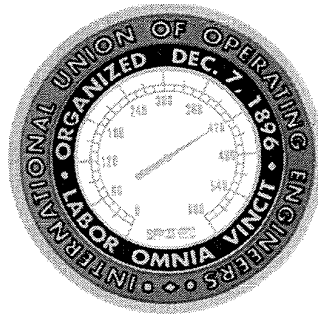


May 22,2003

Comments and Proposals to MSHA pertaining to Proposed Rule 03-3941 “Verification of Underground Coal Mine Operators’ Dust Control Plans and Compliance Sampling for Respirable Dust”.



Comments from Teresa Thompson and Chris Barbee, coal miners and miners representatives IUOE (International Union of Operating Engineers) Local 953, New Mexico. Employed at BHP-Billiton, New Mexico Coal, San Juan Underground mine, Waterflow, New Mexico.

A fundamental goal of MSHA, organized labor, and coal miners **is** the reduction in the number of cases of Black Lung and Silicosis. This is shown by the concerted efforts of all parties, such as this hearing today, to produce a method by which to reduce exposures to harmful dust generated in the workplace. With this goal in mind, we must produce a system that is effective, practical, verifiable, and enforceable. The following are points for consideration when devising this method.

Effective:

The best measure of effectiveness would be to see a reduction in the number of cases of Black Lung and Silicosis and any other respiratory ailment contracted by exposure to dust in coal mines. **All** participants in the industry **recognize** the need for controlling exposure to dust. This need is what has produced the laws and mining methods we use today. As we are not willing to wait for an inevitable outcome to measure effectiveness, we must gauge our efforts against a known standard. That standard is “**Lower Dust Exposure is Safer and Healthier for Miners**”.

Any regulation produced by MSHA must be measured against this standard.

AB14-HEAR-6E
AB18-HEAR-6E
rec'd 5/22/03-OSRV

Practical:

Any number of methods could be used to achieve reduced dust exposures. But whatever method is mandated, it must be useable by all parties concerned. The greater the level of difficulty, the less effective any method will become. The following are points of concern:

1. Verification:

The proposed rule would require an operator to run a mining section at the quantity and velocity levels, and with any engineering controls, prescribed in their vent plan. If an operator has been exceeding these levels to control dust, they would be required to reduce these levels back to plan specifications. For verification, this could potentially expose miners to elevated dust levels even if they were at or below the limits specified by regulation. This would continue until the vent plan was verified as workable. If the vent plan were to be verified at such a reduced level, then the miners could potentially be exposed to elevated dust levels from that point on. Operators would then have a choice to make, either run the section with the reduced levels as prescribed in the vent plan with the potential of more dust, or put the higher quantity and velocity levels they are actually using into their vent plan.

We strongly emphasize that the first option is unacceptable due to the potential for increased exposure to dust. Also, if MSHA's intent is to have higher quantity and velocity limits in approved vent plans, just mandate this and save the miners from potential exposure to higher levels of dust. If, indeed, higher limits are MSHA's goal, then why were any vent plans approved with limits that were too low?

2. Maximum 15% over plan levels:

The limit of exceeding the vent plan levels by a maximum of 15% would be extremely impractical. As shown in the attachments to this document, a mining height variation of as little as 1.3 feet could produce a citable condition on a longwall face by exceeding the face velocity specified in the vent plan by 15%. This condition could arise from variation in seam thickness or top coal falling out from in front of the shields. Neither of these conditions is directly controlled by the vent plan but could trigger a violation or a re-evaluation of the plan. At the very least, it could force the miners out of the mine for a major air change and re-preshifting of the mine. If some conditions are not dealt with immediately, such as caving on a longwall tailgate, this could expose miners to a far more dangerous situation than a 9,000 cfm air change.

3. Incentive for Cleaner Air:

It is recognized that certain operators are in need of being held to a higher standard in their dust exposure control efforts. It is also recognized that if operators are held to a very limiting standard (i.e. 15% max rule) this could become a disincentive to achieve lower exposures to dust if the operator finds it more economical to operate as close to the maximum of 2.0 mg/m³ as possible.

We propose the use of a category scale to encourage operators to achieve lower dust exposure levels below the 2.0 mg/m³ limit.

Table 1. Compliance Levels for Reduced Dust Exposures.

