		Headlap/Utility			392	698	1.8	0.698	0.537	0.769	0.024	4.5	0.034	1.546	1.855	41	0.05	68.8
2/21/2013	200958		Mill Operator			416	740	1.8	0.74	0.739	0.999	0.033	4.5	0.045	1.547	1.856	54	0.05	89.2
2/21/2013	111080		Waste Unit Operator			369	657	1.8	0.657	0.692	1.053	0.03	4.3	0.046	1.578	1.894	56	0.05	91.3
2/21/2013	110977		Waste Unit Labor			372	632	1.7	0.632	0.775	1.226	0.029	3.7	0.046	1.742	2.09	59	0.05	91.8
5/21/2013	110587	Mill	Mill Operator, Chief			411	707	1.7	0.707	0.1	0.141	0.005	5	0.007	1.429	1.714	8	0.05	14.1
5/21/2013	110596	Maintenance	Maintenance			359	625	1.7	0.625	0.169	0.27	0.005	3	0.008	2.017	2.42	11	0.05	16
5/21/2013	110591	Intermediate	Intermediate Oper.			414	742	1.8	0.742	0.183	0.247	0.007	3.8	0.009	1.717	2.06	12	0.05	18.9
5/21/2013	110592	Mill	Waste unit Oper.			340	602	1.8	0.602	0.189	0.314	0.005	2.6	0.008	2.153	2.583	12	0.05	16.6
5/21/2013	110558	Color Plant	Utility Oper.			420	727	1.7	0.727	0.374	0.514	0.005	1.3	0.007	2.997	3.596	14	0.05	13.8
5/21/2013	110601	Color Plant	Mixing Oper.			441	763	1.7	0.763	0.776	1.017	0.014	1.8	0.018	2.629	3.154	32	0.05	36.7
5/21/2013	110594	Mill	Mill Operator			389	664	1.7	0.664	0.582	0.877	0.022	3.8	0.033	1.73	2.076	42	0.05	66.3
5/21/2013	110584	Headlap	Utility			372	657	1.8	0.657	0.743	1.131	0.043	5.8	0.065	1.284	1.541	73	0.05	130.9
5/22/2013	110593	Intermediate	Utility			408	702	1.7	0.702	0.479	0.682	0.015	3.1	0.021	1.949	2.338	29	0.05	42.7
5/22/2013	110606	Waste Unit	Operator			432	756	1.8	0.756	0.698	0.923	0.019	2.7	0.025	2.118	2.541	36	0.05	50.3
5/22/2013	110581	Mill	Screenman			409	708	1.7	0.708	1.447	2.044	0.052	3.6	0.073	1.788	2.145	95	0.05	146.9
9/11/2013	172500	Mill	Waste Unit Truck Driver			452	768	1.7	0.768	0.1	0.13	0.005	5	0.007	1.429	1.714	8	0.05	13
9/11/2013	172496		G-11 Loader			482	844	1.8	0.844	0.151	0.179	0.005	3.3	0.006	1.883	2.259	8	0.05	11.8
9/11/2013	172498	Headlap Plant	Maintenance			360	634	1.8	0.634	0.1	0.158	0.005	5	0.008	1.429	1.714	9	0.05	15.8
9/11/2013	172480	Headlap Plant	Laborer			410	705	1.7	0.705	0.153	0.217	0.005	3.3	0.007	1.898	2.278	10	0.05	14.2
9/11/2013	110589		Water Truck Driver			375	634	1.7	0.634	0.12	0.189	0.005	4.2	0.008	1.622	1.946	10	0.05	15.8
9/11/2013	110600	Coloring Plant	Utility Operator			411	711	1.7	0.711	0.246	0.346	0.005	2	0.007	2.48	2.976	12	0.05	14.1
9/11/2013	110598	Headlap Plant	Utility			431	771	1.8	0.771	0.245	0.318	0.007	2.9	0.009	2.059	2.471	13	0.05	18.2
9/11/2013	172497	Maintenance	Maintenance			410	726	1.8	0.726	0.238	0.328	0.007	2.9	0.01	2.024	2.429	13	0.05	19.3
9/11/2013	110603	Mill	Waste Unit			455	787	1.7	0.787	0.425	0.54	0.01	2.4	0.013	2.297	2.757	20	0.05	25.4
9/11/2013	110586	Headlap Plant	Utility			448	780	1.7	0.78	0.521	0.668	0.015	2.9	0.019	2.05	2.459	27	0.05	38.5
9/11/2013	172481		Maintenance			426	737	1.7	0.737	0.473	0.642	0.017	3.6	0.023	1.788	2.145	30	0.05	46.1
9/11/2013	172491	Mill	Operator			441	772	1.8	0.772	0.646	0.837	0.019	2.9	0.025	2.024	2.429	34	0.05	49.2
9/11/2013	110578	Intermediate	Utility			607	1032	1.7	1.032	0.855	0.828	0.026	3	0.025	1.984	2.381	35	0.05	50.4
9/11/2013	172492	Intermediate	Intermediate Operator			446	758	1.7	0.758	0.731	0.964	0.022	3	0.029	1.996	2.395	40	0.05	58
9/11/2013	110576	Mill	Operator			455	792	1.7	0.792	1.319	1.665	0.04	3	0.051	1.987	2.384	70	0.05	101
9/11/2013	172494	Mill	Screenperson			438	753	1.7	0.753	2.239	2.973	0.057	2.5	0.076	2.2	2.64	113	0.05	151.4
12/11/2013	203312	Operator	UMMP			394	690	1.8	0.69	0.102	0.148	0.005	4.9	0.007	1.449	1.739	9	0.05	14.5
12/11/2013	203306	Utility/operator	UMMP			356	641	1.8	0.641	0.126	0.197	0.005	4	0.008	1.676	2.011	10	0.05	15.6
12/11/2013	213789	Utility/operator	UMMP			457	823	1.8	0.823	0.278	0.338	0.007	2.5	0.009	2.213	2.656	13	0.05	17
12/11/2013	213788	Utility	intermediate			456	825	1.8	0.825	0.344	0.417	0.012	3.5	0.015	1.822	2.186	19	0.05	29.1
12/11/2013	213786	Operator	UMMP			420	735	1.8	0.735	0.387	0.527	0.021	5.4	0.029	1.347	1.616	33	0.05	57.1
12/11/2013	213792	Operator	mill			448	797	1.8	0.797	0.624	0.783	0.023	3.7	0.029	1.759	2.11	37	0.05	57.7
12/11/2013	110582	Operator	Waste Unit			458	815	1.8	0.815	0.589	0.723	0.026	4.4	0.032	1.559	1.871	39	0.05	63.8
12/11/2013	110599	Utility	intermediate			424	755	1.8	0.755	0.855	1.132	0.027	3.2	0.036	1.939	2.327	49	0.05	71.5
12/11/2013	110602	Screenperson	mill			429	746	1.7	0.746	1.571	2.106	0.063	4	0.084	1.664	1.997	105	0.05	168.9
12/11/2013	213794	Utility	Headlap			433	762	1.8	0.762	1.891	2.482	0.08	4.2	0.105	1.605	1.926	129	0.05	210
12/11/2013	213787	Level 4 - BC918 - over start of conveyors	UMMP			351	639	1.8	0.639	0.1	0.156	0.008	8	0.013	1	1.2	13	0.05	25
12/11/2013	213790	level 3 - on conveyor 187 screw	UMMP			358	648	1.8	0.648	0.1	0.154	0.008	8	0.012	1	1.2	13	0.05	24.7

