

CHAPTER 1 - RESPIRABLE DUST

COAL MINE HEALTH INSPECTION PROCEDURES HANDBOOK

TABLE OF CONTENTS

Chapter 1 RESPIRABLE DUST

I. Purpose1.1

II. Authority1.1

III. Sampling Inspections1.1

 A. Types of Entities Sampled.....1.2

 B. Frequency of Sampling.....1.4

 C. Monitoring of Operator-Collected
 Samples.....1.6

 D. Pre-Inspection Reviews.....1.7

 E. Sampling Inspection Procedures.....1.8

 F. Post-Inspection Procedures.....1.23

 G. Evaluation of Sampling Results.....1.27

 H. Evaluation of Ventilation Plan.....1.37

 I. Compliance Assistance.....1.39

 J. Selecting Designated Occupations.....1.40

 K. Establishing Designated Areas (DAs) or
 Designated Work Positions (DWPs).....1.41

 L. Removing DAs or DWPs from Sampling Status.....1.45

 M. Establishing a Reduced Respirable Dust Standard....1.47

Appendix Aa.1

Appendix Bb.1

Appendix Cc.1

Appendix Dd.1

Appendix Ee.1

Appendix Ff.1

Chapter 1

RESPIRABLE DUST

I. Purpose

The purpose of this chapter is to establish procedures and guidelines for conducting respirable dust sampling inspections, evaluating sampling results, establishing and removing sampling entities, establishing reduced dust standards due to quartz, and monitoring the operators' respirable dust control and sampling programs. This document supersedes the previously issued Chapter 1.

II. Authority

Section 103(a) of the Federal Mine Safety and Health Act of 1977 (Mine Act) requires authorized representatives of the Secretary to make frequent inspections for the purpose of "determining whether there is compliance with the mandatory health or safety standards...." Parts 70, 71, and 90, Title 30 of the Code of Federal Regulations, require mine operators to maintain dust concentrations at or below the applicable standard in the mine atmosphere where miners work or travel. Sections 72.620 and 72.630 require mine operators to use effective drill dust controls; and Section 75.362(a)(2) requires mine operators to conduct on-shift examinations to ensure compliance with the dust control parameters stipulated in the approved mine ventilation plan. Under the Mine Act, MSHA has responsibility for determining whether an operator is complying with these standards.

III. Sampling Inspections

Respirable dust sampling inspections will be conducted in accordance with the procedures that follow.

The objective of sampling inspections is to determine:

- ! The dust levels in the work environment to which miners are exposed.
- ! Whether the operator is complying with the on-shift examination provisions of 75.362(a)2).

- ! Whether the operator is complying with either the dust control provisions of the approved mine ventilation plan for underground mines, or with the respirable dust control plan at surface mines, or for a Part 90 miner.
- ! Whether the dust control measures stipulated in the approved mine ventilation plan or in the respirable dust control plan maintain dust levels at or below the applicable standard.
- ! If the dust control measures actually in use differ from those stipulated in the approved plan.
- ! If conditions and activities within the work environment on the day of sampling are compatible to those experienced by miners during non-sampling periods.
- ! Whether the proper occupation has been assigned as the designated occupation (DO) for operator sampling.
- ! If miners are being exposed to excessive levels of respirable crystalline silica (quartz).
- ! If other areas/work positions need to be monitored by the operator on a bimonthly basis.
- ! Whether the operator is complying with the drill dust control standards (§72.620 and §72.630).

A. Types of Entities Sampled

1. Mechanized Mining Units (MMUs)

A full-shift sample will be collected from the environment of at least five (5) occupations, if available, on each MMU. These will include the designated occupation (DO) and any roof bolter occupations on the MMU being surveyed that have not been established as designated areas (DAs).

When sampling the DO, the sampler unit device will remain in the **environment of the DO** during the entire sampling shift (whenever the mining equipment is in operation) rather than with the individual miner, even when miners change positions or alternate duties during the shift.

A full-shift intake air dust sample will also be collected for each MMU. Since these are intake air samples, the sampler unit will remain in the intake airway within 200 feet of the working face(s). The 1.0-mg/m³ dust standard will apply to these samples.

2. **Designated Areas (DAs)**

A full-shift sample will be collected from each DA. Since these are area samples, the sampler unit will remain at the designated location specified, or to be specified in the operator's approved ventilation plan, or as specified in 75.350(b)(3), or stipulated in the petition for modification (two-entry mining systems) allowing the use of belt air. The 1.0-mg/m³ dust standard will apply to intake air DAs.

3. **Part 90 Miners**

A full-shift sample will be collected from the environment of each Part 90 miner, except during the 20-day "grace" period following the operator's receipt of notification that a miner has elected to exercise the option. The sampler unit will remain in the **environment of the person** being sampled by placing the sampling device either (a) on the Part 90 miner; or (b) on the equipment that the Part 90 miner operates within 36 inches of the normal working position; or (c) at another location that represents the maximum concentration of dust to which the Part 90 miner is exposed.

4. **Designated Work Position (DWP)**

A full-shift sample will be collected from the working environment of each DWP. The sampler unit will normally remain in the **environment of the work position (occupation) being sampled** rather than with the individual miner, even when miners change positions or alternate duties during the shift. However, if the DWP involves the performance of multiple tasks during the shift (e.g., operating a highwall drill, dozer, and truck for part of the shift), none of which are assumed by another miner, the sampler unit will remain with the miner.

5. **Nondesignated Entities (NDEs)**

A full-shift sample will be collected from the environment of at least three occupations (if available) other than the DWP (non-DWP or NDWP), or, if available, from other active work positions that are currently in "D" status ("bimonthly sampling not required") where the potential for high levels of coal mine respirable or quartz dust may exist (specifically, Occ. 307 - blaster/shooter/shotfirer; Occ. 368 - bulldozer operator; Occ. 382 - high lift operator/front end loader; Occ. 383 - highwall drill helper; Occ. 384 - highwall drill operator; and Occ. 386 - refuse truck driver/backfill truck driver), at each surface mine, surface facility, and surface area of an underground mine. Contract workers exposed to coal mine dust while on mine property also will be sampled. (Refer to Appendix A of this chapter, formally Procedure Instruction Letter (PIL) I99-V-7, for additional guidelines regarding the sampling of contract employees and construction sites at coal mines.) The sampling device will remain with the occupation, or with the individual miner as described under DWP, or at the location in the nondesignated area (NDA) selected by the inspector.

B. Frequency of Sampling

1. **Underground Mines**

All entity types will be sampled quarterly or as stipulated below. The number of sampling inspections to be completed during a quarterly period will be based on the average number of MMUs in producing status on the 1st of each month of the applicable quarter.

- a. MMUs - Inspectors will sample approximately 25 percent of MMUs during off-shift (i.e., other than day shift) and/or weekends at mines that produce material during off-shifts and/or on weekends. For tracking purposes, the minimum number required to be sampled will be based on the average number of MMUs in producing status on the 1st of each month of the affected quarter that work multiple shifts or weekends.

- b. DAs inby the section dump point and other DAs that can be sampled concurrently with MMUs. All outby DAs will be sampled once each year.
- c. Intake air (NDAs).
- d. Part 90 miners.
- e. NDEs (NDAs) that can be sampled concurrently with outby DAs (includes active DAs in "D" status or "sampling not required") will be sampled at the same frequency as stipulated in B.1.b. above.

2. **Surface Mines, Surface Facilities, and Surface Areas of Underground Mines - Normal Sampling**

Surface mines, surface facilities, and surface areas of underground mines in producing status will be sampled the equivalent of once every 6 months. For tracking purposes, the minimum number required to be sampled will be based on the average number of surface mines, surface facilities, and underground mines in producing status on the 1st of each month during the applicable 6-month period. Inspectors will sample approximately 25 percent of surface mines, surface facilities, and surface areas of underground mines during off-shifts and/or weekends if production or normal work activity occurs during off-shift and/or weekends.

NOTE: Sampling at surface mines should be conducted during dry periods in order to accurately determine the dust concentrations to which miners are normally exposed. If any significant rainfall occurs during any sampling inspection, the sample(s) are to be voided by the inspector.

The following entity types will be sampled the equivalent of once every 6 months, unless noted otherwise:

- a. DWPs (includes DWPs in "D" status or "sampling not required").
- b. Part 90 Miners.
- c. NDEs (NDWPs). This does not apply to NDEs at surface facilities (excluding preparation plants) or surface areas of underground mines with fewer than 20 employees and no active DWPs or history of respirable dust problems; these facilities and surface areas will be sampled at least once annually.

C. Monitoring of Operator-Collected Samples

Inspection personnel will monitor at least one of the required 5 compliance samples collected to abate at least 10% of the excessive dust citations. This monitoring will cover the entire sampling shift and include the preparation of the sampler at the start of the shift, the completion of the dust data card, and capping or securing of the cassette at the end of the shift. The inspector will also determine if the sampling pumps utilized at the mine are being properly calibrated, cleaned, and inspected as required by 30 CFR §70.204, 71.204 and/or 90.204. When monitoring operator sampling, the inspector will measure the parameters specified in the approved ventilation plan and record the findings on MSHA Form 2000-86.

If the operator utilizes a contract sampler, the sampling equipment must still be checked by the inspector prior to the start of sampling to determine if the unit(s) meet the requirements of 30 CFR §70.204, 71.204 and/or 90.204. MSHA has previously notified the mining industry that the requirement for performing these checks "...immediately before each sampling shift..." to be no more than 3 hours before the sampling shift (PIB NO. P94-13 dated April 18, 1994).

The following information will be documented in the inspector's notes while conducting the monitoring of an operator collected sample:

- All data from the Dust Data card for the sample being monitored.
- Citation number that the sample is being credited toward.
- Note observation of the Certified Person performing pre-sampling shift checks of the sampling equipment:
 - ✓ Certified Person number performing checks

- ✓ Did check interior of cyclone, vortex finder, grit pot and o-rings?
 - ✓ Did check pump condition for cracks and fully legible approval labels?
 - ✓ Check battery voltage under load?
 - ✓ Check the tubing - clean and free of leaks?
 - ✓ Check clamping and alignment of cassette and cyclone assembly?
- Note the time sampling unit started.
 - Note time sampling unit entered underground mine or located on DWP.
 - Note miner's name wearing sampling unit if applicable.
 - Note if a Certified Person turned the pump on and placed pump at the sampling location.
 - Note if a Certified Person performed the shift checks of flow rate.
 - Note how the sampling unit was transported from the sampling location at the end of the 8-hour maximum sampling time.
 - Note if Certified Person turned the sampling unit off.
 - Note observation of Certified Person completing the Dust Data Card and packaging the sample for transmittal to MSHA.

The District will assemble a package that includes: a copy of the completed 2000-86s, a legible copy of the inspector's notes, a copy of the citation, a copy of the computer report with all 5 samples collected for this citation, a copy of any extension, abatement or order issued as a result of these samples. This package will be provided to the Chief, Division of Health within 15 days of the end of the calendar quarter in which all data is available. This package can be mailed hard copies or submitted as an e-mail with electronic copies of all data.

D. Pre-Inspection Reviews

MSHA records (e.g., Respirable Dust Emphasis Program, operator sampling program monitoring results, weekly listing of inspector and operator samples containing more than 100 $\mu\text{g}/\text{m}^3$ (0.100 mg/m^3) of quartz, (refer to Appendix B of this chapter, formally *Procedure Instruction Letter* (PIL) I99-V-5), listing of entities on a reduced standard, etc.) and the Uniform Mine File notebook shall be reviewed prior to beginning the inspection at the mine.