Respirable Coal Mine Dust mg/m ³	Respirable Quartz Dust microgram/m ³	Allowable to Exceed Plan by: Percentage over Plan Minimum
2.0 - 1.5	100 - 75	15%
1.5 - 1.0	75 - 50	30%
1.0 - 0.5	50 - 25	45%
0.5 - 0.0	25 - 0	60%

Verifiable:

1. Operator Sampling:

The proposed plan would put required dust sampling for verification solely in the hands of MSHA. While this is a welcome thought for miners who have worked for an unscrupulous operator who may have cheated on their dust sampling, it could introduce problems. The threat of a citation based on these samples would be removed without a specified method of how MSHA will handle an out of compliance sample. Would it be enough for an operator to claim, "We're working on it" to avoid the attention of MSHA?

We maintain that operator sampling should continue with the potential of a citation based on operator results. This would give "good" operators the opportunity to remedy dust generation issues AND give MSHA the enforcement needed to deal with compliance problems regardless of the source of data.

2. Single Shift Sampling:

Single Shift Sampling could reduce the workload on inspectors, dust labs, company officials, and even miners representatives by reducing the number of tests required in the long run. However, MSHA has noted a concern of “masking” true data by averaging multiple shift samples and possibly lowering a result to within acceptable numerical limits. This could allow a higher content dust sample to be effectively ignored along with its potential effects on coal miners.

We maintain that it would also be possible to give approval to a plan based on a Single Shift Sample while masking the same data by just plain not measuring it. A sampling program must be comprehensive enough to take in mining conditions that could produce higher dust levels that may not be evident on the Single Shift Sample day. We propose at the least to keep the existing multiple shift sampling regimen and even increasing the number and variety of locations needed for verification.

Enforceable:

We are making no effort to reduce MSHA’s enforcement ability. In fact, we encourage MSHA to enforce any compliance issue through communication with operators and coal miners to produce a safer work place.

Conclusion:

Please consider the above suggestions when formulating a better method of reducing dust exposures to coal miners. Thank you for the opportunity to air our concerns and provide these comments into the record.

Attachment A

Effects of Mining Height on Face Velocities
At a Plan Minimum of 450 Feet per Minute

plan 100% 115%
 ft/min 450 517.5

Velocity remains same, adjust quantity to offset mining height.

cfm Q=	min Wmin		ft ²	ft	ft	Velocity at Mining Height and Fixed Quantity													
	v	x	A	height	width	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	
55,734	450		123.9	6.5	14.57101	450	445	440	435	430	425	420	416	411	407	403	398	394	
56,390	450		125.3	8.6	14.57101	455	450	445	440	435	430	425	421	416	412	407	403	399	
57,046	450		126.8	8.7	14.57101	461	455	450	445	440	435	430	426	421	416	412	408	404	
57,701	450		128.2	8.8	14.57101	466	460	455	450	445	440	435	430	426	421	417	413	408	
58,357	450		129.7	8.9	14.57101	471	466	460	455	450	445	440	435	431	426	422	417	413	
59,013	450		131.1	9.0	14.57101	476	471	466	460	455	450	445	440	435	431	426	422	418	
59,668	450		132.6	9.1	14.57101	482	476	471	465	460	455	450	445	440	436	431	427	422	
60,324	450		134.1	9.2	14.57101	487	481	476	470	465	460	455	450	445	440	436	431	427	
60,980	450		135.5	9.3	14.57101	492	487	481	476	470	465	460	455	450	445	441	436	431	
61,635	450		137.0	9.4	14.57101	498	492	486	481	475	470	465	460	455	450	445	441	436	
62,291	450		138.4	9.5	14.57101	503	497	491	486	480	475	470	465	460	455	450	445	441	
62,947	450		139.9	9.6	14.57101	508	502	497	491	485	480	475	470	465	460	455	450	445	
63,602	450		141.3	9.7	14.57101	514	508	502	496	490	485	480	474	469	464	459	455	450	
64,258	450		142.8	9.8	14.57101	519	513	507	501	496	490	485	479	474	469	464	459	455	
64,914	450		144.3	9.9	14.57101	524	518	512	506	501	495	490	484	479	474	469	464	459	
65,570	450		145.7	10.0	14.57101	529	523	517	511	506	500	495	489	484	479	474	469	464	
66,225	450		147.2	10.1	14.57101	535	528	522	516	511	505	499	494	489	484	478	473	469	
66,881	450		148.6	10.2	14.57101	540	534	528	522	516	510	504	499	494	488	483	478	473	
67,537	450		150.1	10.3	14.57101	545	539	533	527	521	515	509	504	498	493	488	483	478	
68,192	450		151.5	10.4	14.57101	551	544	538	532	526	520	514	509	503	498	493	488	482	
68,848	450		153.0	10.5	14.57101	556	549	543	537	531	525	519	514	508	503	497	492	487	
69,504	450		154.5	10.6	14.57101	561	555	548	542	536	530	524	518	513	507	502	497	492	
70,159	450		155.9	10.7	14.57101	566	560	553	547	541	535	529	523	518	512	507	502	496	
70,815	450		157.4	10.8	14.57101	572	565	559	552	546	540	534	528	523	517	512	506	501	
71,471	450		158.8	10.9	14.57101	577	570	564	557	551	545	539	533	527	522	516	511	506	
72,126	450		160.3	11.0	14.57101	582	576	569	563	556	550	544	538	532	527	521	516	510	
72,782	430		161.7	11.1	14.57101	588	581	574	568	561	555	549	543	537	531	526	520	515	
73,438	450		163.2	11.2	14.57101	593	586	579	573	566	560	554	548	542	536	531	525	520	
74,094	450		164.7	11.3	14.57101	598	591	584	578	571	565	559	553	547	541	535	530	524	