Date	Sample	Location	Job Title	Time on	Time off	Total Time (min.)	Volume (liters)	Flow Rate (L/min.)	Volume (m3)	Dust Mass (mg)	Respirable Dust TWA (mg/m3)	Quartz Mass (mg)	Quartz (%)	Quartz (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	MSHA Respirable Dust TLV +20% (mg/m3)	% MSHA TLV	OSHA Proposed SiO2 PEL (mg/M3)	% OSHA Proposed Quartz PEL
12/11/2013	203307	Behind the midwestern	UMMP			363	675	1.9	0.675	0.1	0.148	0.007	7	0.01	1.111	1.333	11	0.05	20.7
12/11/2013	213791	Level 1 - on 430 elevator	UMMP			356	648	1.8	0.648	0.1	0.154	0.008	8	0.012	1	1.2	13	0.05	24.7
12/11/2013	110585	Desk in office	UMMP			438	815	1.9	0.815	0.108	0.133	0.006	5.6	0.007	1.324	1.588	8	0.05	14.7
3/4/2014	215800	Maintenance				437	787	1.8	0.787	0.1	0.127	0.005	5	0.006	1.429	1.714	7	0.05	12.7
3/4/2014	215815	UMMP	utility			342	622	1.8	0.622	0.1	0.161	0.005	5	0.008	1.429	1.714	9	0.05	16.1
3/4/2014	215813	Color Plant	loader			284	506	1.8	0.506	0.1	0.198	0.005	5	0.01	1.429	1.714	12	0.05	19.8
3/4/2014	215798	Maintenance	Electrician			354	620	1.8	0.62	0.181	0.292	0.005	2.8	0.008	2.1	2.52	12	0.05	16.1
3/4/2014	215808	Color Plant	shipping loader			290	502	1.7	0.502	0.1	0.199	0.005	5	0.01	1.429	1.714	12	0.05	19.9
3/4/2014	215804	Color Plant	kiln operator			271	472	1.7	0.472	0.1	0.212	0.005	5	0.011	1.429	1.714	12	0.05	21.2
3/4/2014	215802	Coloring Plant	laborer			426	801	1.9	0.801	0.372	0.464	0.009	2.4	0.011	2.263	2.715	17	0.05	22.5
3/4/2014	215809	Color Plant	kiln operator			276	483	1.8	0.483	0.17	0.352	0.008	4.7	0.017	1.491	1.789	20	0.05	33.1
3/4/2014	215805	Waste Unit	Operator			464	821	1.8	0.821	0.358	0.436	0.013	3.6	0.016	1.776	2.131	20	0.05	31.7
3/4/2014	215811	Waste Unit	operator			346	619	1.8	0.619	0.23	0.372	0.011	4.8	0.018	1.474	1.769	21	0.05	35.5
3/4/2014	215807	Mill	screenperson			363	643	1.8	0.643	0.383	0.596	0.011	2.9	0.017	2.053	2.463	24	0.05	34.2
3/4/2014	215797	Mill	utility			374	669	1.8	0.669	0.339	0.507	0.015	4.4	0.022	1.556	1.868	27	0.05	44.8
3/4/2014	215814	Mill	operator			364	641	1.8	0.641	0.448	0.699	0.013	2.9	0.02	2.04	2.448	29	0.05	40.6
3/4/2014	215799	Mill	Operator			465	851	1.8	0.851	0.424	0.498	0.021	5	0.025	1.438	1.726	29	0.05	49.4
3/4/2014	215801	Intermediate	utility			402	768	1.9	0.768	0.548	0.714	0.021	3.8	0.027	1.715	2.058	35	0.05	54.7
3/4/2014	215803	Primary Crusher	Operator			471	820	1.7	0.82	0.339	0.413	0.031	9.1	0.038	0.897	1.077	38	0.05	75.6
3/4/2014	215812	Intermediate	utility			370	677	1.8	0.677	1.096	1.619	0.035	3.2	0.052	1.926	2.311	70	0.05	103.4
8/13/2014	215781	Intermediate	Utility			518	901	1.7	0.901	0.1	0.111	0.005	5	0.006	1.429	1.714	6	0.05	11.1
8/13/2014	215785	Headlap	Utility			397	695	1.8	0.695	0.1	0.144	0.005	5	0.007	1.429	1.714	8	0.05	14.4
8/13/2014	215780	UMPP	Utility			401	686	1.7	0.686	0.107	0.156	0.005	4.7	0.007	1.499	1.798	9	0.05	14.6
8/13/2014	215775	Maintenance				431	763	1.8	0.763	0.263	0.345	0.008	3	0.01	1.983	2.38	14	0.05	21
8/13/2014	215768	Maintenance	Electrician			428	749	1.8	0.749	0.295	0.394	0.009	3.1	0.012	1.98	2.376	17	0.05	24
8/13/2014	215790	Mill	Operator			443	784	1.8	0.784	0.41	0.523	0.012	2.9	0.015	2.03	2.436	21	0.05	30.6
8/13/2014	215795	Mill	Labor			461	811	1.8	0.811	0.712	0.878	0.022	3.1	0.027	1.965	2.358	37	0.05	54.3
8/13/2014	215784	Mill	Operator			459	817	1.8	0.817	0.922	1.129	0.031	3.4	0.038	1.865	2.238	50	0.05	75.9
8/13/2014	215788	Intermediate	Utility			457	786	1.7	0.786	1.078	1.372	0.037	3.4	0.047	1.841	2.209	62	0.05	94.1
8/13/2014	215779	Mill	Screen Person			461	802	1.7	0.802	1.234	1.539	0.038	3.1	0.047	1.969	2.362	65	0.05	94.8
8/13/2014	215793	Mill	Screen Person			435	766	1.8	0.766	1.5	1.958	0.041	2.7	0.054	2.113	2.535	77	0.05	107
8/13/2014	215783	Waste Unit	Operator			441	767	1.7	0.767	1.585	2.066	0.047	3	0.061	2.014	2.417	86	0.05	122.6
8/13/2014	215792	Waste Unit	Operator			455	819	1.8	0.819	1.767	2.158	0.05	2.8	0.061	2.071	2.485	87	0.05	122.1
8/13/2014	215789	Color Plant	Kiln Operator			474	810	1.7	0.81	1.944	2.4	0.052	2.7	0.064	2.139	2.567	93	0.05	128.4
8/13/2014	215791	Intermediate	Utility			427	743	1.7	0.743	1.882	2.533	0.054	2.9	0.073	2.054	2.464	103	0.05	145.4
12/9/2014	215776	Mill	Laborer			469	844	1.8	0.844	0.126	0.149	0.005	4	0.006	1.676	2.011	7	0.05	11.8
12/9/2014	215786	Intermediate	utility			478	1147	2.4	1.147	0.545	0.475	0.012	2.2	0.01	2.38	2.856	17	0.05	20.9
12/9/2014	215778	Waste Unit	Operator			465	814	1.8	0.814	0.905	1.112	0.024	2.7	0.029	2.15	2.58	43	0.05	59
12/9/2014	215774	UMMP	utility			450	810	1.8	0.81	1.063	1.312	0.03	2.8	0.037	2.074	2.488	53	0.05	74.1
12/9/2014	215782	Mill	operator			457	777	1.7	0.777	1.98	2.548	0.055	2.8	0.071	2.093	2.512	101	0.05	141.6
12/10/2014	215773	mill	laborer			396	697	1.8	0.697	0.207	0.297	0.006	2.9	0.009	2.041	2.45	12	0.05	17.2
12/10/2014	215771	mill	operator			431	754	1.7	0.754	0.549	0.728	0.013	2.4	0.017	2.289	2.747	27	0.05	34.5
12/10/2014	215769	mill	screenperson			432	769	1.8	0.769	0.514	0.668	0.016	3.1	0.021	1.956	2.347	28	0.05	41.6
12/10/2014	215772	intermediate	operator			441	776	1.8	0.776	0.623	0.803	0.017	2.7	0.022	2.115	2.538	32	0.05	43.8
12/10/2014	215770	intermediate	utility			401	710	1.8	0.71	0.581	0.818	0.02	3.4	0.028	1.837	2.205	37	0.05	56.3
12/10/2014	215767	waste unit	operator			429	772	1.8	0.772	0.809	1.048	0.022	2.7	0.028	2.119	2.543	41	0.05	57
3/11/2015	229437	UMPP	Chief Operator			532	938	1.8	0.938	0.209	0.223	0.007	3.3	0.007	1.869	2.243	10	0.05	14.9
3/11/2015	229438	Mill	Operator			454	798	1.8	0.798	0.226	0.283	0.006	2.7	0.008	2.148	2.578	11	0.05	15
3/11/2015	229436	UMPP	Chief Operator			410	705	1.7	0.705	0.238	0.338	0.007	2.9	0.01	2.024	2.429	14	0.05	19.9
3/11/2015	229449	HeadLap	Utility			479	844	1.8	0.844	0.382	0.453	0.01	2.6	0.012	2.166	2.599	17	0.05	23.7