E. Sampling Inspection Procedures

The following procedures will be followed during respirable dust sampling inspections:

1. Prior to the mine visit, check the battery voltage (minimum of 4.8 volts) and flow rate (2.0 liters per minute) of the MSA Model Escort ELF® sampling pump under load. The test results will be documented in the inspector's notes or in a notebook maintained in the field office.
2. Use properly maintained and calibrated sampler units (i.e., in accordance with IR 1240 [1996] at intervals not to exceed 200 hours of use) that have been cleaned and examined prior to use, and assembled correctly according to 30 CFR Parts 70, 71, and 90. The units will be secured in accordance with established procedures to minimize tampering.
3. Use only filter cassettes that are preweighed to the nearest 0.001 mg. The dust data card accompanying the filter cassette will be "blue" and be stamped with the Field Office number in the lower, right-hand portion of the data card.
4. Secure one **control** filter cassette for **each** respirable dust sampling inspection and note the cassette number in the inspector's notes. The control filter will be used to adjust the resulting weight gain obtained on each exposed filter capsule. That is, any change in weight of the control filter capsule will be subtracted from the change in weight of the exposed filter capsule. Therefore, the control filter cassette must have the same **preweight date** (noted on the front of the dust data card) as all the other cassettes to be used for sampling on the same inspection.
 - a. **Do not** remove the plugs from the control filter cassette. Mark the dust data card with a large capital "C" for 'CONTROL' in the middle of the card and enter a "9" in the 'Type of Sample' box. Also complete Items 2 (Mine ID), 6 (Date Sampled), and 13 (Certified Person) and stamp the Field Office number in the lower right-hand portion of the data card.
 - b. **Carry the control filter cassette in a shirt or coverall pocket during the sampling inspection;** keep the control filter cassette together with the exposed

cassettes after sampling; and treat the control filter cassette the same as the exposed cassettes after returning to the office or laboratory.

NOTE: If the above procedures are not followed, the sampling results cannot be used for enforcement purposes. However, if all sample results are less than the applicable standard and the control filter is invalid, then the survey may be considered complete.

5. Upon arrival at the mine, the inspector will discuss with mine management and representatives of the miners the purpose of the inspection activity, stressing the need to have dust controls in place, examined in accordance with § 75.362(a)(2), and functioning properly on every production shift, and to have dust samples that reflect dust concentrations in the work environment to which miners are typically exposed. During this time, the inspector will confer with miners and mine management to discuss the results of any previous MSHA dust inspections and, if currently on a reduced standard, explain its significance. The inspector will also determine the length of the shift and solicit cooperation from the miner in wearing the sampler unit. The shift length will be noted in the comments section of the 2000-86 completed during this inspection. If a miner objects to wearing the sampler unit, determine the reasons for the objection. Explain the objectives of sampling inspections (refer to page 1.1). If the cooperation of the miner cannot be obtained, the sampler will be carried to the miner's work site and placed within 36 inches in by the miner's normal work position or at a location that will measure the maximum dust concentration to which the miner is exposed.

In addition, the inspector will take the following actions:

- a. Explain to the miners that when either the DO (in particular at longwall MMUs) or DWP is being sampled, the sampler unit must always remain in the environment of the DO or DWP rather than with any single individual miner, even when miners change positions or alternate duties during the shift. However, if the DWP involves the performance of different tasks during the shift (operating a highwall drill, dozer, and truck for part of the shift), none of which are assumed by another miner, the affected miner will wear the sampler the entire shift.

- b. Make certain that when attaching the sampling head assembly to the miner's clothing, the inlet of the cyclone is facing away from the body of the worker. Instruct the miner not to cover the sampling head (cyclone inlet) with a coat or other garment. Care must be exercised to prevent the sampling unit from presenting a safety hazard. Attach the unit so that the sample tubing will not catch on equipment or other objects.
 - c. Emphasize the need for the miners whose occupations will be sampled to continue to work in a routine manner and to report any unusual occurrences during the sampling period that may affect the validity of the sample.
 - d. Inform the miners of when and where the sampler unit will be removed.
 - e. Distribute health hazard information cards or other educational material. Talk to miners about black lung and silicosis, and the importance of complying with approved dust control parameters on every production shift. Encourage miners to participate in the NIOSH administered x-ray program and discuss the operator's responsibilities under this program. Also, share with the mine operator information on dust controls and provide whatever assistance is requested to enable the mine operator to maintain compliance with applicable standards on a continuous basis.
 - f. Determine if the following items are posted on the mine bulletin board:
 - 1) latest results of operator bimonthly sampling (excluding Part 90);
 - 2) current ventilation plan and/or respirable dust control plan; and
 - 3) the approved x-ray plan or NIOSH notice for medical examinations (underground mines only).
6. Record in the inspector's notes the cassette number, the time the sampler unit was started, and location of the sampler by sample type and occupation code for each sample collected.
7. Check the pump flow rate when first turned "ON" and before turning it "OFF" at the end of the shift. On-shift checks

of the sampler units will be made as frequently as necessary (no less than beginning, middle, and end of shift) to ensure that:

- a. The pump is operating properly and at the correct flow rate;
- b. The pump has remained in the same environment as recorded earlier;
- c. The pump has not been tampered with;
- d. The sample tubing is not being pinched and connections are not leaking; and
- e. The sampling head (cyclone inlet) is not covered with a coat or other garment.

If the pump is not operating properly when first turned "ON" (after allowing the pump to reach the set point value), it shall be adjusted using the flow rate control (↑ and ↓) switch buttons. If the proper flow rate was not being maintained during the final check, the sample should be voided by entering the code "MFP" in the "Void Code" box located in the lower right-hand portion of the dust data card. Improper flow rate is indicated if the actual flow rate displayed in the readout window is either less than 1.9 LPM or greater than 2.1 LPM or if the Flow Fault LED is "ON." The inspector's notes will show the MSHA pump property number, the time of the examination, and whether the flow rate readout is within the acceptable range or the Flow Fault LED is "ON."

8. Accompany the miners to the work area and remain on the section or with the Part 90 miner to assess the following:
 - a. To ensure that the sampler units are located in the correct environments.
 - b. To observe working conditions and activities, and to document any changes that occur during the sampling shift which may affect the level of respirable dust to which miners are exposed.
 - c. To observe miners during the shift to verify the job classifications previously recorded.
 - d. To determine from discussions with a representative number of miners whether working conditions and activities during sampling by either MSHA or the

operator are representative of non-sampling periods, and document any relevant findings in the inspector's notes. Since any shift may exhibit wide variations in working conditions and activities, it should be determined if these are "typical" conditions.

Inspectors must remain in the area where **Sampling** (plan evaluation, routine respirable dust, quartz evaluation, citation/order abatement, monitoring inspection) is being conducted to ensure the samples are representative of the normal mining activities. The inspector will observe enough of the sampling activity to ensure that the sampling units are maintained in the environment being sampled, the pump flow rate is maintained, sampling units are not abused, normal mining activities are taking place, a determination of production level is made, dust control practices and work activities are properly documented, and etc. The inspector will not perform other activities that will require being away from an MMU (section dumping point and inby) more than 15 minutes during the sampling shift. This requirement, however, does not prevent the inspector from performing other work while conducting the sampling inspection. Normally, the inspector will accompany the miners out of the mine except as noted in Item 15 of this section.

9. When sampling DWPs and outby DAs, an inspector normally should not remain with the entity for the entire sampling shift. Instead, the inspector should spend sufficient time to either properly place the sampler unit in the environment to be monitored or verify its location, record its location in the inspector's notes, and make the on-shift pump checks. Additionally, the inspector should observe and record the operating conditions and work activities in the area, the controls in use with a general description and whether or not they seem adequate, and potential sources of dust exposure. The inspector must remain at the mine site while sampling is being conducted.

If the work position to be sampled involves the highwall drill operator, the inspector will first determine if the mine operator is in compliance with the drill dust control standard ('72.620). (Refer to Appendix C of this chapter, formerly *Procedure Instruction Letter* (PIL) I98-V-1 for specific guidelines regarding enforcement of this standard.)

- a. Normally, the inspector should not continue sampling when visible dust is present, unless the drill is equipped with a properly maintained pressurized environmental cab and the only person potentially

exposed to the drill dust is inside the cab. In such cases, the environment inside the cab shall be sampled to determine if the pressurized cab is equipped with an effective air filtration system that is being properly maintained.

- b. In the cases where the dust control appears to be effective, samples should be collected from work positions where miners are exposed to drill dust to determine if the operator is complying with the respirable coal mine dust standard.
10. If during the shift an inspector observes another entity being sampled by the mine operator, the following steps will be taken:
 - a. Record the location and general condition of the sampler unit, the time the sampler was observed operating, and the cassette number in the inspector's notes;
 - b. Check whether the pump is operating at the proper flow rate and, if not, record the company's pump identification number;
 - c. Document any abnormal conditions that exist in the sampling area and note worker activities;
 - d. Determine who is responsible for making the required pump checks and make an attempt to determine whether such checks were actually performed during the second and last hour of pump operation by a certified person;
 - e. Do not discuss his/her observations with the mine operator while on site; and
 - f. Inform the responsible field office supervisor so that appropriate follow-up enforcement action can be taken if the sample in question is transmitted to MSHA as a valid sample. This may involve meeting with the operator to discuss findings, initiating a special investigation, or conducting a monitoring and/or sampling inspection, etc.
 11. Intake air samples taken at DA locations by inspectors or mine operators will be coded as "Type 3" samples on the dust data card, and the entity block (Block 10) should be identified using the "801-0 through 899-9" numbering series in the following manner:

- a. The first digit will always be "8." This indicates the sampling entity is located in intake air and is recognized by the computer for the purpose of applying the 1.0 mg/m³ intake air standard.
 - b. The next two digits, in this case "01," indicate that this intake air "DA" is associated with MMU 001-0.
 - c. The fourth digit, in this case "0," indicates that this is the first intake air DA associated with a particular MMU, and is useful, especially, in identifying MMUs with multiple intake air "DAs," except when the DA sampling entity has been established as a result of a petition for modification. In only those instances, the fourth digit will be a "9" to denote this fact.
 - d. Other "intake air" samples taken by inspectors from areas that are not a DA will be coded as "Type 7" (in Block 9) on the dust data card, and the entity number of the associated MMU (i.e., 001-0 thru 099-0) will be entered in Block 10.
12. The District Manager must be able to reliably ascertain whether the approved ventilation plan's minimum control parameters (e.g., air quantity, number of sprays, water pressure, etc.) allow for effective and consistent control of respirable dust and methane. Data based on samples collected when control parameters significantly exceeded the ventilation plan minimums (and/or when production is significantly below normal levels) cannot reasonably or reliably serve as the basis for justifying the continued approval of a ventilation plan.

Since a primary sampling objective is to assess the effectiveness of the control parameters in the approved ventilation plan, when an operator is operating with any parameters that exceed 120% of the quantities/volumes specified in the approved ventilation plan, the inspector will inform the operator that he/she may adjust the parameters to levels that do not exceed 120% of the specified quantities/volumes. If a plan specifies a range of values as a control parameter, the lowest value in the range is the quantity/volume to which the 120% factor will be applied. The inspector will inform the operator that, if such adjustments are not made, the District Manager may determine that the minimum plan parameters do not reliably assure protection for all miners over all shifts, even if the MSHA sampling results do not exceed the applicable dust standard.