plan 100% 115%
 ft/min 450 517.5

Velocity remains same, adjust quantity to offset mining height.

cfm Q≠	min ft/min V X	ft ² A	ft height	ft width	Velocity at Mining Height and Fixed Quantity												
					9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	11.0
63,602	450	141.3	9.7	14.97101	445	441	437	432	428	424	420	416	412	408	404	400	397
64,258	450	142.8	9.8	14.57101	450	445	441	437	432	428	424	420	416	412	408	405	401
64,914	450	144.3	9.9	14.57101	455	450	446	441	437	433	428	424	420	416	413	409	405
65,570	450	145.7	10.0	14.57101	459	455	450	446	441	437	433	429	425	421	417	413	409
66,225	450	147.2	10.1	14.57101	464	459	455	450	446	441	437	433	429	425	421	417	413
66,881	450	148.6	10.2	14.57101	468	464	459	454	450	446	441	437	433	429	425	421	417
67,537	450	150.1	10.3	14.57101	473	468	464	459	454	450	446	441	437	433	429	425	421
68,192	450	151.5	10.4	14.57101	478	473	468	463	459	454	450	446	442	437	433	429	425
68,848	450	153.0	10.5	14.57101	482	477	473	468	463	459	454	450	446	442	438	433	430
69,504	450	154.5	10.6	14.57101	487	482	477	472	468	463	459	454	450	446	442	438	434
70,159	450	155.9	10.7	14.57101	491	486	482	477	472	467	463	459	454	450	446	442	438
70,815	450	157.4	10.8	14.57101	496	491	486	481	476	472	467	463	458	454	450	446	442
71,471	450	158.8	10.9	14.57101	501	495	491	486	481	476	472	467	463	458	454	450	446
72,126	450	160.3	11.0	14.57101	505	500	495	490	485	481	476	471	467	463	458	454	450
72,782	450	161.7	11.1	14.57101	510	505	500	495	490	485	480	476	471	467	463	458	454
73,438	450	163.2	11.2	14.57101	514	509	504	499	494	489	485	480	475	471	467	462	458
74,094	450	164.7	11.3	14.57101	519	514	509	503	499	494	489	484	480	475	471	467	462
74,749	450	166.1	11.4	14.57101	523	518	513	508	503	498	493	489	484	479	475	471	466
75,405	450	167.6	11.5	14.57101	528	523	518	512	507	502	498	493	488	484	479	475	470
76,061	450	169.0	11.6	14.57101	533	527	522	517	512	507	502	497	492	488	483	479	475
76,716	450	170.5	11.7	14.57101	537	532	527	521	516	511	506	501	497	492	488	483	479
77,372	450	171.9	11.8	14.57101	542	536	531	526	521	516	511	506	501	496	492	487	483
78,028	450	173.4	11.9	14.57101	546	541	536	530	525	520	515	510	505	500	496	491	487
78,683	450	174.9	12.0	14.57101	551	545	540	535	529	524	519	514	509	505	500	495	491
79,339	450	176.3	12.1	14.57101	556	550	545	539	534	529	524	519	514	509	504	500	495
79,995	450	177.8	12.2	14.57101	560	555	549	544	538	533	528	523	518	513	508	504	499
80,651	450	179.2	12.3	14.57101	565	559	554	548	543	537	532	527	522	517	513	508	503
81,306	450	180.7	12.4	14.57101	569	564	558	552	547	542	537	531	526	521	517	512	507
81,962	450	182.1	12.5	14.57101	574	568	563	557	551	546	541	536	531	526	521	516	511

plan 100% 115%
ft/min 450 517.5

Velocity remains same, adjust quantity to offset mining height.