Date	Sample	Location	Job Title	Time on	Time off	Total Time (min.)	Volume (liters)	Flow Rate (L/min.)	Volume (m3)	Dust Mass (mg)	Respirable Dust TWA (mg/m3)	Quartz Mass (mg)	Quartz (%)	Quartz (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	MSHA Respirable Dust TLV +20% (mg/m3)	% MSHA TLV	OSHA Proposed SiO2 PEL (mg/M3)	% OSHA Proposed Quartz PEL
3/11/2015	229443	Mill	Laborer			186	333	1.8	0.333	0.107	0.321	0.005	4.7	0.015	1.499	1.798	18	0.05	30
3/11/2015	229431	UMPP	Loader			300	528	1.8	0.528	0.223	0.422	0.008	3.6	0.015	1.79	2.148	20	0.05	30.3
3/11/2015	229433	HeadLap	Utility			471	849	1.8	0.849	0.397	0.468	0.014	3.5	0.016	1.809	2.171	22	0.05	33
3/11/2015	229448	Mill	Laborer			446	791	1.8	0.791	0.445	0.563	0.014	3.1	0.018	1.943	2.332	24	0.05	35.4
3/11/2015	224432	HeadLap	Laborer			469	851	1.8	0.851	0.61	0.717	0.022	3.6	0.026	1.784	2.14	33	0.05	51.7
3/11/2015	229451	Mill	Screen Person			457	826	1.8	0.826	0.619	0.749	0.021	3.4	0.025	1.854	2.225	34	0.05	50.8
3/11/2015	229453	Waste Unit	Operator			478	838	1.8	0.838	1.054	1.258	0.03	2.8	0.036	2.063	2.476	51	0.05	71.6
3/11/2015	229452	Intermediate	Utility			446	797	1.8	0.797	1.038	1.302	0.028	2.7	0.035	2.129	2.555	51	0.05	70.3
6/18/2015	229439	UMPP	Operator			446	803	1.8	0.803	0.1	0.125	0.005	5	0.006	1.429	1.714	7	0.05	12.5
6/18/2015	229415	Plant	Mechanic			353	628	1.8	0.628	0.264	0.42	0.008	3	0.013	1.988	2.386	18	0.05	25.5
6/18/2015	229420	Intermediate	Utility			469	844	1.8	0.844	0.441	0.523	0.011	2.5	0.013	2.225	2.67	20	0.05	26.1
6/18/2015	229425	Plant	Mechanic			403	717	1.8	0.717	0.269	0.375	0.012	4.5	0.017	1.548	1.857	20	0.05	33.5
6/18/2015	229424	Headlap	Utility			438	762	1.7	0.762	0.342	0.449	0.015	4.4	0.02	1.566	1.879	24	0.05	39.4
6/18/2015	229404	Intermediate	Operator			452	791	1.8	0.791	0.964	1.219	0.022	2.3	0.028	2.335	2.802	43	0.05	55.6
6/18/2015	229427	UMPP	Operator			414	729	1.8	0.729	2.169	2.975	0.074	3.4	0.102	1.848	2.217	134	0.05	203
6/18/2015	229419	Mill	Screen Person			478	832	1.7	0.832	3.029	3.641	0.084	2.8	0.101	2.095	2.514	145	0.05	201.9
6/19/2015	229414	Headlap	Utility			447	778	1.7	0.778	2.437	3.132	0.106	4.3	0.136	1.575	1.89	166	0.05	272.5
5/12/2016		Baghouse-Air slid Chute	Maint			438	771	1.8	0.771	0.103	0.134	0.005	4.9	0.006	1.459	1.751	8	0.05	13
5/12/2016		Baghouse - Air slid Chute	Maint			437	761	1.7	0.761	0.222	0.292	0.005	2.3	0.007	2.352	2.822	10	0.05	13.1
5/12/2016		Baghouse - Maint	Maint			439	786	1.8	0.786	0.347	0.441	0.007	2	0.009	2.489	2.987	15	0.05	17.8
5/12/2016		Baghouse-Maint	Maint			442	782	1.8	0.782	0.805	1.029	0.019	2.4	0.024	2.293	2.752	37	0.05	48.6
11/30/2016	247884	315 Crusher	Area Sample			433	743	1.7	0.743	0.1	0.135	0.005	5	0.007	1.429	1.714	8	0.05	13.5
11/30/2016	247872	UMPP	Chief Operator			434	741	1.7	0.741	0.1	0.135	0.005	5	0.007	1.429	1.714	8	0.05	13.5
11/30/2016	247869	300 Building - Bottom	Area Sample			431	735	1.7	0.735	0.1	0.136	0.005	5	0.007	1.429	1.714	8	0.05	13.6
11/30/2016	247864	300 -Crusher Floor	Area Sample			427	730	1.7	0.73	0.1	0.137	0.005	5	0.007	1.429	1.714	8	0.05	13.7
11/30/2016	247868	Mill	Labor			433	744	1.7	0.744	0.141	0.19	0.005	3.5	0.007	1.803	2.164	9	0.05	13.4
11/30/2016	247863	Between 320 &340 crusher	Area Sample			437	759	1.7	0.759	0.128	0.169	0.006	4.7	0.008	1.495	1.794	9	0.05	15.8
11/30/2016	247867	Crushing	Intermedicate			425	729	1.7	0.729	0.342	0.469	0.012	3.5	0.016	1.815	2.178	22	0.05	32.9
11/30/2016	247862	Mill	Mill Operator			433	775	1.8	0.775	0.633	0.817	0.032	5.1	0.041	1.417	1.701	48	0.05	82.6
11/30/2016	247879	Head Lap	Utility			428	736	1.7	0.736	0.839	1.14	0.034	4.1	0.046	1.652	1.983	57	0.05	92.4
11/30/2016	247861	Mill	Screen Person			434	743	1.7	0.743	1.207	1.624	0.04	3.3	0.054	1.882	2.258	72	0.05	107.7
11/30/2016	247874	51/2 Crusher/Quarry	Area Sample			427	739	1.7	0.739	1.662	2.249	0.212	12.8	0.287	0.678	0.813	277	0.05	573.7
12/1/2016	247906	300 Building -Top	Area Sample			491	839	1.7	0.839	0.1	0.119	0.005	5	0.006	1.429	1.714	7	0.05	11.9
12/1/2016	247907	UMPP Screen Floor	Area Sample			490	856	1.7	0.856	0.144	0.168	0.005	3.5	0.006	1.827	2.193	8	0.05	11.7
12/1/2016	247909	Between 320 &340 crusher	Area Sample			492	851	1.7	0.851	0.155	0.182	0.005	3.2	0.006	1.914	2.296	8	0.05	11.8
12/1/2016	247911	315 Crusher	Area Sample			495	876	1.8	0.876	0.145	0.166	0.007	4.8	0.008	1.465	1.758	9	0.05	16
12/1/2016	247912	Waste Unit	Waste Unit Operator			478	816	1.7	0.816	0.173	0.212	0.006	3.5	0.007	1.829	2.195	10	0.05	14.7
12/1/2016	247902	Waste Unit-at 1&2 Screen	Area Sample			486	842	1.7	0.842	0.806	0.957	0.029	3.6	0.034	1.786	2.144	45	0.05	68.9
12/1/2016	247914	Mill	Labor			465	797	1.7	0.797	1.509	1.893	0.05	3.3	0.063	1.882	2.258	84	0.05	125.5
12/1/2016	247913	Crushing	Intermedicate			474	815	1.7	0.815	2.317	2.843	0.069	3	0.085	2.009	2.411	118	0.05	169.3
4/26/2017	SGC-042617-01	Mill	Utility	1449	2243	474	1180	2.49	1.18	0.217	0.184	0.006	2.8	0.005	2.099	2.518	7	0.05	10.2
4/26/2017	SGC-042617-04		Shift Mechanic	1504	2248	464	1170	2.52	1.17	0.379	0.324	0.007	1.8	0.006	2.599	3.119	10	0.05	12
4/26/2017	SGC-042617-02	Mill	Operator	1459	2257	478	1200	2.51	1.2	0.738	0.615	0.023	3.1	0.019	1.954	2.345	26	0.05	38.3