If the operator adjusts the control parameters as requested, and the MSHA samples indicate compliance with the applicable respirable dust standard, the District Manager will consider this data as evidence, but not definitive proof, that the approved ventilation plan's minimum control parameters allow for the effective and consistent control of respirable dust and methane. If the MSHA samples indicate **noncompliance** with the applicable respirable dust standard, or there are **individual occupation samples** that exceed the applicable dust standard, the District Manager will consider this data as evidence that the approved ventilation plan's minimum control parameters are insufficient to assure the effective and consistent control of respirable dust and methane.

If the MSHA sampling results and other relevant data/information support a determination that the plan parameters are inadequate to reliably and consistently protect each miner from exposure to respirable dust concentrations that exceed the applicable standard, the District Manager will undertake the 3-step process to gain modification of the existing ventilation plan. The first step of the 3-step process is a notification to the operator of the District Manager's determination and rationale. If the MSHA samples indicate noncompliance with the applicable respirable dust standard, or there are individual occupation samples that exceed the applicable dust standard, the modified plan should include parameters that exceed those measured by the inspector during the sampling inspection. Additional controls, such as those listed in section III H. of this Chapter, and modification or elimination of deep-cut systems, may also be required to help ensure miners are protected against respirable dust overexposures.

If the plan being evaluated stipulates the use of blowing or exhausting face ventilation in any entry at any time, each type of face ventilation should be evaluated separately or the use of all blowing face ventilation must be evaluated to retain the option in the approved plan. For MMUs that specify in the plan specific entries that will use blowing face ventilation and specific entries that will use exhausting face ventilation, this combination of face ventilation must occur during the sampling shift so that the MSHA sampling reflects these conditions.

It is important that the inspector's notes and MSHA Form 2000-86 accurately reflect the dust controls being used

and the actual quantities measured. This will serve as supporting documentation when plan changes are required and/or enforcement actions are taken.

13. At least **twice** during the sampling shift, the inspector will verify that **all** dust control parameters stipulated in the approved ventilation plan are in place and functioning properly and make other necessary measurements as detailed below. These complete checks will be initiated at least at the beginning of the shift and between the 4th and 5th hour of operation. When checking air quantities and velocities, the inspector will make such measurements in as many working places as practical and immediately prior to the operation of the miner in that place, recording the results on MSHA Form 2000-86, July 93 (revised), *Respirable Dust Sampling and Monitoring Data*.

If the plan requires the use of a machine-mounted dust collector, the inspector should follow the procedures outlined in Appendix E (formerly PIL I97-V-8) in performing the required visual checks and measurements to verify that the scrubber is being maintained and is operating properly. In addition, inspection personnel will conduct a full pitot tube traverse on each scrubber at least every other fiscal year quarter. This traverse data will be attached or otherwise included with the 2000-86 form. This information will be used by the inspector to determine if the plan scrubber quantity is correct. The inspector can also use this data to determine a centerline correlation (if a centerline hole is provided) which can be used during non-measurement inspections of the scrubber system to determine if the scrubber is being maintained and the ventilating air current is suitable for this system of mining. A duct set-up for a centerline hole will always have an odd number of holes.

NOTE: A full pitot tube traverse will consist of collecting approximately 16 data points (not less than 14) from holes in the scrubber duct that must be less than 6 inches from the sides and between each hole. For example: Scrubber duct measuring 20" X 20". A minimum of 4 holes must be present spaced equally across the duct. A minimum of 4 readings at each hole will be taken that are equally spaced in the 20 inch depth. This will result in 16 velocity pressure (VP) readings. The 16 VP readings must be converted to velocity (V) readings and then the 16 V readings averaged. This average is the velocity of the air in the scrubber. A chart of conversions from VP to V is presented on page 1.17 to aid in this work. The average velocity is then multiplied by the area of the duct (20 X 20 = 400 square inches/144 = 2.78 square feet in this

example) to obtain the volume of air in CFM for the scrubber. This number is what the plan should specify for the scrubber quantity and is what should be recorded on the 2000-86 form. The reference used to obtain the traverse information is the ACGIH "Industrial Ventilation: A Manual of Recommended Practice" 22nd Edition.

The results of the complete on-shift checks of plan parameters may be recorded on a single 2000-86 form if all readings can be accommodated and the data from each check is clearly labeled as being the first or second check. Inspection personnel can continue to record each check on separate 2000-86 forms if preferred or if necessary to accommodate the information. Record other dust controls or work practices (i.e., higher air quantities, greater number of water sprays, frequency of scrubber screen cleaning, wetting roadways or shields, bolting procedures, etc.) that are in use but not included in the approved plan in the comment section of MSHA Form 2000-86.

The inspector will also include in the comment section of MSHA Form 2000-86, the method used to determine the average production over the last 30 production **shifts**. This will include the date range for data utilized, the total production during the 30 shifts, the average for the 30 shifts, the normal shift length, the conversion to an 8-hour equivalent, and the percent of the 30-shift average obtained during this sampling shift. The preferred method of determining the 30 shift average is to measure the mine map for the distance mined and calculate the cubic feet of material mined. All measurements, as well as any conversion factor used, must be included in the comments section. Note that material mined includes all material mined, including rock. Each MSHA Form 2000-86 will be reviewed and signed by the inspector's supervisor indicating that the data is complete and accurate.

The inspector will also determine if the operator performed an on-shift examination of the respirable dust control parameters as specified in the approved mine ventilation plan (Refer to Appendix D of this chapter, formerly PIL I97-V-6).

Velocity Pressure Conversion

VP	V	VP	V								
0.01	401	0.51	2860	1.01	4025	1.51	4921	2.01	5678	2.60	6458
0.02	566	0.52	2888	1.02	4045	1.52	4938	2.02	5692	2.70	6581
0.03	694	0.53	2916	1.03	4065	1.53	4954	2.03	5706	2.80	6702
0.04	801	0.54	2943	1.04	4084	1.54	4970	2.04	5720	2.90	6820
0.05	896	0.55	2970	1.05	4104	1.55	4986	2.05	5734	3.00	6937
0.06	981	0.56	2997	1.06	4123	1.56	5002	2.06	5748	3.10	7052
0.07	1060	0.57	3024	1.07	4143	1.57	5018	2.07	5762	3.20	7164
0.08	1133	0.58	3050	1.08	4162	1.58	5034	2.08	5776	3.30	7275
0.09	1202	0.59	3076	1.09	4181	1.59	5050	2.09	5790	3.40	7385
0.10	1266	0.60	3102	1.10	4200	1.60	5066	2.10	5804	3.50	7493
0.11	1328	0.61	3128	1.11	4220	1.61	5082	2.11	5818	3.60	7599
0.12	1387	0.62	3154	1.12	4238	1.62	5098	2.12	5831	3.70	7704
0.13	1444	0.63	3179	1.13	4257	1.63	5113	2.13	5845	3.80	7807
0.14	1499	0.64	3204	1.14	4276	1.64	5129	2.14	5859	3.90	7909
0.15	1551	0.65	3229	1.15	4295	1.65	5145	2.15	5872	4.00	8010
0.16	1602	0.66	3254	1.16	4314	1.66	5160	2.16	5886	4.10	8110
0.17	1651	0.67	3278	1.17	4332	1.67	5176	2.17	5900	4.20	8208
0.18	1699	0.68	3303	1.18	4351	1.68	5191	2.18	5913	4.30	8305
0.19	1746	0.69	3327	1.19	4369	1.69	5207	2.19	5927	4.40	8401
0.20	1791	0.70	3351	1.20	4387	1.70	5222	2.20	5940	4.50	8496
0.21	1835	0.71	3375	1.21	4406	1.71	5237	2.21	5954	4.60	8590
0.22	1879	0.72	3398	1.22	4424	1.72	5253	2.22	5967	4.70	8683
0.23	1921	0.73	3422	1.23	4442	1.73	5268	2.23	5981	4.80	8775
0.24	1962	0.74	3445	1.24	4460	1.74	5283	2.24	5994	4.90	8865
0.25	2003	0.75	3468	1.25	4478	1.75	5298	2.25	6007	5.00	8955
0.26	2042	0.76	3491	1.26	4496	1.76	5313	2.26	6021	5.50	9393
0.27	2081	0.77	3514	1.27	4513	1.77	5328	2.27	6034	6.00	9810
0.28	2119	0.78	3537	1.28	4531	1.78	5343	2.28	6047	6.50	10211
0.29	2157	0.79	3560	1.29	4549	1.79	5358	2.29	6061	7.00	10596
0.30	2194	0.80	3582	1.30	4566	1.80	5373	2.30	6074	7.50	10968
0.31	2230	0.81	3605	1.31	4584	1.81	5388	2.31	6087	8.00	11328
0.32	2266	0.82	3627	1.32	4601	1.82	5403	2.32	6100	8.50	11676
0.33	2301	0.83	3649	1.33	4619	1.83	5418	2.33	6113	9.00	12015
0.34	2335	0.84	3671	1.34	4636	1.84	5433	2.34	6126	9.50	12344
0.35	2369	0.85	3692	1.35	4653	1.85	5447	2.35	6140	10.00	12665
0.36	2403	0.86	3714	1.36	4671	1.86	5462	2.36	6153	10.50	12978
0.37	2436	0.87	3736	1.37	4688	1.87	5477	2.37	6166	11.00	13283
0.38	2469	0.88	3757	1.38	4705	1.88	5491	2.38	6179	11.50	13582
0.39	2501	0.89	3778	1.39	4722	1.89	5506	2.39	6192	12.00	13874
0.40	2533	0.90	3799	1.40	4739	1.90	5521	2.40	6205	12.50	14160
0.41	2564	0.91	3821	1.41	4756	1.91	5535	2.41	6217	13.00	14440
0.42	2596	0.92	3841	1.42	4773	1.92	5549	2.42	6230	13.50	14715
0.43	2626	0.93	3862	1.43	4789	1.93	5564	2.43	6243	14.00	14985
0.44	2657	0.94	3883	1.44	4806	1.94	5578	2.44	6256	14.50	15251
0.45	2687	0.95	3904	1.45	4823	1.95	5593	2.45	6269	15.00	15511
0.46	2716	0.96	3924	1.46	4839	1.96	5607	2.46	6282	15.50	15768
0.47	2746	0.97	3944	1.47	4856	1.97	5621	2.47	6294	16.00	16020
0.48	2775	0.98	3965	1.48	4872	1.98	5636	2.48	6307	16.50	16268
0.49	2804	0.99	3985	1.49	4889	1.99	5650	2.49	6320	17.00	16513
0.50	2832	1.00	4005	1.50	4905	2.00	5664	2.50	6332	17.50	16754

V = 4005 X √ VP

V = Velocity in fpm

VP = Velocity Pressure "WG

14. If a mine operator is found to be in violation of the approved ventilation plan, the operator will be cited and required to take immediate corrective action while the sampling is taking place. If this occurs, the inspector will document in his/her notes what specific action was taken and when it was taken during the sampling shift.
 - a. Consideration should be given to a finding of S&S when an operator is found to be in violation of the approved ventilation plan. In determining whether the violation should be designated as S&S, the inspector will take into consideration all facts surrounding the violation and make a judgment based on his/her past experience of whether the operator's failure to comply could result in overexposure. One key factor to be considered is the extent of the deviation from the plan and its potential impact on the dust exposure. For instance, if the plan calls for 30 operating sprays and 3 were found defective but were separated by other functional sprays, the violation may not be considered S&S because its impact on the miner's dust exposure may be minimal. On the other hand, if the 3 sprays that were not operating were in the same location, such as in the throat of the continuous miner, the impact on the dust suppression could be more severe and may justify a finding of S&S.
 - b. When deciding on the degree of negligence, consideration will be given to a high negligence finding if the mine operator was in a position to be aware of the conditions based on the results of the on-shift examination of the dust control parameters and there were no mitigating circumstances. Because of the on-shift requirement, the mine operator is expected to be fully familiar with the provisions of the approved ventilation plan.