cfm	min ft/min		ft ²	ft	ft	Velocity at Mining Height and Fixed Quantity												
	v	x				A	height	width	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	12.0	12.1
72,120	450		100.3	11.0	14.57101	442	438	434	430	427	423	419	416	413	409	400	402	399
72,782	450		161.7	11.1	14.57101	446	442	438	434	431	427	423	420	416	413	409	406	403
73,438	450		163.2	11.2	14.57101	450	446	442	438	434	431	427	424	420	417	413	410	406
74,094	450		164.7	11.3	14.57101	454	450	446	442	438	435	431	427	424	420	417	413	410
74,749	450		166.1	11.4	14.57101	458	454	450	446	442	438	435	431	428	424	420	417	414
75,405	450		167.6	11.5	14.57101	462	458	454	450	446	442	439	435	431	428	424	421	417
76,061	450		169.0	11.6	14.57101	466	462	458	454	450	446	442	439	435	431	428	424	421
76,716	450		190.5	11.9	14.57101	470	466	462	458	454	460	446	442	430	435	432	428	425
77,372	450		171.9	11.8	14.57101	474	470	466	462	458	454	450	446	443	439	435	432	428
78,028	450		173.4	11.9	14.57101	478	474	470	466	462	458	454	450	446	443	439	435	432
78,683	450		174.9	12.0	14.57101	482	478	474	470	466	462	458	454	450	446	443	439	435
79,339	450		176.3	12.1	14.57101	486	482	478	473	469	465	461	458	454	450	446	443	439
79,995	450		177.8	12.2	14.57101	490	486	482	477	473	469	465	461	458	454	450	446	443
80,651	450		179.2	12.3	14.57101	494	490	486	481	477	473	469	465	461	457	454	450	446
81,306	450		180.7	12.4	14.57101	498	494	489	485	481	477	473	469	465	461	457	454	450
81,962	450		182.1	12.5	14.57101	502	498	493	489	485	481	477	473	469	465	461	457	454
82,618	450		183.6	12.6	14.57101	506	502	497	493	489	485	481	476	473	469	465	461	457
83,273	450		185.1	12.7	14.57101	510	506	501	497	493	488	484	480	476	472	468	465	461
83,929	450		186.5	12.8	14.57101	514	510	505	501	497	492	488	484	480	476	472	468	465
84,585	450		188.0	12.9	14.57101	518	514	509	505	500	496	492	488	484	480	476	472	468
85,240	450		189.4	13.0	14.57101	522	518	513	509	504	500	496	492	488	483	480	476	472
85,896	450		190.9	13.1	14.57101	526	522	517	513	508	504	500	495	491	487	483	479	475
86,552	450		192.3	13.2	14.57101	530	526	521	517	512	508	503	499	495	491	487	483	479
87,207	450		193.8	13.3	14.57101	534	530	525	520	516	512	507	503	499	495	491	487	483
87,863	450		195.3	13.4	14.57101	538	534	529	524	520	515	511	507	503	498	494	490	486
88,519	450		196.7	13.5	14.57101	542	538	533	528	524	519	515	511	506	502	498	494	490

plan 100% 115%
 ft/min 450 517.5

Velocity remains same, adjust quantity to offset mining height.