Date	Sample	Location	Job Title	Time on	Time off	Total Time (min.)	Volume (liters)	Flow Rate (L/min.)	Volume (m3)	Dust Mass (mg)	Respirable Dust TWA (mg/m3)	Quartz Mass (mg)	Quartz (%)	Quartz (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	MSHA Respirable Dust TLV +20% (mg/m3)	% MSHA TLV	OSHA Proposed SiO2 PEL (mg/M3)	% OSHA Proposed Quartz PEL
4/26/2017	SGC-042617-05		Waste Unit	1507	2252	465	1160	2.49	1.16	0.935	0.806	0.027	2.9	0.023	2.046	2.455	33	0.05	46.6
4/26/2017	SGC-042617-03	Mill	Screen Person	1501	2257	476	1200	2.52	1.2	1.167	0.973	0.036	3.1	0.03	1.967	2.36	41	0.05	60
4/27/2017	SGC-042717-04		Maintenance	732	1421	409	1030	2.52	1.03	0.189	0.183	0.005	2.6	0.005	2.153	2.583	7	0.05	9.7
4/27/2017	SGC-042717-01		Laborer	708	1444	456	1130	2.48	1.13	0.649	0.574	0.018	2.8	0.016	2.095	2.514	23	0.05	31.9
4/27/2017	SGC-042717-05		Maintenance	730	1420	410	1030	2.51	1.03	1.325	1.286	0.024	1.8	0.023	2.624	3.149	41	0.05	46.6
4/27/2017	SGC-042717-03	Mill	Screen Person	725	1446	441	1100	2.49	1.1	1.241	1.128	0.038	3.1	0.035	1.975	2.371	48	0.05	69.1
4/27/2017	SGC-042717-02	Headlap	Utility	712	1452	357	896	2.51	0.896	2.049	2.287	0.069	3.4	0.077	1.863	2.236	102	0.05	154
8/15/2017	257479		UMPP	1501	2252	471	1190	2.53	1.19	0.171	0.144	0.005	2.9	0.004	2.031	2.437	6	0.05	8.4
8/15/2017	257476	Mill	Area Sample-Mill Central Control	1536	2151	375	945	2.52	0.945	0.1	0.106	0.005	5	0.005	1.429	1.714	6	0.05	10.6
8/15/2017	257475	Mill	Lower Mill Screen Person	1459	2247	468	1200	2.56	1.2	0.719	0.599	0.029	4	0.024	1.657	1.989	30	0.05	48.3
8/15/2017	257477	Headlap	Headlap Utility	1455	2250	475	1180	2.48	1.18	1.555	1.318	0.057	3.7	0.048	1.765	2.118	62	0.05	96.6
8/16/2017	257472	Mill	Area Sample-Mill Central Control	748	1410	382	957	2.51	0.957	0.1	0.104	0.005	5	0.005	1.429	1.714	6	0.05	10.4
8/16/2017	257480	Mill	Lower Mill Intermediate	702	1454	309	766	2.48	0.766	0.235	0.307	0.008	3.4	0.01	1.85	2.22	14	0.05	20.9
8/16/2017	257478	Mill	Lower Mill Laborer	703	1450	466	1200	2.58	1.2	0.367	0.306	0.013	3.5	0.011	1.804	2.165	14	0.05	21.7
8/16/2017	257474	Headlap	Headlap Laborer	706	1448	462	1170	2.53	1.17	4.046	3.458	0.168	4.2	0.144	1.625	1.951	177	0.05	287.2
11/7/2017	SGC-110717-03		UMP Plant			475	1170	2.46	1.17	0.204	0.174	0.008	3.9	0.007	1.689	2.026	9	0.05	13.7
11/7/2017	SGC-110717-02		Lower Mill Screen Person			473	1190	2.52	1.19	0.255	0.214	0.01	3.9	0.008	1.689	2.026	11	0.05	16.8
11/7/2017	SGC-110717-05		Waste Unit Operator			462	1170	2.53	1.17	0.325	0.278	0.01	3.1	0.009	1.97	2.364	12	0.05	17.1
11/7/2017	SGC-110717-04		Lower Mill Maintenance			469	1160	2.47	1.16	0.567	0.489	0.016	2.8	0.014	2.074	2.489	20	0.05	27.6
11/7/2017	SGC-110717-01		Headlap Utility			477	1200	2.52	1.2	0.904	0.753	0.031	3.4	0.026	1.842	2.21	34	0.05	51.7
11/8/2017	SGC-110817-02		Headlap Operator			468	1180	2.52	1.18	0.158	0.134	0.007	4.4	0.006	1.555	1.866	7	0.05	11.9
11/8/2017	SGC-110817-01		Lower Mill Intermediate			491	1230	2.51	1.23	0.235	0.191	0.008	3.4	0.007	1.85	2.22	9	0.05	13
11/8/2017	SGC-110817-04		Lower Mill Operator			473	1170	2.47	1.17	0.657	0.562	0.023	3.5	0.02	1.818	2.182	26	0.05	39.3
11/8/2017	SGC-110817-05		Lower Mill Screen Person			471	1190	2.53	1.19	1.342	1.128	0.042	3.1	0.035	1.949	2.339	48	0.05	70.6
11/8/2017	SGC-110817-03		Headlap Utility			465	1150	2.47	1.15	1.929	1.677	0.061	3.2	0.053	1.937	2.325	72	0.05	106.1
1/10/2018	265470		Relief Operator- Quarry	641	245	484	834	1.72	0.834	0.1	0.12	0.005	5	0.006	1.429	1.714	7	0.05	12
1/10/2018	265464		Quarry Supervisor	653	245	472	813	1.72	0.813	0.1	0.123	0.005	5	0.006	1.429	1.714	7	0.05	12.3
1/10/2018	265475		Haul Truck Driver	718	245	447	787	1.76	0.787	0.1	0.127	0.005	5	0.006	1.429	1.714	7	0.05	12.7
1/10/2018	265469		Haul Truck Driver	717	245	448	774	1.73	0.774	0.1	0.129	0.005	5	0.006	1.429	1.714	8	0.05	12.9
1/10/2018	265468		Loader Operator-990	719	245	446	762	1.71	0.762	0.1	0.131	0.005	5	0.007	1.429	1.714	8	0.05	13.1
1/10/2018	265480		Rock Breaker Operator	716	245	449	770	1.71	0.77	0.149	0.194	0.009	6	0.012	1.244	1.492	13	0.05	23.4
1/10/2018	265465		Quarry Laborer	722	245	443	765	1.73	0.765	0.674	0.881	0.02	3	0.026	2.013	2.416	36	0.05	52.3
1/11/2018	265479		Quarry Garage Mechanic	722	253	451	797	1.77	0.797	0.1	0.125	0.005	5	0.006	1.429	1.714	7	0.05	12.5
1/11/2018	265458		Relief Operator- Quarry	717	237	438	793	1.81	0.793	0.1	0.126	0.005	5	0.006	1.429	1.714	7	0.05	12.6
1/11/2018	265466		Haul Truck Driver	710	234	444	787	1.77	0.787	0.1	0.127	0.005	5	0.006	1.429	1.714	7	0.05	12.7
1/11/2018	265463		Haul Truck Driver	718	242	444	783	1.76	0.783	0.1	0.128	0.005	5	0.006	1.429	1.714	7	0.05	12.8
1/11/2018	265478		990 Loader Operator	714	236	442	781	1.77	0.781	0.1	0.128	0.005	5	0.006	1.429	1.714	7	0.05	12.8
1/11/2018	265459		EV-Tech	707	228	441	779	1.77	0.779	0.1	0.128	0.005	5	0.006	1.429	1.714	7	0.05	12.8
1/11/2018	265460		Primary Crusher Operator	718	244	446	790	1.77	0.79	0.1	0.127	0.006	6	0.008	1.25	1.5	8	0.05	15.2
1/11/2018	265467		Quarry Laborer	718	236	438	761	1.74	0.761	0.349	0.459	0.011	3.2	0.014	1.941	2.329	20	0.05	28.9
1/11/2018	265462		Aggregate Tester-Quarry	722	248	446	788	1.77	0.788	0.279	0.354	0.015	5.4	0.019	1.356	1.627	22	0.05	38.1
2/6/2018	261887		Mechanic			440	1100	2.5	1.1	0.1	0.091	0.005	5	0.005	1.429	1.714	5	0.05	9.1
2/6/2018	261883		Waste Unit Operator			496	1240	2.5	1.24	0.265	0.214	0.009	3.4	0.007	1.853	2.224	10	0.05	14.5
2/6/2018	261885		Intermediate Operator			470	1180	2.51	1.18	0.841	0.713	0.024	2.9	0.02	2.06	2.472	29	0.05	40.7