Furthermore, if there are unique aggravating circumstances associated with the violation, such as repeated violations of the same standard, serious consideration will be given to recommending the violation for special assessment.
15. Full-shift samples will be considered 8-hour samples, taken portal to portal, unless the normal work shift is less than 8 hours. When the normal work shift is longer than 8 hours, remove the sampler units from the occupations being sampled near the end of the eighth hour, carry them to the surface, and turn them "OFF" after exiting the portal of the mine.

If this is not possible because of the unavailability of transportation to the surface or involvement in other inspection work, the inspector will turn "OFF" and remove the sampling device from the occupations being sampled at the expiration of the 8-hour sampling period. Once the sampling device is removed, the inspector will exercise care to protect it from mishandling, particularly the sampling head assembly. Also, the inspector will note on the dust data card that the pump was turned "OFF" in the mine at the end of the 8-hour shift.

NOTE: A 15-minute window is provided in both the inspector and operator sampling programs to cover unanticipated delays when exiting the mine.

16. At the conclusion of the sampling shift, record the time, examine the condition of the sampler units for any evidence of mishandling, and note any findings in the inspector's notes. Also, when sampling MMUs, estimate the amount of total material in tons that was mined during the time the sampler unit(s) was located on the section based on either the number of feet advanced, number of passes, or number of cars loaded. Tonnage for sampling purposes includes all mined material, which may be rock or coal or both. (See para. B.13 above). Record this information on the dust data card and MSHA Form 2000-86.
17. MSHA samples will be valid if production is at least 80% of the average of the previous 30 production shifts. MSHA samples will be voided with the production (PRO) void code on the dust data card by the inspector if the production is less than the 80% level prior to the samples being submitted to the Pittsburgh laboratory.

If the production obtained during sampling is less than the 80% level and the subsequent sample results indicate one or more samples having a concentration that exceeds the applicable standard by any amount, all samples from this survey will be modified by the district to remove the production void code. These samples may be voided for other reasons at the inspector's discretion. Removing the void code from these samples will permit the district to count this survey toward their sampling completion rates.

F. Post-Inspection Procedures

1. Complete the dust data card for each exposed filter cassette and review the information for clarity, legibility, and accuracy. Refer to paragraph E.4.a. for

completing the dust data card for a control filter cassette.

- a. Cassette Number: This number is supplied by the manufacturer and must correspond to the number on the filter cassette bearing the identical serial number.
- b. Mine ID Number: The seven-digit number assigned by MSHA.
- c. Contractor Code: No entry required.
- d. Mine Name: Name of the mine being inspected.
- e. Company Name: Name of the company that operates the mine.
- f. Date Sampled: The date the sample was taken. When entering the date, be sure to enter a zero before single-digit months or days so that each box contains a digit (Example: [02 28 93]).
- g. Sample Start Time: The hour on a 24 hour clock that the sampling unit is started (if start time is 7:15, 7:30, or 7:45 a.m., record 07).
- h. Sampling Time: The **actual** elapsed time in minutes between when the pump was started and when the pump was turned "OFF". The total time cannot be more than 495 minutes or the sample will be voided (a 15-minute window is provided to cover unanticipated delays when exiting the mine). Also, the time cannot be less than 360 minutes, unless that is the normal length of the shift or the Administrator for CMS&H has granted written permission to run less than 360 minutes. If the actual time is less than the normal full-shift time, note on the dust data card the length of the normal full shift.

NOTE: Although the actual elapsed time can be 495 minutes for the sample to be considered valid, the concentration will be determined by using a maximum time of 480 minutes.
- i. Tons This Shift - Tons of material produced. This item is required for samples taken on MMUs only. Tonnage less than five digits must be preceded by zeros (Example: [0 1 2 3 0]).

If a situation should arise during which no material was mined but other ongoing activities resulted in

dust exposures, the actual production must be reported as [0 0 0 0 1] since the computer will not accept zero production for an MMU.

- j. Type of Sample - The number identifying the type of sample collected.

Designated Occupation (DO)	1
Nondesignated Occupation (NDO)	2
Designated Area (DA)	3
Designated Work Position (DWP)	4
Part 90 Miner	5
Nondesignated Area (NDA)	6
Intake Air	7
Nondesignated Work Position (NDWP)	8
Control Filter	9

Sample codes "1" through "5" will be used by coal operators and MSHA inspectors. However, the only time that an operator would use sample code "2" would be after an excessive dust citation has been issued on a nondesignated occupation, which requires the operator to sample the environment to demonstrate that the violation has been abated. Codes "6" through "9" will be used only by MSHA inspectors.

- k. MMU/DA/SA: These four blocks are for the number assigned by MSHA to identify the MMU, DA, surface area (SA), or Part 90 miner. Part 90 miners working underground, but not working on an MMU, are coded 850-0. When a Part 90 miner is working on an MMU, the MMU identification number is used (Example: 001-0). Part 90 miners working in surface occupations are coded 950-0.
- l. Occupation Code: Enter the appropriate three-digit occupation code. This block is not filled out when DAs are sampled.
- m. Part 90 Miner Sampled: Complete only if the miner sampled is one who has exercised the option to work in a less dusty area of the mine (a "Part 90 miner"). The Part 90 miner's social security number or other MSHA assigned identifier is entered, one digit in each box.
- n. Certified Person - Enter the certification number of the inspector taking the sample by entering the inspector AR/RE number followed by zeros. (Ex. AR # 2-0743 certification number for dust data card would be:

[2][0][7] [4][3] [0][0][0][0]).

o. Record the district field office code number in the lower right-hand portion of the dust data card. A stamp with this number is preferred.

p. All MSHA samples shall be considered valid by the inspector, except the following:

- BRK** - Broken (actual physical damage)
- CON** - Contaminated (abnormal particle size or foreign material)
- IVR** - Inspector void - rain (rain caused environmental changes that are not normal)
- MFP** - Malfunctioning pump (pump would not operate or maintain proper flow rate)
- PRO** - Production less than 80% of the last 30 shift average
- TME** - Invalid Time (less than 360 minutes or greater than 495 minutes)
- IWS** - Invalid Work Shift - activity is not representative of normal operation.

NOTE: If an inspector recommends that a sample be voided, the appropriate void code shall be entered in the "Void Code" box located in the lower right-hand portion of the dust data card.

q. Review the dust data card information for clarity, legibility and accuracy, and then reattach the **control** filter cassette and each exposed filter cassette to the data card via the hole in the card.

2. Package all cassettes from each sampling inspection along with the **control** filter cassette and properly completed dust data cards in one mailing container. If more than one container is required, securely tape both containers together and mail to the following address:

Respirable Dust Processing Laboratory
PSHTC
P.O. Box 18179
Pittsburgh, PA 15236-0179

Cochrans Mill Road, Bldg 38 (FOR OVERNIGHT
MAIL)

Multiple surveys may be packaged in the same mailing container if each survey is placed in a sealed plastic bag and the multiple bags are then placed in the mailing container. All cassettes will be wrapped with "bubble-wrap" or similar packing material prior to placement in the shipping container. The packing material should result in the shipping container being lined with the "bubble-wrap" or other packing material.

NOTE: Never split cassettes from the same inspection and mail them separately.

3. Complete all applicable sections of the computer-generated report, *Respirable Dust Sampling Inspection Results*, MSHA Form 2000-83 (Revised) for each of the checks conducted during the shift sampled, MSHA Form 2000-142 (MMU/DA/DWP Data) if necessary, and other required information and send it to the appropriate office for filing and mailing.

G. Evaluation of Sampling Results

1. After dust sample processing and determination of the MRE equivalent dust concentration, refer to the Sampling Decision Charts on page 1.29 and 1.30 and Table 1 on page 1.31 to determine if compliance or noncompliance is demonstrated or if sampling should continue. Additional sample days shall be treated the same as the initial day of sampling with **ALL** occupations being sampled each day. If additional samples are required, the additional sampling must be collected within 14 calendar days of receiving the sample results from either the Denver Computer Center (DCC) or the Pittsburgh Safety and Health Technology Center (PSHTC).
 - a. If a designated area (i.e., roof bolter DA) has been created on a MMU or a Part 90 miner is on a MMU, neither sampling result can be used in arriving at the MMU average dust concentration.
 - b. Before referring to Table 1, note that the individual dust concentrations, as well as the average concentration calculated from multiple samples collected on one day, reported by either the DCC Denver Computer Center or PSHTC will be in milligrams and thousandths of a milligram. A noncompliance decision results when the average concentration is greater than or equal to (\geq) the "noncompliance" value listed in Table 1.

SAMPLING DECISION CHART

SECTION 1 1ST DAY SAMPLING

a. MMU 5 samples, including DO * EXCEPT AS NOTED	Avg. conc. \leq applicable standard, and each sample is \leq the applicable std.	Avg. conc. > applicable standard * <u>less than 5 samples</u> - avg. conc. \geq "noncompliance" value in Table 1	Avg. conc. \leq applicable std., 1 or more samples > applicable standard
b. DA, DWP	Conc. Is \leq applicable standard		Conc. is > applicable standard
c. Part 90	Conc. is \leq applicable standard		Conc. is > applicable standard
ACTION TO BE TAKEN BY INSPECTOR	PERMITTED TO STOP SAMPLING	NONCOMPLIANCE INDICATED - STOP SAMPLING	CONTINUE SAMPLING ALL OCCUPATIONS & REFER TO SECTION 2

SECTION 2

SUBSEQUENT DAYS SAMPLING

NOTE: MUST SATISFY REQUIREMENTS FOR SECTION 2 a. and b.

<p>a. MMU (section avg.) (5 samples, one shift with DO. Do not use previous days samples)</p> <p>* EXCEPT AS NOTED</p>	<p>Avg. conc. \leq applicable standard, and each sample is \leq applicable standard</p>	<p>Avg. conc. $>$ applicable standard</p> <p>* <u>less than 5 samples - avg. conc. \geq "noncompliance" value in Table 1</u></p>	<p>Avg. conc. \leq applicable standard, 1 or more samples $>$ applicable standard</p>
<p>b. DA, DWP, PART 90 & INDIVIDUAL OCCUPATIONS ON MMU (INCLUDING DO)</p>	<p>Avg. conc. of 2 or more samples is \leq applicable standard</p>	<p>Avg. conc. of 2 or more samples is \geq "noncompliance" value listed in Table 1 for the applicable number of samples</p>	<p>Avg. conc. of 2 or more samples is $>$ applicable standard but $<$ the "noncompliance" value listed in Table 1 for the applicable number of samples</p>
<p>ACTION TO BE TAKEN BY INSPECTOR</p>	<p>PERMITTED TO STOP SAMPLING</p>	<p>NONCOMPLIANCE INDICATED - STOP SAMPLING</p>	<p>CONTINUE SAMPLING ALL OCCUPATIONS ACCORDING TO THIS SECTION</p>

TABLE 1
"NONCOMPLIANCE VALUES"

Applicable standard	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
2 Samples																				
≥ Stop Sampling Noncompliance	5.3	5.0	4.8	4.5	4.3	4.0	3.8	3.5	3.3	3.0	2.8	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5
3 Samples																				
≥ Stop Sampling Noncompliance	3.5	3.4	3.2	3.0	2.9	2.7	2.5	2.4	2.2	2.0	1.9	1.7	1.5	1.4	1.2	1.0	0.9	0.7	0.5	0.4
4 Samples																				
≥ Stop Sampling Noncompliance	2.7	2.5	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.5	1.4	1.3	1.2	1.0	0.9	0.8	0.7	0.5	0.4	0.3
5 Samples																				
≥ Stop Sampling Noncompliance	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2

Examples:

1)	<u>Occupation</u>	<u>Concentration</u>	Standard: 2.0
	036	2.091	
	035	2.000	
	050	1.204	
	046	1.881	
	047	<u>1.702</u>	
	Total	8.878	
	Avg.	$8.878/5 = 1.775$	

1.775 is < standard but 1 sample (036) exceeds the standard. Continue sampling all occupations for additional shifts.