cfm Q=	min ft/min		ft ² A	ft height	ft width	Velocity at Mining Height and Fixed Quantity									
	v	x				126	127	128	129	130	131	132	133	134	135
79,995	450		177.8	12.2	14.57101	436	432	429	426	422	419	416	413	410	407
80,651	450		179.2	12.3	14.57101	439	436	432	429	426	423	419	416	413	410
81,306	450		180.7	12.4	14.57101	443	439	436	433	429	426	423	420	416	413
81,962	450		182.1	12.5	14.57101	446	443	439	436	433	429	426	423	420	417
82,018	450		103.6	12.6	14.57101	450	446	443	440	436	433	430	426	423	420
83,273	450		185.1	12.7	14.57101	454	450	446	443	440	436	433	430	426	423
83,929	450		186.5	12.8	14.57101	457	454	450	447	443	440	436	433	430	427
84,585	450		188.0	12.9	14.57101	461	457	454	450	447	443	440	436	433	430
85,240	450		189.4	13.0	14.57101	464	461	457	453	450	447	443	440	437	433
85,896	450		190.9	13.1	14.57101	468	464	461	457	453	450	447	443	440	437
86,552	450		192.3	13.2	14.57101	471	468	464	460	457	453	450	447	443	440
87,207	450		193.8	13.3	14.57101	475	471	468	464	460	437	453	450	447	443
87,863	450		195.3	13.4	14.57101	479	475	471	467	464	460	457	453	450	447
88,519	450		196.7	13.5	14.57101	482	478	475	471	467	464	460	457	453	450

Attachment 3

Effects of Mining Height on Face Velocities
At a Plan Minimum of *600 Feet per Minute*

plan 100% 115%
 ft/min 600 690.0

Velocity remains same. adjust quantity to offset mining height.

cfm Q=	min Wmin		ft ² A	ft height	ft width	Velocity at Mining Height and Fixed Quantity												
	V	x				8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7
14,312	600		123.9	8.5	14.57101	600	593	588	580	573	567	560	554	548	943	537	531	526
75,186	600		125.3	8.6	14.57101	607	600	593	586	580	573	567	561	555	549	543	538	532
76,061	600		126.8	8.7	14.57101	614	607	600	593	587	580	574	567	561	555	549	544	538
76,935	600		128.2	8.8	14.57101	621	614	607	600	593	587	580	574	568	562	556	550	544
77,809	600		129.7	8.9	14.57101	628	621	614	607	600	593	587	580	574	568	562	556	551
78,683	600		131.1	9.0	14.57101	635	628	621	614	607	600	593	587	581	574	568	563	557
79,558	600		132.6	9.1	14.57101	642	635	628	620	613	607	600	593	587	581	575	569	563
80,432	600		134.1	9.2	14.57101	649	642	634	627	620	613	607	600	594	587	581	575	569
81,306	600		135.5	9.3	14.57101	656	649	641	634	627	620	613	607	600	594	587	581	575
82,180	600		137.0	9.4	14.57101	664	656	648	641	634	627	620	613	606	600	594	588	581
83,055	600		138.4	9.5	14.57101	671	663	655	648	640	633	626	620	613	606	600	594	588
83,929	600		139.9	9.6	14.57101	678	670	662	655	647	640	633	626	619	613	606	600	594
84,803	600		141.3	9.7	14.57101	685	677	669	661	654	647	640	633	626	619	613	606	600
85,678	600		142.8	9.8	14.57101	692	684	676	668	661	653	646	639	632	626	619	613	606
86,552	600		144.3	9.9	14.57101	699	691	683	675	667	660	653	646	639	632	625	619	612
87,426	600		145.7	10.0	14.57101	706	698	690	682	674	667	659	652	645	638	632	625	619
88,300	600		147.2	10.1	14.57101	713	705	697	689	681	673	666	659	652	645	638	631	625
89,175	600		148.6	10.2	14.57101	720	712	703	695	688	680	673	665	658	651	644	638	631
90,049	600		150.1	10.3	14.57101	727	719	710	702	694	687	679	672	665	657	651	644	637
90,923	600		151.5	10.4	14.57101	734	726	717	709	701	693	686	678	671	664	657	650	643
91,797	600		153.0	10.5	14.57101	741	733	724	716	708	700	692	685	677	670	663	656	649
92,672	600		154.5	10.6	14.57101	748	740	731	723	715	707	699	691	684	677	669	663	656
93,546	600		155.9	10.7	14.57101	755	747	738	730	721	713	705	698	690	683	676	669	662
94,420	600		157.4	10.8	14.57101	762	753	745	736	728	720	712	704	697	689	682	675	668
95,294	600		158.8	10.9	14.57101	769	760	752	743	735	727	719	711	703	696	688	681	674
96,169	600		160.3	11.0	14.57101	776	767	759	750	742	733	725	717	710	702	695	688	680
97,043	600		161.7	11.1	14.57101	784	774	766	757	748	740	732	724	716	709	701	694	687
97,917	600		163.2	11.2	14.57101	791	781	772	764	755	747	738	730	723	715	707	700	693
98,791	600		164.7	11.3	14.57101	798	788	779	770	762	753	745	737	729	721	714	706	699

plan 100% 115%
 ft/min 600 690.0

Velocity remains same, adjust quantity to offset mining height.