Date	Sample	Location	Job Title	Time on	Time off	Total Time (min.)	Volume (liters)	Flow Rate (L/min.)	Volume (m3)	Dust Mass (mg)	Respirable Dust TWA (mg/m3)	Quartz Mass (mg)	Quartz (%)	Quartz (mg/m3)	MSHA Respirable Dust TLV (mg/m3)	MSHA Respirable Dust TLV +20% (mg/m3)	% MSHA TLV	OSHA Proposed SiO2 PEL (mg/M3)	% OSHA Proposed Quartz PEL
2/6/2018	261886		Lower Mill Screen Person			458	1140	2.49	1.14	1.235	1.083	0.044	3.6	0.039	1.798	2.157	50	0.05	77.2
2/6/2018	261884		Headlap Utility			494	1240	2.51	1.24	2.523	2.035	0.089	3.5	0.072	1.809	2.171	94	0.05	143.5
2/7/2018	261877		Waste Unit Operator			497	1260	2.54	1.26	0.126	0.1	0.005	4	0.004	1.676	2.011	5	0.05	7.9
2/7/2018	261879		Headlap Laborer			465	1180	2.54	1.18	0.407	0.345	0.016	3.9	0.014	1.686	2.023	17	0.05	27.1
2/7/2018	261880		UMPP			486	1220	2.51	1.22	0.849	0.696	0.03	3.5	0.025	1.807	2.169	32	0.05	49.2
2/7/2018	261881		Lower Mill Laborer			450	1140	2.53	1.14	1.196	1.049	0.038	3.2	0.033	1.932	2.318	45	0.05	66.7
2/7/2018	261876		Headlap Utility			478	1210	2.53	1.21	3.205	2.649	0.122	3.8	0.101	1.722	2.067	128	0.05	201.7
8/2/2018	276169		UMPP	2:37 PM	11:13 PM	516	1313	2.54	1.313	0.149	0.113	0.005	3.4	0.004	1.867	2.241	5.1	0.05	7.6
8/2/2018	246174		Waste Unit Operator	2:44 PM	11:14 PM	510	1275	2.50	1.275	0.394	0.309	0.014	3.6	0.011	1.801	2.161	14.3	0.05	22.0
8/2/2018	276188		Lower Mill Intermediate	2:57 PM	10:46 PM	469	1189	2.54	1.189	1.125	0.946	0.028	2.5	0.024	2.228	2.673	35.4	0.05	47.1
8/2/2018	276179		Lower Mill laborer	2:59 PM	10:55 PM	476	1209	2.54	1.209	1.347	1.114	0.046	3.4	0.038	1.847	2.216	50.3	0.05	76.1
8/2/2018	276184		Headlap Utility	3:02 PM	10:53 PM	471	1178	2.50	1.178	2.406	2.042	0.076	3.2	0.065	1.938	2.326	87.8	0.05	129.0
8/3/2018	276167		Lower Mill Operator	6:56 AM	2:39 PM	463	1171	2.53	1.171	0.125	0.107	0.005	4.0	0.004	1.667	2.000	5.3	0.05	8.5
8/3/2018	276178		Lower Mill Laborer	6:58 AM	2:47 PM	469	1180	2.52	1.180	0.391	0.331	0.007	1.8	0.006	2.638	3.166	10.5	0.05	11.9
8/3/2018	276172		Headlap Laborer	7:00 AM	1:34 PM	394	995	2.53	0.995	1.051	1.056	0.037	3.5	0.037	1.811	2.174	48.6	0.05	74.4
8/3/2018	276177		Lower Mill Screen Person	7:03 AM	2:39 PM	456	1158	2.54	1.158	0.334	0.288	0.009	2.7	0.008	2.130	2.556	11.3	0.05	15.5
11/5/2018	264755		Area-Tech Room	7:08 AM	3:00 PM	472	847	1.79	0.847	1.352	1.596	0.061	4.51	0.072	1.536	1.843	86.6	0.05	144.0
11/5/2018	264759		Loader-c-Truck	7:11 AM	2:56 PM	465	835	1.80	0.835	0.005	0.006	0.005	100.00	0.006	0.098	0.118	5.1	0.05	12.0
11/5/2018	264758		Mill Tech A/G	7:09 AM	2:59 PM	470	831	1.77	0.831	0.3	0.361	0.03	10.00	0.036	0.833	1.000	36.1	0.05	72.2
11/14/2018	264745		Area-Tech Room	7:08 AM	2:45 PM	457	809	1.77	0.809	0.178	0.220	0.014	7.87	0.017	1.014	1.216	18.1	0.05	34.6
11/14/2018	264753		Loader-Crusher Bin	7:25 AM	2:55 PM	450	780	1.73	0.780	0.1	0.128	0.005	5.00	0.006	1.429	1.714	7.5	0.05	12.8
11/14/2018	264747		Loader-Customer	7:25 AM	2:42 PM	437	759	1.74	0.759	0.1	0.132	0.005	5.00	0.007	1.429	1.714	7.7	0.05	13.2
11/14/2018	264746		Maint/Utility Person	7:24 AM	2:57 PM	453	783	1.73	0.783	0.309	0.395	0.046	14.89	0.059	0.592	0.711	55.5	0.05	117.5
11/14/2018	264751		Ag-Tech	7:22 AM	2:46 PM	444	765	1.72	0.765	0.185	0.242	0.009	4.86	0.012	1.457	1.748	13.8	0.05	23.5
12/18/2018	261845		Waste Unit Operator	2:58 PM	10:45 PM	467	1175	2.52	1.175	0.931	0.792	0.033	3.54	0.028	1.804	2.164	36.6	0.05	56.2
12/18/2018	261860		Headlap Utility	3:01 PM	9:57 PM	416	1052	2.53	1.052	1.41	1.340	0.04	2.84	0.038	2.067	2.481	54.0	0.05	76.0
12/18/2018	261849		Screen Person	3:03 PM	10:47 PM	464	1160	2.50	1.160	0.684	0.590	0.02	2.92	0.017	2.031	2.437	24.2	0.05	34.5
12/18/2018	261859		Mill Operator	3:06 PM	10:49 PM	463	1162	2.51	1.162	0.698	0.601	0.018	2.58	0.015	2.184	2.621	22.9	0.05	31.0
12/18/2018	261851		Intermediate	3:09 PM	10:57 PM	468	1156	2.47	1.156	1.285	1.112	0.032	2.49	0.028	2.227	2.672	41.6	0.05	55.4
12/19/2018	261847		Headlap Laborer	6:57 AM	2:53 PM	476	1197	2.51	1.197	0.904	0.755	0.03	3.32	0.025	1.880	2.256	33.5	0.05	50.1
12/19/2018	261848		Headlap Utility	7:02 AM	2:53 PM	471	1182	2.51	1.182	1.604	1.357	0.046	2.87	0.039	2.054	2.465	55.0	0.05	77.8
12/19/2018	261838		UMP Plant	7:05 AM	2:53 PM	468	1182	2.53	1.182	0.1	0.085	0.005	5.00	0.004	1.429	1.714	4.9	0.05	8.5
7/25/2019	264674		Waste Unit Operator	6:58: AM	2:53: PM	475	830	1.75	0.830	0.603	0.727	0.021	3.48	0.025	1.824	2.189	33.2	0.05	50.6
7/25/2019	264673		Mill Operator	6:51: AM	2:55: PM	484	787	1.63	0.787	2.392	3.039	0.064	2.68	0.081	2.139	2.567	118.4	0.05	162.6
7/25/2019	264663		UMPP Operator	7:03: AM	2:15: PM	432	750	1.74	0.750	0.1	0.133	0.005	5.00	0.007	1.429	1.714	7.8	0.05	13.3
7/25/2019	264683		Intermediate Operator	6:56 AM	3:15 PM	499	874	1.75	0.874	1.104	1.263	0.032	2.90	0.037	2.041	2.450	51.6	0.05	73.2
6/18/2019	SGC-061819-01		Mill Operator	3:01 PM	10:53 PM	472	1204	2.55	1.204	3.162	2.626	0.062	1.96	0.051	2.525	3.030	86.7	0.05	103.0
6/18/2019	SGC-061819-02		Mill Intermediate	3:04 PM	10:40 PM	456	1163	2.55	1.163	1.11	0.954	0.024	2.16	0.021	2.403	2.883	33.1	0.05	41.3
6/18/2019	SGC-061819-03		Mill Laborer	3:18 PM	10:40 PM	442	1118	2.53	1.118	1.158	1.036	0.021	1.81	0.019	2.622	3.147	32.9	0.05	37.6
6/18/2019	SGC-061819-04		Screen Person	3:20 PM	10:58 PM	458	1144	2.50	1.144	2.627	2.296	0.056	2.13	0.049	2.420	2.904	79.1	0.05	97.9
6/18/2019	SGC-061819-05		UMPP Plant	3:23 PM	10:58 PM	455	1152	2.53	1.152	1.091	0.947	0.02	1.83	0.017	2.609	3.131	30.3	0.05	34.7
6/19/2019	SGC-061919-01		Waste Unit Operator	6:55 AM	2:48 PM	473	1209	2.56	1.209	1.71	1.414	0.03	1.75	0.025	2.664	3.196	44.3	0.05	49.6
6/19/2019	SGC-061919-03		Headlap Utility	7:00 AM	2:52 PM	472	1204	2.55	1.204	1.274	1.058	0.036	2.83	0.030	2.072	2.487	42.6	0.05	59.8
6/19/2019	SGC-061919-04		Screen Person	7:03 AM	2:55 PM	472	1199	2.54	1.199	2.044	1.705	0.034	1.66	0.028	2.730	3.276	52.0	0.05	56.7
6/19/2019	SGC-061919-05		Mill Laborer	7:05 AM	2:48 PM	463	1181	2.55	1.181	0.768	0.650	0.014	1.82	0.012	2.616	3.139	20.7	0.05	23.7