2)	036	2.402	
	035	2.471	
	050	1.253	
	046	2.281	
	047	<u>2.122</u>	
	Total	10.529	
	Avg.	$10.529/5 = 2.106$	

2.106 is > 2.1 which indicates noncompliance with 2.0 Standard.

When multiple days of sampling are to be averaged, the inspector will total the dust concentrations as reported by the lab to the thousandths. Then divide this total by the number of samples used and report the resulting average to the thousandths of a milligram. If the average concentration is \geq the "noncompliance" value in Table 1, noncompliance is demonstrated.

Examples:

1) DWP

<u>Day</u>	<u>Conc.</u>	<u>Total/No. Samples = Avg.</u>	
1	2.661		
2	2.215	4.876/2	= 2.438
3	1.903	6.779/3	= 2.260
4	1.120	7.899/4	= 1.975

1.975 is < 2.0. In Compliance with 2.0 Standard--
Stop Sampling.

2) DA

<u>Day</u>	<u>Conc.</u>	<u>Total/No. Samples = Avg.</u>
1	2.914	
2	2.870	5.784/2 = 2.892
3	2.881	8.665/3 = 2.888
4	2.723	11.388/4 = 2.847

2.847 exceeds the Table 1 "noncompliance" value of 2.7 for 4 samples on a 2.0 standard.

Noncompliance is established - Stop Sampling.

2. If the sampled entity is on a reduced standard, the inspector will delay any enforcement action until the results of quartz analysis are received. If the percentage of quartz found in a set of samples that met or exceeded the Noncompliance Value established in Table 1 on page 1.31 would not cause the dust standard to change, the operator will be cited for violation of the dust standard. However, as illustrated in the example below, if the percentage of quartz found in the sample would cause the dust standard and the corresponding Noncompliance Value to change so that the average concentration would no longer indicate noncompliance, no citation will be issued.

For example, suppose that the MMU is on a 1.3 mg/m³ dust standard and an average concentration of 1.605 mg/m³ is reported. Since this concentration exceeds the applicable standard, the operator is in violation of the standard. However, subsequent quartz analysis of the DO sample shows the sample contained 6 percent quartz which, if used, would result in a 1.7 mg/m³ standard. Based on this analysis, there is indication that quartz levels have changed in the environment of the DO, suggesting that the current standard may no longer be valid. Therefore, since the original concentration of 1.605 mg/m³ is less than the 1.7 mg/m³ standard that would have been in effect on the shift sampled if the result was used to set the standard, a citation should not be issued in this case.

3. When completing MSHA Form 7000-3, *Mine Citation/Order*, refer to Chapter 7 - *Health Citations and Orders*, Coal Mine Health Inspection Procedures Handbook, for specific guidelines. Dust citations and orders will

generally be designated as "significant and substantial" (S&S). The proper use of personal protective equipment (PPE), however, should be taken into account, as well as any other evidence that miners were not exposed to the hazard posed by the excessive concentration of respirable dust. Although the use of PPE may not constitute compliance with the dust standard, the proper use of PPE by the miners affected by the violation is relevant to determining whether the violation is S&S. Therefore, under these circumstances, the inspector will evaluate the effectiveness of the PPE (Refer to Appendix F to this chapter, formerly PIL I97-V-1). This evaluation will include consideration of whether the PPE has been properly selected, used, and maintained to ensure that an adequate degree of protection is afforded to the miner.

A high degree of negligence will be considered. "Reckless disregard" should be considered if the operator was in a position to be aware of the condition that contributed to the high dust levels in the environment and there were no mitigating circumstances, or if there are unique aggravating circumstances associated with the violation, such as repeated past violations of the same standard at the mine. Otherwise, the negligence would be less than high. When high negligence is assigned, such violations will be reviewed for special assessment.

4. If a NDE is cited, MSHA Form 2000-142, will be completed. The violation information must be promptly entered in the computer before it will accept operator abatement dust samples from the NDE. For example, if the shuttle car operator (Occ. 050) on MMU 001-0 was cited, the operator will be instructed to sample a nondesignated entity ("Type 2" sample) identified as 001-1, Occ. 050. The effective date of this action (Item 4 on Form 2000-142) will be the actual date the citation was issued (Item 1 on MSHA Form 7000-3).
5. The District Manager may require the operator to submit the date on which abatement sampling will begin so that an inspector can monitor the action(s) taken to correct the condition causing the violation. Note requirement of Section III C to monitor operator compliance sampling.

The information gathered during this on-site visit will enable the inspector to better evaluate whether the dust control portion of the ventilation plan needs to be revised after the operator has abated the violation, or whether the abatement period needs to be extended if samples show continued noncompliance. When onsite, the inspector will determine if the operator has made available, approved PPE and whether this equipment, if utilized, is being worn properly and by whom. If approved PPE is not made available, the inspector will take appropriate enforcement action.

- a. If the condition that caused the violation has been corrected through the application of additional controls not included in the approved ventilation plan and after examination of all factors the inspector has determined that changes in the plan are necessary to protect miner health, the mine operator will be instructed to update the ventilation plan and incorporate the parameters that were observed and documented by the inspector while the samples were collected.
 - b. However, if the operator fails to correct the condition within the period of time set forth in the citation, the inspector will review the circumstances surrounding the operator's failure to abate and determine whether an extension is justified. Refer to Chapter 7 of the Coal Mine Health Inspection Procedures Handbook for specific guidelines. If an extension of time is not justified, the inspector will issue a withdrawal order under Section 104(b). The inspector will document the following in the narrative portion of the order:
 - 1) the action or inaction of the mine operator that made it necessary to issue the order; and
 - 2) the area(s) of the mine affected by the violation.
6. Once an order is issued, MSHA must be reasonably assured that the mine operator is able to achieve and maintain dust levels within the applicable respirable

dust standard before the order is terminated. Therefore, the inspector will take the following action.

- a. Determine, based on the history of this and similar entities, whether the corrective actions proposed by the operator, in writing, may reasonably be expected to achieve compliance.
 - b. Ensure that the mine operator implements the corrective actions.
 - c. Modify the order to allow production in the affected area so that respirable dust samples can be collected to determine if the violation has been abated. The inspector will outline in the narrative portion of the modification to the order the corrective action that has been taken or refer to the submitted revised ventilation plan. The samples will be collected by MSHA in accordance with the requirements of this document. The samples will be collected on one shift from five occupations including the DO.
 - d. MSHA collected samples will be transmitted via overnight mail or equivalent, to the Pittsburgh laboratory the next MSHA normal business day.
 - e. Determine compliance/noncompliance according to Section III.G. of this chapter.
 - f. Record on MSHA Form 2000-86 (Revised) the dust controls that are actually used by the mine operator to abate the violation.
7. Once the condition that caused the violation has been corrected and compliance is achieved, the inspector will terminate the order. The mine operator must submit a revised ventilation plan for the entity in question (if not already submitted). The revised plan should include all parameters that were observed and documented by the inspector while the samples were collected. If the operator fails to submit a revised plan after the order has been abated, the District Manager will notify the operator that his current plan is inadequate following the procedures discussed in paragraph G.9. below.

8. If compliance is not achieved, the inspector will modify the order to its original state until the operator determines what other measures need to be taken that could reasonably be expected to achieve compliance. Follow the steps outlined in paragraph G.6.a. thru f. above until the order can be terminated.

H. Evaluation of Ventilation Plan

1. MSHA personnel shall determine whether the operator's ventilation plan provides sufficient controls to reliably and consistently protect each miner from exposure to concentrations of respirable coal mine dust that exceed the applicable standard. MSHA may determine that a ventilation plan is inadequate, even if the operator has not been cited for an excessive concentration of respirable dust when there is a reasonable basis to conclude that, if the mine operated in accordance with the minimum plan parameters, one or more miners would be exposed to concentrations of respirable dust exceeding the applicable standard. If a review of the operator's ventilation plan results in a determination by MSHA that it is inadequate to control dust, the District Manager will send written notification to the operator that changes are needed in the plan. The notice will identify the reasons(s) why such changes are needed, afford the operator an opportunity to meet with District personnel to discuss any proposed changes, and set a reasonable time for the operator to submit revised plan provisions to the District. The existence of:

- a citation for excessive dust,
- multiple samples (4 or more samples from a particular entity in a one-year period) that exceed the applicable standard, or
- issues related to Section E.12. of this chapter

are among the factors that, in conjunction with other supporting information/data, would justify a written notification to the operator.

If the operator fails to respond within the time provided, or if the District and operator discuss the plan but cannot resolve the differences and the

operator does not submit a revised plan, the District Manager will send a second written notification to the operator. This notification shall (1) inform the operator that the District continues to be unable to approve the plan with the existing provisions, (2) specify a time by which suitable plan provisions must be submitted by the operator to the District, and (3) make it clear that, if suitable provisions are not submitted, approval of the plan in its present form will be revoked and the operator will be without the required approved plan. Operating after the revocation date is a violation of the standard requiring the approved plan.

2. When MSHA collected respirable dust samples are determined to have greater than 119 μ g of quartz present, the following actions will be considered in securing a revised ventilation plan:
 - a. Mining Machine with Scrubber:
 - 2) Require use of at least a 30 mesh screen.
 - 3) Adjust the ventilating air quantity to no more than 1000CFM greater than the scrubber quantity in the working place when using blowing ventilation (ventilating air quantity measured with the scrubber turned off)
 - 4) Removal of the "Deep-Cut" provisions. Permit tubing/curtain set-back incrementally so that MSHA can sample to determine that miners are not exposed to quartz levels greater than 119 μ g. MSHA samples must reflect normal mining activity and include those activities that would result in the greatest dust levels such as advancing to the deepest point of penetration in plan, turning crosscuts, mining on side of section opposite the return and cutting top or bottom.
 - 5) Scrubber duct cleaned each day or shift.
 - 6) Scrubber screens cleaned each cut as a minimum.
 - 7) Require specific checks of scrubber air quantity and condition of screen and ductwork to be performed during 75.362(a)(2) on-shift examination.
 - b. Roof Bolting Machine:

- 1) Require on-shift examination to cover specific areas of dust collection system in the plan.
- 2) Specify vacuum setting for each drill pot in plan.
- 3) Specify periodic cleaning of dust collection system in the plan.
- 4) Specify procedure to dump dust collection box in the plan.
- 5) Specify type of bits to be used in the plan.
- 6) Specify the amount of time that roof bolting can be done down wind of continuous miner in the plan.
- 7) Specify the ventilating air quantity where bolting in the plan.

c. Other Areas/Occupations:

- 1) Review ventilation plan to determine if additional controls will reduce quartz levels. Identified improvements will be specified in the plan.