cfm Q≅	min Wmin		ft ² A	ft height	ft width	Velocity at Mining Height and Fixed Quantity												
	v	x				9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	11.0
04,003	000		141.3	9.7	14.57101	594	500	502	576	571	565	560	554	549	544	533	534	620
85,678	600		142.8	9.8	14.57101	600	594	588	582	576	571	565	560	555	550	544	539	535
86,552	600		144.3	9.9	14.57101	606	600	594	588	582	577	571	566	560	555	550	545	540
87,426	600		145.7	10.0	14.57101	612	606	600	594	588	583	577	571	566	561	556	550	545
88,300	600		147.2	10.1	14.57101	618	612	606	600	594	588	583	577	572	566	561	556	551
89,175	600		148.6	10.2	14.57101	624	618	612	606	600	594	588	583	577	572	567	561	556
90,049	600		150.1	10.3	14.57101	631	624	618	612	606	600	594	589	583	578	572	567	562
00,023	600		161.6	10.4	11.67101	637	630	624	618	612	606	600	594	589	583	578	572	567
91,797	600		153.0	10.5	14.57101	643	636	630	624	618	612	606	600	594	589	583	578	573
92,672	600		154.5	10.6	14.57101	649	642	636	630	624	617	612	606	600	594	589	583	578
93,546	600		155.9	10.7	14.57101	655	648	642	636	629	623	617	611	606	600	594	589	584
94,420	600		157.4	10.8	14.57101	661	655	648	642	635	629	623	617	611	606	600	594	589
95,294	600		158.8	10.9	14.57101	667	661	654	648	641	635	629	623	617	611	606	600	595
96,169	600		160.3	11.0	14.57101	673	667	660	653	647	641	635	629	623	617	611	606	600
97,043	600		161.7	11.1	14.57101	680	673	666	659	653	647	640	634	628	622	617	611	605
97,917	600		163.2	11.2	14.57101	686	679	672	665	659	652	646	640	634	628	622	617	611
98,791	600		164.7	11.3	14.57101	692	685	678	671	665	658	652	646	640	634	628	622	616
99,666	600		166.1	11.4	14.57101	698	691	684	677	671	664	658	651	645	639	633	628	622
100,540	600		167.6	11.5	14.57101	704	697	690	683	676	670	663	657	651	645	639	633	627
101,414	600		169.0	11.6	14.57101	710	703	696	688	682	676	669	663	657	650	644	639	633
102,288	600		170.5	11.7	14.57101	716	709	702	695	688	682	675	669	662	656	650	644	638
103,163	600		171.9	11.8	14.57101	722	715	708	701	694	687	681	674	668	662	656	650	644
104,037	600		173.4	11.9	14.57101	729	721	714	707	700	693	687	680	674	667	661	655	649
104,911	600		174.9	12.0	14.57101	735	727	720	713	706	699	692	686	679	673	667	661	655
105,786	600		176.3	12.1	14.57101	741	733	726	719	712	705	698	691	685	679	672	666	660
106,660	600		177.8	12.2	14.57101	747	739	732	725	718	711	704	697	691	684	678	672	665
107,534	600		179.2	12.3	14.57101	753	745	738	731	724	717	710	703	696	690	683	677	671
108,408	600		180.7	12.4	14.57101	759	752	744	737	729	722	715	709	702	695	689	683	676
109,283	600		182.1	12.5	14.57101	765	758	750	743	735	728	721	714	708	701	694	688	682

plan 100% 115%
ft/min 600 690.0

Velocity remains same, adjust quantity to offset mining height.