SGL, Inc.

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34 Charles Street

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Hagerstown, Maryland 21740

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# **Industrial Hygiene Sampling Report**

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Sampling for Noise and Respirable Dust  
containing Quartz (RDCQ) during Industrial  
Operations at the SGI Plant in Charmian, PA

September 29-30, 2016

IHSR, LLC  
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Oklahoma City, Oklahoma  
73118

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- A – MSHA Noise Policy re Exceedances of 115 dBA
- B – Analytical Results

## 1.0 Executive Summary

On September 29-30, 2016, air sampling for respirable dust containing quartz (RDCQ) and noise sampling was conducted at the SGI Charmian Plant. This sampling was conducted over two day shifts.

A total of 11 personal and 5 area air samples for RDCQ and suspect materials were collected. Additionally, 10 noise exposure profiles were collected.

The results of the personal breathing zone air sampling show that two of the workers were exposed to RDCQ more than the calculated MSHA Compliance Threshold Limit Values (TLVs + 20%) for an 8-hour workday. Both mill maintenance workers were doing tasks that were non-routine, e.g. tearing down old equipment, etc. The RDCQ air samples indicated exposures ranging from <5 to 174% of the current MSHA TLV.

Monitoring for noise exposure showed no one was exposed to noise in excess of the MSHA PEL (90 dBA) and four employees were exposed over the MSHA Hearing Conservation level (85 dBA). Six employees showed noise exposure maxima greater than 117 dBA. Given that the average 8-Hr TWA exposures for the monitored employees were at or near 85 dBA, it is anticipated that these exposures were for less than 30 seconds. A 30 second or greater exposure to noise levels in excess of 117 dBA would result in an 8-hr. TWA noise exposure greater than 90 dBA.

All employees are required to wear effective respiratory and hearing protection in all plant buildings when the plant is operating, thus the true exposure for any miner to RDCQ and noise is significantly less than that measured in the breathing zone with these air samples.

## 2.0 Introduction

Quartz is found in conjunction with the green stone that is quarried at this site. MSHA regulates exposure to RDCQ by reducing the allowable amount of respirable dust in the air as a function of the dust quartz content (%).

Green Stone ore is quarried, crushed, and sieved prior to coloring for sale.