I. Compliance Assistance

In addition to following the procedures outlined in section F. when sampling additional shifts, the inspector will also offer compliance assistance to mine operators and miners as part of an overall enforcement strategy to achieve a healthier work environment for all miners on all shifts. The type and level of compliance assistance to be offered will depend on the frequency and the gravity of overexposures measured, the mine's compliance history, the specific help requests by either the operator or miner(s), and on the willingness of individual operators and miners to work with MSHA to resolve identified overexposures and achieve and maintain compliance on a continuous basis. Examples of the types of compliance assistance to be made available include:

1. Assisting in determining the cause(s) of identified overexposure(s) and in sharing information on available dust controls and "best practices" to implement that are designed to protect miners on all production shifts. This will be the standard practice whenever an inspector returns to the mine to conduct additional sampling.

2. Offering educational and training expertise and aids aimed at improving and reinforcing operator and miner awareness of the health hazards associated with exposure to excessive concentrations of coal mine dust and quartz dust, of the "best practices" available to address those hazards on a continuous basis, and of the importance to implement and maintain these practices operational on each production shift in order to make the workplace safer and healthier. In certain circumstances, it may be necessary to provide "one-on-one" training to help operators and miners better understand their individual responsibilities in achieving and promoting a healthier workplace.
3. Encouraging the operator or miner(s) to seek the expertise of MSHA's Technical Support to achieve a workplace that is free of excessive dust when initial efforts by the inspector and operator fail to resolve the identified overexposures. This assistance can be in the form of a consultation visit involving the sharing of technical knowledge acquired over the years or an in-mine visit when dictated by the complexity of the particular situation. The latter will enable MSHA personnel to identify the various dust-generating sources in the workplace that may be responsible for causing individual miners to be overexposed, quantify the amount of respirable dust generated by each source, identify potential solutions, and, if requested, assist the operator in evaluating their effectiveness in achieving and maintaining compliance on a continuous basis

J. Selecting Designated Occupations

In some cases the DO specified by section 70.207(e) for operator sampling may not be the occupation exposed to the most dust. The following procedure will ensure that the proper occupation is selected for operator sampling.

1. After each sampling inspection of an MMU, the results will be reviewed to verify that the correct occupation was assigned as the DO for the MMU sampled.
2. If the results indicate that some other occupation has the highest dust exposure, serious consideration should be given to changing the DO or establishing a DA for the occupation in question. However, a change should not be based solely on the results of a single sampling inspection. For example, if the dust concentration at

the off-side shuttle car operator location on an MMU operating under a deep cut plan exceeds that of the DO during two consecutive inspections, consideration should be given in this instance to changing the DO to the shuttle car operator.

3. If a decision is made to change the DO, the coal mine operator must be notified in writing in accordance with Section 70.207(e) using MSHA Form 2000-96, *Designated Occupation Change Notice*. This change will be entered in the computer using MMU/DA/DWP Status Form (MSHA Form 2000-142) on the first day of the next bimonthly sampling cycle.

K. Establishing Designated Areas (DAs) or Designated Work Positions (DWPs)

In some instances after completion of a sampling inspection, it may be necessary to establish additional DAs or DWPs for operator bimonthly sampling in order to ensure the health of miners working in the affected work area(s)/position(s). The following procedure will be applied to ensure that the work area(s)/position(s) are properly designated.

1. After each respirable dust sampling inspection, the results will be reviewed to determine if additional sampling entities must be established.
 - a. When a sample collected by the inspector is found to exceed 1.0 mg/m^3 or a reduced standard less than 1.0 mg/m^3 , and the sampling entity is not being adequately protected by dust control measures that are in place at another entity in the same area, a DA/DWP shall be established.
 - b. When an MMU uses belt air to ventilate the face areas, a DA shall be established in accordance with 75.350(b)(3), unless already required by a petition for modification. The intake air coursed through a belt conveyor haulage way shall be sampled at a location as stipulated in the petition for modification allowing the use of belt air or as stipulated in 75.350(b)(3). The DA sampling locations shall be maintained continuously during the sampling shift within the stated area.

2. When a new DA or DWP is to be established, the District Manager or his/her authorized representative will notify the mine operator in writing and identify the following:
 - a. the cassette number and sample concentration and, if applicable, the quartz percentage of the cassette(s) used to establish the entity as a DA or DWP;
 - b. the code the mine operator will use to identify the sample type for sampling purposes (Item 9 on dust data card) which shall be "Type 3" for DA and "Type 4" for DWP samples;
 - c. the codes the mine operator will use to correctly identify the MMU/DA/SA entity in question (Item 10 on dust data card) as listed below or as designated by the district:

DA Codes (Sample Type #3)

100-0 -- 199-0 Track Haulage
 200-0 -- 299-0 Belt Area
 300-0 -- 399-0 Trackless Haulage
 400-0 -- 499-0 Shops
 500-0 -- 599-0 Section Dumping Points
 600-0 -- 699-0 Rotary Dumps and Crushers
 700-0 -- 799-0 Miscellaneous
 800-0 -- 899-0 Intake Air
 900-0 -- 999-0 Roof Bolters

DWP Codes (Sample Type #4)

001-0 -- 099-0 Surface Mines
 900-0 -- 999-0 Surface Area UG Mines

- d. the occupation code the mine operator will use to identify the DWP (Item 11 on dust data card);
- e. the date that bimonthly sampling will begin for the newly established entity (this normally is the first day of the next bimonthly sampling period for DAs and DWPs); and

- f. requiring the mine operator to submit a short addendum to the approved ventilation plan that shows the location of the new DA to be sampled bimonthly, and the position of the sampling unit within the DA, including the type of dust controls that are to be maintained.
3. Enter the required information in the computer using MSHA Form 2000-142 on the first day of the next bimonthly sampling period. If the newly established entity is an intake air DA on a 1.0 mg/m^3 dust standard, Item 7B on MSHA Form 2000-142 shall be marked "Yes."

Examples:

1. The sample concentration of the roof bolter occupation on an MMU with double-split ventilation exceeds 1.0 mg/m^3 or the applicable standard, and the DO on the MMU and the roof bolter occupation are on different splits of air. Since the respirable dust level in the environment of the DO is not representative of the dust concentration to which the roof bolter is exposed and the dust control measures for the DO do not protect the environment of the roof bolter occupation, a DA will be established on the roof bolter.
2. A reduced dust standard is established for the roof bolter at an MMU with single-split ventilation. Since the dust standard of the roof bolter is significantly lower than the DO's and the environment to which the DO is exposed does not contain over 5 percent quartz, a DA will be established on the roof bolter.
3. A sample is taken on the highwall drill helper occupation on a reduced dust standard and is found to exceed the reduced standard. Since the highwall drill operator is established as a DWP (i.e., 001-0 384) but his or her duties require that the drill rig be operated from within the cab of the machine and the operator is not exposed to the quartz dust, the highwall drill helper occupation will be established as a DWP (i.e., 001-0 383) using the same surface area

identification number that was assigned to the highwall drill operator DWP.

4. The DWP will be established with the appropriate DWP number, identification of the occupation code and completion of the location description. The location description shall establish the type of work that the occupation must be performing while monitoring the DWP.

Example 1: A bulldozer operator (occupation code 368) is determined to be exposed to 1.705 mg/m³ of respirable dust and has a quartz level of 10.0% while performing the task of pushing rock at a surface mine. Other bulldozers surveyed were not pushing rock and did not have respirable dust levels exceeding 1.0 mg/m³ and quartz exceeding 5.0%. The DWP would be established as:

DWP:	001-0
Occupation Code:	368
Location:	Bulldozer pushing rock

If the operator assigns another bulldozer to pushing rock, then that bulldozer pushing rock could be monitored as the DWP.

Example 2: A contract highwall drill operator (occupation code 384) is determined to be exposed to 1.224 mg/m³ of respirable dust and has a quartz level of 20.0% while performing the task of drilling at a surface mine. The DWP would be established as:

DWP:	001-0
Occupation Code:	384
Location:	Highwall drill drilling blast holes

The DWP would be established such that any contract drill brought onto the site to perform this task would be the DWP.

Specific pieces of mining equipment, through listing of the serial number or company number, will only be tied to the DWP when there are multiple pieces of the same equipment being used

at the mine site performing the same tasks. The operation/duties performed that resulted in the need to establish the DWP will be the primary determinate of the location where to monitor the potential exposure.

Example of multiple pieces of equipment: A haul truck driver is found to be exposed to 1.607 mg/m³ while hauling coal from the pit to the preparation plant in truck # 555. There are 4 additional haul trucks that haul coal from the pit to the Preparation plant. The other truck drivers are not exposed to dust concentrations exceeding 1.0 mg/m³. The

DWP would be established as:

DWP:	001-0
Occupation code:	376
Location:	Truck driver hauling pit to plant Co. truck #555

If truck #555 is removed from the mine property, the DWP will be abandoned.

L. Removing DAs or DWPs from Sampling Status

It may be necessary to withdraw the designation of a work position or an underground area for operator bimonthly sampling upon finding that the operator is able to maintain continuing compliance with the applicable dust standard. To ensure that the proper work positions or areas are removed from bimonthly sampling and that miners are not being overexposed, apply the following procedures:

1. Before conducting a respirable dust sampling inspection, the inspector shall review the computer report MSM035, *Review List For Potential Removal From Sampling*.
2. Identify the DAs (excluding those required by a petition for modification) or DWPs that have the potential to be removed from required operator bimonthly sampling.

3. Determine what dust control measures are in place in the environment of the DA or DWP being sampled.
4. For those entities identified on MSM035, collect a sample from the DA or DWP.

For DWPs, if the sample concentration is at or below 1.0 mg/m³ when the entity is on a standard of 2.0 mg/m³ or at or below the applicable standard when the entity is on a standard of 1.0 mg/m³ or less, the District Manager shall notify the mine operator in writing that the entity is being removed from the bimonthly sampling status.

However, if the entity is a DA, the District Manager has the discretion to remove the entity from bimonthly sampling, provided the operator was able to maintain continuing compliance with the applicable dust standard during the previous six bimonthly sampling cycles and this was verified by an MSHA sample taken during the same period. A minimum of five (5) valid respirable dust samples - combination of MSHA and operator samples - must be available during this time period. The notification shall include the following information:

- a. the cassette numbers and sample concentrations of all operator and MSHA samples that were used in making the determination;
 - b. identity of the type of sampling entity, DA or DWP;
 - c. the entity ID (Item 10 on Dust Data Card); and
 - d. the occupation code (if applicable) of the entity in question.
5. Complete MMU/DA/DWP form (MSHA Form 2000-142) and enter the required information in the computer. This is to update the sampling status of the entity and prevent the computer from generating erroneous "Failure-to-Sample" advisories for the entity in question. Therefore, if a DA or DWP is no longer required to be sampled by the operator, the entity shall be placed in "D" status (Sampling not required) by checking Item 6D on the form.

M. Establishing a Reduced Respirable Dust Standard

In some cases, it may be necessary to establish a reduced standard for an entity when a sample contains more than 5

percent quartz or more than 10 percent quartz for Part 90 miner samples. Apply the following procedures to ensure that miners are protected from breathing respirable dust containing quartz levels in excess of 5 percent.

1. The following inspector samples will be analyzed for quartz:
 - those with at least 0.200 mg weight gain collected from the environment of a DO, roof bolter, DA, DWP, NDE, or Part 90 miner; and
 - those with at least 0.100 mg weight gain collected from these occupations: blaster/shooter/shotfirer (code 307), bulldozer operator (code 368), high lift operator/front end loader (code 382), highwall drill helper (code 383), highwall drill operator (code 384), refuse/backfill truck driver (code 386) and from any other occupations identified by the inspector.