cfm Q=	min ft/min		ft ² A	ft height	ft width	Velocity at Mining Height and Fixed Quantity												
	V	x				11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4
96,169	600		160.3	11.0	14.57101	589	584	579	574	569	564	559	555	550	545	541	537	532
97,043	600		161.7	11.1	14.57101	595	589	584	579	574	569	564	560	555	550	546	541	537
97,917	600		163.2	11.2	14.57101	600	595	589	584	579	574	569	565	560	555	551	546	542
98,791	600		164.7	11.3	14.57101	605	600	595	590	584	579	575	570	565	560	556	551	547
99,666	600		166.1	11.4	14.57101	611	605	600	595	590	585	580	575	570	565	561	556	552
100,540	600		167.6	11.5	14.57101	616	611	605	600	595	590	585	580	575	570	566	561	556
401,414	600		169.0	11.6	14.57101	621	616	611	605	600	595	590	585	580	575	570	566	561
102,288	600		170.5	11.1	14.57101	627	621	616	610	605	600	595	590	505	500	575	571	566
103,163	600		171.9	11.8	14.57101	632	627	621	616	610	605	600	595	590	585	580	576	571
104,037	600		173.4	11.9	14.57101	638	632	626	621	616	610	605	600	595	590	585	580	576
104,911	600		174.9	12.0	14.57101	643	637	632	626	621	615	610	605	600	595	590	585	581
105,786	600		176.3	12.1	14.57101	648	642	637	631	626	621	615	610	605	600	595	590	585
106,660	600		177.8	12.2	14.57101	654	648	642	637	631	626	620	615	610	605	600	595	590
107,534	600		179.2	12.3	14.57101	659	653	647	642	636	631	625	620	615	610	605	600	595
108,408	600		180.7	12.4	14.57101	664	658	653	647	641	636	631	625	620	615	610	605	600
109,283	600		182.1	12.5	14.57101	670	664	658	652	647	641	636	630	625	620	615	610	605
110,157	600		183.6	12.6	14.57101	675	669	663	657	652	646	641	635	630	625	620	615	610
111,031	600		185.1	12.7	14.57101	680	674	668	663	657	651	646	640	635	630	625	620	615
111,905	600		186.5	12.8	14.57101	686	680	674	668	662	656	651	645	640	635	630	624	619
112,780	600		188.0	12.9	14.57101	691	685	679	673	667	662	656	650	643	637	634	629	624
113,654	600		189.4	13.0	14.57101	696	690	684	678	672	667	661	655	650	645	639	634	629
114,528	800		190.9	13.1	14.57101	702	696	689	683	678	672	666	661	655	650	644	639	634
115,402	600		192.3	13.2	14.57101	707	701	695	689	683	677	671	666	660	655	649	644	639
116,277	600		193.8	13.3	14.57101	713	706	700	694	688	682	676	671	665	660	654	649	644
117,151	600		195.3	13.4	14.57101	718	712	705	699	693	687	681	676	670	664	659	654	648
118,025	600		196.7	13.5	14.57101	723	717	711	704	698	692	686	681	675	669	664	659	653

plan 100% 115%
 ft/min 600 690.0

Velocity remains same, adjust quantity to offset mining height.

cfm Q=	min ft/min		ft ² A	ft height	ft width	Velocity at Mining Height and Fixed Quantity									
	V	x				12.6	12.7	12.8	12.9	13.0	13.1	13.2	13.3	13.4	13.5
106,660	600		177.8	12.2	14.57101	581	576	572	567	563	559	555	550	546	542
107,534	600		179.2	12.3	14.57101	586	581	577	572	568	563	559	555	551	547
108,408	600		180.7	12.4	14.57101	590	586	581	577	572	568	564	559	555	551
109,283	600		182.1	12.5	14.57101	595	591	586	581	577	573	568	564	560	556
110,157	600		183.6	12.6	14.57101	600	595	591	586	582	577	573	568	564	560
111,031	600		185.1	12.7	14.57101	605	600	595	591	586	582	577	573	569	564
111,905	600		186.5	12.8	14.57101	610	605	600	595	591	586	582	577	573	569
112,780	600		188.0	12.9	14.57101	614	609	605	600	595	591	586	582	578	573
113,654	600		189.4	13.0	14.57101	619	614	609	605	600	595	591	586	582	578
114,528	600		190.9	13.1	14.57101	624	619	614	609	605	600	595	591	587	582
115,402	600		192.3	13.2	14.57101	629	624	619	614	609	605	600	595	591	587
116,277	600		193.8	13.3	14.57101	633	628	623	619	614	609	605	600	596	591
117,151	600		195.3	13.4	14.57101	638	633	628	623	618	614	609	605	600	596
118,025	600		196.7	13.5	14.57101	643	638	633	628	623	618	614	609	604	600