### **3.0 Sampling Methods, Worksite Conditions, and Work Practices**

#### **Sampling Methods and Area Sample Locations:**

Personal and area air samples were collected on 0.5 $\mu$  PVC filters using MSA Dorr-Oliver respirable dust cyclones and MSA Escort ELF pumps calibrated (pre and post shift) at 1.7 L/min. Samples were analyzed by RJ Lee Group using gravimetric analysis for respirable dust, NIOSH 0600 and, X-ray diffraction analysis for quartz, NIOSH 7500.

Personal noise exposure measurements were collected with Edge 4 data logging noise dosimeters. Recorded end points included maximum noise exposure, 8-Hr. TWA, and dose.

#### **Work Site Conditions:**

The raw greenstone is processed through a series of jaw and cone crushers to a particle size distribution and surface area that is warranted for use in a variety of commercial products. After crushing and sizing, the stone particulate may be colored or sold as is. While most of the process is enclosed, conveyors, crushers, etc. there is still some release of fugitive dusts that require constant clean-up and monitoring of potential exposures. During this sampling, environmental conditions (continuous hard rain) disrupted the manufacturing process for a large fraction of the day. During this time workers either cleaned up areas or were working to unclog air cleaners, e.g. baghouses.

Typical for this quarry, the quartz content of the respirable dust generated during the stone processing is approximately 2-5% (mass of respirable quartz/mass of respirable dust).

#### **General Work Practices:**

Job tasks evaluated for silica exposures are described to provide an understanding of task-related exposures. All workers in buildings used respiratory protection when the plant was in operation. The type of respirator used included 1/2 masks, dual strap, air purifying fitted with P100 dust cartridges. Additionally, hearing protection (insert plugs) is mandatory throughout the plant's various buildings, e.g. mill, primary crusher, etc., when the plant is in operation.

Workers monitored for quartz were involved in a variety of plant operations including removing and cleaning screens used to size segregate processed stone, sweeping and shoveling

of loose stone and fugitive dusts, taking samples of the processed stone, and sitting in control rooms monitoring the process via monitors.

All plant operations were normal during air and noise sample collection.

**Monitored Workers Activities and Tasks associated with Each RDCQ and Noise Measurement:**

Five employees were sampled during the day shift on September 29<sup>th</sup> and four employees were sampled on the September 30<sup>th</sup> day shift. It was raining during both shifts and the plant was having difficulties operating.

**September 29 Day Shift**

Sample #247880 – [REDACTED] is an intermediate utility person in the mill. He was sampled for 449 minutes at a flow rate of 1.8 liters/minute.

Sample #247875 – [REDACTED] is a lower mill maintenance person. He was sampled for 423 minutes at a flow rate of 1.76 liters/minute.

Sample #247870 – [REDACTED] is a mill laborer. He was sampled for 439 minutes at a flow rate of 1.72 liters/minute.

Sample #247865 – [REDACTED] was working as the screenperson in the mill. He was sampled for 469 minutes at flow rate of 1.81 liters/minute.

Sample #247866 – [REDACTED] is a headlap maintenance person and was sampled for 402 minutes at a flow rate of 1.78 liters/minute.

**September 30 Day Shift**

Sample #247882 – [REDACTED] is a UMPP operator. He was sampled for 485 minutes at a flow rate of 1.75 liters/minute.

Sample #247881 – [REDACTED] is a headlap utility person and was sampled for 448 minutes at a flow rate of 1.77 liters/minute.

Sample #247877 – [REDACTED] is a headlap maintenance person. He was sampled for 392 minutes at a flow rate of 1.77 liters/minute.

Sample #247876 – [REDACTED] is a waste unit operator. He was sampled for 434 minutes at a flow rate of 1.68 liters/minute.

Sample #247883 – [REDACTED] is a mill maintenance person. He was sampled for 334 minutes at a flow rate of 1.73 liters/minute.

Sample #247873 – [REDACTED] is a mill operator. He was sampled for 365 minutes at a flow rate of 1.75 liters/minute.



## 4.0 Results

The 8-hr. time-weighted average (TWA) for RDCQ and the MSHA calculated threshold limit values (TLV) for each monitored worker are presented in Table 1. The last column shows the percent of the 8-Hr. TWA exposure for respirable dust containing quartz over the MSHA calculated TLV plus 20%, the MSHA compliance value.

Table 2 presents the noise monitoring results. Only four of these current results indicate an 8-Hr. TWA exposure at or above 85 dBA (Column 8 of table 2).

## 5.0 Discussion and Conclusions

During the day and evening shifts on September 29 and 30, 2016, it was raining and the plant was having difficulty operating normally. Many of the employees spent their shifts trying to unplug the equipment. Two of the monitored employees, both maintenance workers, showed exposure over the MSHA PEL for RDCQ. Historical monitoring of maintenance workers in the mill has not demonstrated exposures that are more than the allowable MSHA TLV for RDCQ. The lower mill maintenance worker, Mr. [REDACTED], stated that he had spent most of the day unplugging chutes, installing access doors, and unplugging the sampler at the loading system at the UMPP. He stated that these activities were rather dusty. He said it took around 6 hours to complete these chores. The mill maintenance worker on September 30, Mr. [REDACTED], stated that he spent 7 hours of his day tearing down equipment at the old dryer building and that there was a lot of residual dust associated with the work he was doing.

The task of tearing down old process equipment should be accompanied by monitoring to specifically identify task-related exposure to RDCQ to insure that the current level of respiratory protection is adequate.

Four of the employees were exposed to noise levels at or above the MSHA Hearing Conservation level of 85 dBA as an 8-Hr. TWA. Six employees had maximal noise exposures exceeding 117 dBA. For these maxima noise exposures to be considered an exceedance of the MSHA allowable noise exposure level, they must exceed 117 dBA (115 dBA+2 dBA error factor) for 30 seconds. Given that the 8-Hr. average exposures for the monitored employees were below 90 dBA, it is anticipated that these exposures were for less than 30 seconds. All workers wear insert hearing protection and have annual audiograms in compliance with the MSHA

Hearing Conservation Standard. **All areas of the plant require the use of hearing protection while the plant is in operation!**

Generally, workers at this plant are protected from potential excessive exposure to RDCQ and high noise levels using engineering controls, enclosures, local exhaust ventilation, and personal protective equipment, i.e. respirators and insert ear plugs.

Table 1. Summary of Individual Air Sampling Results

Date	Last Name	First Name	Job Title	Shift	Location	Respirable Dust 8 hr. TWA (mg/M <sup>3</sup> )	Quartz (mg/M <sup>3</sup> )	Quartz (%)	MSHA Respirable Dust TLV (mg/M <sup>3</sup> )	MSHA Compliance Level	% Allowable Exposure
29-Sep	[REDACTED]	[REDACTED]	Utility	Day	Intermediate	0.41	0.015	3.7	1.75	2.11	19
			Maintenance		Mill	4.17	0.125	3.0	2.00	2.40	174
			Laborer		Mill	0.91	0.029	3.2	1.92	2.31	40
			Screen Person		Mill	2.25	0.068	3.0	2.00	2.40	94
			Maintenance		Headlap	0.70	0.028	3.9	1.69	2.03	34
30-Sep	[REDACTED]	[REDACTED]	Operator		UMPP	0.29	0.008	2.9	2.04	2.45	12
			Utility	Day	Headlap	1.09	0.034	3.1	1.96	2.35	46
			Maintenance		Headlap			N/A	5.00	6.00	0
			Utility		Waste	0.55	0.016	3.0	2.00	2.40	23
			Maintenance		Mill	3.63	0.101	2.8	2.08	2.50	145
			Operator		Mill	1.34	0.047	3.4	1.85	2.22	60