If the weight gain is less than 0.450 mg, the results will not be used to initiate the dust standard setting process unless the sample contains at least 25 micrograms (0.025 mg) of quartz.

2. If any sample from a DO, DA, DWP, or NDE (NDO, NDA, or NDWP) on a 2.0 mg/m³ dust standard contains more than 5 percent quartz, the mine operator will be notified via computer message of the option to collect a respirable dust sample from the affected area or occupation within 7 calendar days after receipt of the computer message.

NOTE: If from an NDE, the entity must first be established in "Q" status by MSHA before a computer message is generated informing the operator of the MSHA sample results and the option to collect a sample for quartz analysis. Operator optional samples will be used only for purposes of quartz analysis to adjust the standard and not for compliance determinations. Optional samples may be collected over more than one shift if there is reason to believe that sampling for one shift will not produce sufficient weight gain for quartz analysis (at least 0.45 mg on operator collected samples). Mine operators may also pre- and post-weigh the entire cassette package to determine whether it contains sufficient dust for quartz analysis. However, the cassette package shall not be opened. All optional samples must be collected in accordance with Parts 70, 71, or 90 (with the above exceptions) and transmitted

to MSHA within 24 hours after the end of the sampling shift(s).

- a. If an optional sample is received by MSHA within 10 calendar days after its collection, MSHA will compare the results of quartz analysis from MSHA's sample and the operator's sample. The District Manager may grant the operator additional time to submit samples under these procedures due to idling of the mine or other unforeseen circumstances.
 - b. If the percent of quartz found in the MSHA sample differs by 2 percent or less from that found in the operator's sample (for example, if the MSHA sample contains 10 percent quartz, the operator's sample would differ by 2 percent or less if it contained either 8 percent or 12 percent quartz), the quartz percentages will be averaged and the result will be used to establish the reduced dust standard for the affected areas or occupation.
 - c. If the percent of quartz found in the MSHA sample differs by more than 2 percent from that found in the operator's sample, the operator will be notified by computer message and afforded the opportunity to collect a second optional sample from the affected area or occupation within 7 calendar days after receiving such notification. If the quartz level of the operator's first optional sample differs by more than 5 percent from that of the MSHA sample, the District Manager should request that the mine operator inform MSHA when the second optional sample will be collected. An inspector should be present to observe collection of the second optional sample.
 - d. If the operator's second optional sample is received within 10 calendar days after its collection, MSHA will determine the percentage of quartz present in the sample; and the result will be averaged with the previous two samples -- the MSHA sample and the operator's first optional sample.
 - e. If the average percent quartz in the three samples is greater than 5 percent, the average result will be used to determine the applicable standard.
3. If the operator's first optional sample is not collected in accordance with sampling procedures under

Parts 70, 71, or 90, not received within 10 calendar days following its collection, or if such optional sample is submitted with weight gain insufficient for quartz analysis, the percentage of quartz found in the MSHA respirable dust sample will be used to set the applicable standard. If this occurs with the operator's second optional sample, the higher percentage of quartz in the MSHA or operator samples will be used to set the standard.

4. When MSHA collects respirable dust samples from DOs, DAs, DWPs, Part 90 miners, and NDEs that are already on a reduced dust standard, the applicable standard will be adjusted in the following manner:
 - a. If the percent of quartz differs by 2 percent or less from the previously-established quartz value, these two values will be averaged. The result will be used to determine the applicable dust standard for the affected area or occupation.
 - b. If the percent of quartz in the MSHA sample differs by more than 2 percent from the previously established quartz value, MSHA will notify the operator, via computer message, of the option to collect a respirable dust sample from the affected area or occupation within 7 calendar days after receiving MSHA notification. Preceding paragraphs 2(a) - (e) and 3 will then be followed,
5. Approximately every 6 months, MSHA will automatically conduct quartz analysis of one valid operator bimonthly sample with sufficient weight gain that was submitted under Parts 70, 71, and 90 from DOs, DAs, DWPs, and Part 90 miners on reduced standards.
 - a. If the percentage of quartz found in a respirable dust sample submitted by the operator for a DO, DA, DWP, or Part 90 miner differs by 2 percent or less from the previously-established quartz value used to set the dust standard for that occupation or area, it will be averaged with the previously-established value. The result will be the basis for applying an adjusted dust standard to the affected area or occupation.
 - b. If the percentage of quartz found in the operator's sample differs by more than 2 percent from the previously-established quartz value for that occupation or area, MSHA will notify the operator via computer message of the option to

collect a respirable dust sample from the affected area or occupation within 7 calendar days after receiving MSHA notification.

- c. If the sample is received by MSHA within 10 calendar days of its collection, MSHA will determine the percentage of quartz present in the sample and average the result with previously-established quartz value for the affected area, miners, or occupations and with the quartz value of Parts 70, 71, or 90 samples. Based on the average of these three quartz values, the respirable dust standard will be adjusted.
 - d. If the operator's optional sample is not collected in accordance with Parts 70, 71, or 90, is not received within 10 calendar days following its collection, or is submitted with insufficient weight gain for quartz analysis, the previously-established respirable dust standard will remain in effect.
6. When results of quartz analysis indicate that a change may be required in the dust standard for a nondesignated occupation, area, or work position, the following procedures apply:
- a. All new NDEs added to the data base for the purpose of quartz analysis only must be entered with a status of "Q" and with the status date that is equal to or prior to the date the sample was taken.
 - c. Once established in "Q" status, the computer will notify the operator that a "temporary" entity has been established and of the option to submit a sample for quartz analysis.
 - c. Upon completion of quartz processing and after a new dust standard is determined, the District Manager will be notified via computer message of the results of the quartz analysis. The District Manager will then determine whether or not to retain the entity in "temporary" status or establish it as a permanent entity in sampling status. If the latter option is selected, the entity will be placed in "P" status via the MMU/DA/DWP form. The computer will then send a message to the operator detailing the results of the quartz analysis, informing the operator that

the entity must be sampled on a bimonthly basis, and indicating the dates of the first bimonthly cycle and the applicable standard. The entity will be placed in producing status at this time.

- d. If the District Manager determines that the entity should not be made a permanent entity, he will place the entity in "R" status and the quartz history will be maintained on a "dead DA/DWP" file which can be obtained via an overnight query. The computer will then send a message to the operator of the results of the quartz analysis, and notify him that he will not be required to submit bimonthly samples on this entity. In the case of a roof bolter that is not a DA, the standard of the DO will be noted as the applicable standard. The temporary entity will then be deleted from the data base by the computer.

NOTE: If the district desires to track for its own sampling purposes a nondesignated work position that did not meet the criteria for a DWP but was on a reduced dust standard, it can do so by establishing it as a DWP in "D" status.

- e. If the District Manager fails to respond with a "P" or "R" status within 7 days, a reminder will be sent. A monthly quality control report, MSM053, is generated by MSIS showing the mines and entities that have quartz samples pending over 30 days due to delay in establishing the entity on the data base.
 - f. The operator should be informed that DAs in "P" or producing status should be included in an addendum to the approved ventilation plan.
 - g. Bimonthly sampling for an operator under the new standard normally begins on the first production shift in the next bimonthly period following the date of notification.
7. When a mine operator or miners' representative requests a quartz reevaluation based on but not limited to justification listed in paragraph L.9. (below) and MSHA elects to conduct such reevaluation, the inspector will first determine if the applicable dust standard has been exceeded in accordance with Section III.G. of this chapter before submitting the sample for quartz analysis. If the entity is in citation processing, the violation must be abated before the entity can be

sampled by MSHA. When sampling for quartz purposes, the inspector should collect samples not only from the occupation(s) originally requested but from other occupations that normally would be sampled during a respirable dust spot inspection.

8. MSHA's procedures for applying a reduced standard will parallel those of issuing citations on an MMU. This includes keeping the reduced standard, as well as any citations issued for exceeding the reduced standard, with an entity when it moves to a new location. The following examples address some situations that may occur as sampling results are received and entities move to new locations.
 - a. An MMU is operating in location 1 under a reduced standard and is moved to location 2 (for example, 3000 feet away). The reduced standard remains in effect on that MMU in location 2. If subsequent sampling by the operator indicates a violation of the reduced standard at location 2, the inspector issues a citation. However, when sampling by MSHA indicates a violation, the inspector shall refer to paragraph G.2. of this chapter.
 - b. An MMU is operating in location 1 under a reduced standard and a citation is in effect. Mining is completed in location 1 and the MMU is moved to location 2 (for example, 3000 feet away). The citation remains in effect until the violation is abated.
9. Reevaluation of an entity's airborne quartz levels may become necessary because of the following.
 - a. **Changing conditions** - such as cutting more or less roof or bottom, variation in the coal seam parting, etc. - have resulted in increased or decreased quartz content.
 - b. **Improved dust controls** - mine operator requests MSHA to resample because of improved mining methods, ventilation controls, or engineering controls.
10. During the reevaluation, the inspector should look for possible sources that may be the cause of the excessive quartz and include this in the inspection notes along with other information on the types of controls in use and mining conditions being encountered. This can be

used to compare operating conditions observed in subsequent surveys.

Appendix A

Respirable Dust Sampling of Contractors Employees and Construction Sites at Coal Mines

Purpose

The Secretary's Advisory Committee On The Elimination Of Pneumoconiosis Among Coal Mine Workers was charged to make recommendations for improved standards, or other appropriate actions, on permissible exposure limits to eliminate black lung and silicosis; the means to control respirable dust levels; improving monitoring of respirable dust levels and the role of the miner in that monitoring; and the adequacy of the operator's current sampling program. The Advisory Committee issued a final report on November 14, 1996, in which recommendations were made to improve the existing program to control respirable coal mine dust and silica in U.S. coal mines. One recommendation relates to providing protection for contractor employees and construction workers. The Committee found that MSHA has not focused on this portion of mine workers with regard to dust control plans, training, hazard surveillance and compliance activities.

Procedure Instruction

- a. The Advisory Committee recommended that MSHA should develop an initiative to ensure the protection of mine construction workers, contract drillers, and other contract employees from respirable coal mine dust and silica exposures. During MSHA inspections, inspectors shall collect respirable dust samples of contract workers potentially exposed to coal mine dust while on mine property. Due to the erratic nature of contract work at mine sites, inspectors should determine if an operator uses contractors at various times and maintain information on the contractor's presence on the mine site so that when possible, sampling can be conducted at times when the contractor's employees are present on the same site. Although respirable dust samples must be collected over the full shift, there is no requirement for a minimum production level for the sample to be considered valid. Some contract work is of long duration, such as shaft sinking or contract mine maintenance. These activities shall be sampled by MSHA personnel to establish sampling entities, evaluate quartz levels and determine compliance with the applicable standards. Appropriate dust control plans or amendments to current plans shall be required where necessary to maintain respirable dust levels at or below the applicable standard. Contractors performing work on coal mine property must comply with MSHA regulations under 30 CFR. Among other things, this includes required training, maintaining the environment at or below the applicable dust standard, sampling for compliance/non-compliance, complying with dust control plans and reporting occupational injuries/illnesses.