Table 2. Summary of Individual Noise Monitoring Results

Date	Last Name	First Name	Job Title	Shift	Location	Dose (%)	L <sub>TWA</sub> (dBA)	L <sub>avg</sub>	Max (dBA)
29-Sep	[REDACTED]	[REDACTED]	Utility	Day	Intermediate	81	89	89	126
	[REDACTED]	[REDACTED]	Maintenance		Mill	31	84	85	117
	[REDACTED]	[REDACTED]	Laborer		Mill	50	85	86	119
	[REDACTED]	[REDACTED]	Screen Person		Mill	53	86	86	122
	[REDACTED]	[REDACTED]	Maintenance		Headlap	25	80	81	120
30-Sep	[REDACTED]	[REDACTED]	Operator	Day	UMPP	6	70	71	108
	[REDACTED]	[REDACTED]	Utility		Headlap	59	86	87	124
	[REDACTED]	[REDACTED]	Maintenance		Headlap	42	84	85	109
	[REDACTED]	[REDACTED]	Utility		Waste	14	76	76	114
	[REDACTED]	[REDACTED]	Utility		Mill	25	80	81	110

## 6.0 Recommendations

The following recommendations are provided:

1. Training needs to ensure that use of respiratory and auditory protection is properly fitted and worn always during plant operation so that adequate protection is afforded to workers who may be exposed to concentrations of RDCQ or noise at or near their respective MSHA TLVs.
2. The process of tearing down old process equipment containing residual RDCQ dust should be evaluated to determine if a higher level (Protection Factor = 50) of respiratory protection is warranted.

## Appendix A

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### MSHA Policy re 115 dBA noise Exceedances

#### Part 62 NOISE ENFORCEMENT POLICY

##### 62.2 Maximum Level

1. Can miners be exposed to sound levels exceeding the maximum level of 115 dBA for any period of time? Will MSHA permit any duration of exposure above 115 dBA before citing a mine operator? When will MSHA cite operators? Is the maximum level a 15-minute average of exposure?

MSHA will continue to enforce the maximum level in the same manner that it was enforced under its previous noise standards. In most cases MSHA noise exposure determinations will be based on full-shift surveys using a personal noise dosimeter. MSHA may issue a citation if sound levels exceed 117 dBA (115 dBA maximum level + 2 dBA error factor) for at least 30 consecutive seconds. When a miner is exposed to 117 dBA for more than 15 minutes, the 90 dBA PEL is also exceeded. In such cases, the Agency will cite operators for exceeding the 90 dBA PEL rather than for exceeding the maximum level if the operator has not installed and/or maintained all feasible controls.

The noise standard does not include a separate standard for impact/impulse noise. MSHA stated in the preamble to the standard that impact/impulse noise will be integrated along with continuous noise in determining a miner's exposure to the maximum level as well as to all other required levels. Sampling of an individual miner's exposure in the hearing zone will be conducted with a noise dosimeter and a sound level meter using the A-weighting slow response setting for determining compliance with the maximum level.

2. What am I required to do if I exceed the maximum level?

As with exposure exceeding the 90 dBA PEL, if you exceed the maximum level you are required to use all feasible engineering and administrative controls, provide and ensure the use of hearing protection, enroll affected miners in an HCP, post any administrative controls that are being used on the mine bulletin board, and provide copies of those administrative controls to affected miners. All requirements of Section 62.130 apply.

## Laboratory Results

LABORATORY REPORT

IHSR LLC  
 824 NW 42nd St.  
 Oklahoma City, OK 73118  
 ATTENTION: Dr. Tom Hall  
 TELEPHONE: 405 - 209 - 3507

REPORT DATE: October 13, 2016  
 SAMPLES RECEIVED: October 06, 2016  
 RJ LEE GROUP JOB NO.: PA061020160026  
 CLIENT JOB NO.: N/A  
 PURCHASE ORDER NO.: N/A

ANALYSIS: Respirable Dust and Crystalline Free Silica Dust on 5 µm PVC Air Filters  
 METHODS: Gravimetry, NIOSH 0600 and X-Ray Diffraction, NIOSH 7500

Limits of Detection: 0.005 mg Quartz, Cristobalite, and Tridymite 0.100 mg Respirable Dust

Client I.D.	Sample Identification	Air* Volume (liters)	Respirable Dust Mass (mg/filter)	Masses of Free			Weight Percentages of			Airborne Dust			
				Quartz	Cristobalite	Tridymite	Crystalline Silica Minerals			Concentrations (mg/m <sup>3</sup> )			
	RJ Lee Group			Quartz	Cristobalite	Tridymite	Quartz	Cristobalite	Tridymite	Respirable	Quartz	Cristobalite	Tridymite
247880	PA061020160026-001	808	0.329	0.012	< 0.005	< 0.005	3.7	< 1.5	< 1.5	0.407	0.015	< 0.006	< 0.006
247875 **	PA061020160026-002	744	3.106	0.093	< 0.010	< 0.010	3.0	< 0.3	< 0.3	4.175	0.125	< 0.013	< 0.013
247870	PA061020160026-003	755	0.689	0.022	< 0.005	< 0.005	3.2	< 0.7	< 0.7	0.913	0.029	< 0.007	< 0.007
247865	PA061020160026-004	849	1.912	0.058	< 0.005	< 0.005	3.0	< 0.3	< 0.3	2.252	0.068	< 0.006	< 0.006
247866	PA061020160026-005	716	0.499	0.020	< 0.005	< 0.005	3.9	< 1.0	< 1.0	0.697	0.027	< 0.007	< 0.007
247882	PA061020160026-006	851	0.247	0.007	< 0.005	< 0.005	2.9	< 2.0	< 2.0	0.290	0.008	< 0.006	< 0.006
247881	PA061020160026-007	792	0.864	0.027	< 0.005	< 0.005	3.1	< 0.6	< 0.6	1.091	0.034	< 0.006	< 0.006
247877	PA061020160026-008	694	< 0.100	< 0.005	< 0.005	< 0.005	N/A	N/A	N/A	< 0.144	< 0.007	< 0.007	< 0.007
247876	PA061020160026-009	729	0.404	0.012	< 0.005	< 0.005	3.0	< 1.2	< 1.2	0.554	0.017	< 0.007	< 0.007
247883	PA061020160026-010	577	2.092	0.058	< 0.005	< 0.005	2.8	< 0.2	< 0.2	3.626	0.101	< 0.009	< 0.009
247873	PA061020160026-011	637	0.856	0.030	< 0.005	< 0.005	3.4	< 0.6	< 0.6	1.344	0.046	< 0.008	< 0.008
247871	PA061020160026-012	N/A	< 0.100	< 0.005	< 0.005	< 0.005	N/A	N/A	N/A	N/A	N/A	N/A	N/A

\* Supplied by the client.

\*\* Deposit weight exceeded recommended limit for NIOSH 7500. Samples were ground and then prepared by taking an aliquot from the 2-propanol suspension.

N/A Not Applicable

The results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any samples. This laboratory operates in accord with ISO 17025:2005 guidelines, and holds a limited scope of accreditation under AIHA Lab ID 100364; refer to <http://www.rjlg.com/about-us/accreditations/> for more information and current status. This report may not be used to claim product endorsement by any laboratory accrediting agency. The results contained in this report relate only to the items tested or to the sample(s) as received by the laboratory. Any reproduction of this document must be in full for the report to be valid. Results have not been blank corrected unless otherwise noted. Samples were received in good condition unless otherwise noted. Quality Control data is available upon request.



Richard A. Kautz  
 Project Supervisor