Appendix B

Respirable Coal Mine Dust Samples Containing Quartz in Excess of 100 Micrograms Per Cubic Meter ($\mu\text{g}/\text{m}^3$)

Purpose

The Secretary of Labor's Advisory Committee on the Elimination of Pneumoconiosis Among Coal Mine Workers was chartered to "... make recommendations for improving the program to control respirable coal mine dust in underground and surface mines in the United States." On November 14, 1996, the Committee submitted its report in which it recognized that "the potential for exposure to silica in coal mines is substantial." The report stated that there was consensus of the Committee that miners exposed to silica in excess of the current standard for long durations are at risk of silicosis. The report also noted that some miners continue to work in silica concentrations of in excess of $100 \mu\text{g}/\text{m}^3$." Accordingly, the Advisory Committee recommended that efforts be made to target enforcement actions to reduce such exposures and conduct more extensive silica hazard surveillance. This program implements part of that recommendation by stressing that increased emphasis should be replaced by all CMS&H personnel on the examination of dust controls when $100 \mu\text{g}/\text{m}^3$ ($0.100 \text{ mg}/\text{m}^3$) or more of quartz is present in respirable coal mine dust samples.

Procedure Instruction

30 CFR §70.101 and §71.101 require that respirable dust levels be reduced if the respirable dust in the mine atmosphere contains more than 5 percent quartz. Reducing the $2.0 \text{ mg}/\text{m}^3$ respirable coal mine dust standard when more than 5 percent quartz is present is intended to provide miners with an environment containing less than $100 \mu\text{g}/\text{m}^3$ of quartz.

MSHA is aware there may be instances when miners can be exposed to more than $100 \mu\text{g}/\text{m}^3$ of quartz even when the operation is in compliance with the respirable dust standard that is in effect. Breathing excessive amounts of crystalline silica (quartz) can cause a serious and sometime fatal respiratory disease called "silicosis," according to the National Institute for Occupational Safety and Health. As a result, MSHA is instituting a special emphasis program to investigate operations where miners are exposed to $100 \mu\text{g}/\text{m}^3$ or more of quartz.

Procedures have been initiated to notify MSHA personnel of the quartz content in $\mu\text{g}/\text{m}^3$ on samples analyzed for quartz. The Pittsburgh Safety

and Health Technology Center (PS&HTC) will send out a weekly report via E-mail to each District Health Supervisor and to the Division of Health listing the inspector and operator samples that have 100 $\mu\text{g}/\text{m}^3$ or more of quartz present. This information should be compared to the information retrieved from the dust subsystem of the Management Information System. All samples with elevated quartz levels are of concern; however, samples with excess quartz that comply with the applicable standard are of particular concern. When these samples are identified, based on staff availability, an inspector should conduct a follow-up inspection to determine the cause of the elevated quartz level. These inspections can be integrated into any enforcement activity at the mine or by scheduling the next regular inspection (E01) at the mine as soon as practical. When the operation is in non-compliance with the applicable respirable dust standard, MSHA personnel should take appropriate enforcement action.

Samples collected on highwall drills and roof bolters containing 100 $\mu\text{g}/\text{m}^3$ or more of quartz are of particular concern. The drill dust standard contained in 30 CFR §72.620 requires effective dust controls to be utilized when drilling on the surface. 30 CFR §72.630 requires effective dust controls to be utilized when drilling underground. Inspection personnel can visually observe if effective dust controls are in place and functioning properly on surface and underground drills. If follow-up inspections show that effective dust controls are either not installed or not functioning properly, appropriate enforcement action should be taken.

Other occupations associated with surface and underground operations may also be in compliance with the applicable respirable dust standard but contain more than 100 $\mu\text{g}/\text{m}^3$ of quartz. When such entities are identified, they should be investigated to determine the reason for the high levels of quartz. Inspection personnel may rely on visual observations, interviews of miners, repeat sampling, or other appropriate means to identify the problem.

Appendix C

Procedures for Assessing Compliance with §72.620 - Drill Dust Control at Surface Coal Mines and Surface Areas of Underground Coal Mines

Purpose

The purpose of this document is to provide additional guidance to enforcement personnel for assessing compliance with §72.620, which addresses means of controlling exposure to drill dust. Specifically, this document is intended to (1) explain how the surface drill dust control standard is to be enforced; (2) define the operating conditions under which cyclonic dust collectors are an accepted drill dust control; and (3) establish the minimum criterion for determining if a highwall drill is equipped with an environmental cab.

Instructions

Section 72.620 provides that drill holes shall be collared and drilled wet or that other effective dust control measures shall be used when drilling non-water-soluble material. This standard requires operators to provide effective drill dust control, regardless of exposure. Consequently, mine operators will be cited when a dust control is missing, not maintained, defective, or ineffective, generally based on a visual inspection.

How the surface drill dust control standard is to be enforced.

MSHA will enforce the drill dust control standards as explained in the agreement reached between the American Mining Congress and the Secretary of Labor on May 26, 1995, as set out in paragraphs 1 through 6 below. In response to inquiries by MSHA inspectors, paragraph 1 below also discusses the phrase "collaring a hole." The following will guide enforcement personnel in determining the appropriate action to take in specific situations with regard to enforcement of §72.620.

1. The operator is in compliance if the drill holes are collared and drilled wet or other effective dust control measures are used. According to the *Dictionary of Mining, Mineral, and Related Terms*, published by the former U.S. Bureau of Mines in 1968, "collaring a hole" means "the formation of the front end of a drill hole, or the collar, which is the preliminary step in drilling to cause the drill bit to engage in the rock." Thus, collaring is the preliminary step in drilling when the drill bit initiates the drill hole, and collaring of the hole is complete once the drill bit has entered the earth. The depth of the hole once collaring is complete would be the length of the actual bit, which is approximately 12 inches. The duration of collaring should never exceed one minute. Therefore, the dust generated when starting to drill does not constitute a violation of §72.620, until after collaring has been completed.

2. The operator is not in compliance if drill dust controls are not installed.
3. The operator is not in compliance if drill dust controls are installed but are not operating.
4. The operator is not in compliance if a drill dust control is installed and operating but: (a) the control is operating improperly; (b) the control has not been maintained properly; (c) the control is not an effective control for the condition or location in which it is operating (e.g., bailing air volume exceeds the dust collector volume); (d) a necessary dust control component is missing, broken, or malfunctioning; or, (e) the skirt is not close enough to the ground to confine dust at the hole.
5. If an operator's drill dust controls are properly installed and maintained, and appear to be operating properly after inspection of all components of the dust control system but there is still visible dust, no citation will be issued at that time. Instead, the MSHA inspector will take the following actions:
 - a. The MSHA inspector will request assistance from persons with technical expertise, either in the MSHA District Office or from MSHA's Pittsburgh Safety and Health Technology Center (PSHTC), in evaluating the specific drill and its operation at the mine. If MSHA's district personnel with technical expertise or the PSHTC personnel determine that the drill dust controls are operating improperly, or that the controls have not been maintained properly, MSHA will issue a citation for violation of the drill dust control standards.
 - b. However, if the evaluation by MSHA's district or technical center personnel identifies a manufacturing or design defect or flaw in the drill dust control mechanism or device or reveals that the drill dust control device is being used in a manner that exceeds or is inconsistent with its design capacity, MSHA will inform the operator of its findings and give the operator a reasonable time to correct the situation before a citation is issued.
 - c. Finally, if the evaluation by MSHA's technical personnel does not identify any manufacturing or design defects or flaws or any use of the drill dust control mechanism or device in a manner or capacity

for which it was not designed, MSHA will not issue a citation.

6. In addition, as explained in the preamble to the final rule, in cases where it is not obvious that the dust control is effective, MSHA also has the option to collect dust samples from areas where miners are exposed to drill dust to evaluate the effectiveness of dust controls. If samples exceed the applicable dust standard, MSHA will issue a citation for exceeding the permissible exposure limit. If the samples do not indicate an overexposure, no citation for exceeding the exposure limit would be issued.

Because of the need to control drill dust at the source, effective drill dust controls do not include administrative controls, which control exposure by limiting the amount of time a miner is in a contaminated atmosphere, or personal protective equipment.

Even though wet drilling is the preferred means to control drill dust at the source, §72.620 permits the use of effective alternative dust control measures. Dry dust collectors of either the filter or cyclonic type have been used at some mines. Effective filter-type dry dust collectors have been determined to provide the same level of drill dust control as an effective wet-drilling system. Of these two classes of dust collectors, the National Institute for Occupational Safety and Health (NIOSH) considers the cyclonic type as unsuitable for providing sufficient control of respirable dust.¹ For this reason, the use of cyclonic dust collectors as the sole means of drill dust control will not be accepted as meeting the requirements of §72.620, except under certain operating conditions where cyclonic-type dust collectors can be effective in controlling dust.

Operating conditions under which cyclonic dust collectors are an accepted drill dust control.

Cyclonic dust collectors are not designed as high-efficiency collectors of very small dust particles and tend to discharge significant quantities of visible dust (respirable and nonrespirable) into the atmosphere. In the case of a more commonly used cyclonic dust collecting system, such as the Rotoclone system, the collector discharge typically goes through a short section of pipe where it is directed vertically so that the prevailing winds disperse the dust away from the drilling operation. Since this system relies on ambient wind on the drill bench to disperse the emitted drill dust, both MSHA and NIOSH consider the Rotoclone dry-dust collection system to be the least effective drill dust control system.

¹ Page, S.J. and J.A. Organiscak. *Taming the Dust Devil - An Evaluation of Improved Dust Controls for Surface Drills using Rotoclone Collectors*. Eng. and Min. J., Nov. 1995, pp. 30-31

Although this type of dust collector may provide protection for a drill operator under some operating conditions, it does not protect other surface miners working at the drill site. As a result, the use of cyclonic dust collectors as the sole means of drill dust control does not normally satisfy the requirements of §72.620. MSHA will accept a cyclonic dust collector as effective only under the following conditions: (1) the driller is the only individual that potentially can be exposed to the drill dust; (2) the dust cloud emitted by the cyclonic dust collector is always carried away from the driller; and (3) the drill is used only where conditions (1) and (2) exist.

In addition to dry dust collectors, MSHA will also consider positive-pressure enclosures (environmental cabs) on surface drills to be effective in controlling exposure to drill dust if they are properly designed and maintained and the only person(s) exposed to the drill dust is inside the cab. Such enclosures can also offer cost-effective means of reducing exposure to other environmental hazards such as noise and heat stress. Listed below are the minimum criteria for determining if a particular drill is equipped with an environmental cab and for assessing its adequacy.

Minimum criterion for determining if a highwall drill is equipped with an environmental cab.

CMS&H considers positive-pressure enclosures (environmental cabs) on surface drills to be an effective control under §72.620 if they are properly designed and maintained to withstand the drilling environment and the only person(s) exposed to the drill dust is located inside the cab.

To be classified as an environmental cab, the cab's interior must be always pressurized (positive pressure relative to the outside) with filtered air under all conditions of heating, ventilating, and air conditioning to prevent drill dust from entering the cab. That is, all outside intake air used to pressurize the operator cab must pass through a filtering system that captures particulate matter. If pressurized, the direction of air movement should always flow from the cab toward the outside, which can be checked using chemical smoke tubes. This test should be performed under normal operating conditions with doors and windows in the closed position.

To determine if the pressurized cab is equipped with an effective air filtration system that is being properly maintained will require the inspector to sample the environment of the highwall drill operator in accordance with established procedures during each 6-month respirable dust sampling inspection at the mine. This is necessary for two reasons.

1. First, the filter(s) typically used for filtering the outside intake air is not marked to enable the inspector to identify the type of media employed, its classification (e.g., designed to remove vapor, particulate, or vapor and particulate), or its efficiency rating.

2. Secondly, even if the filter is clearly marked, neither the filter's performance as installed or its current condition can be adequately evaluated through visual inspection. Even if the inspector observes dust inside the cab, this by itself is insufficient to conclude that the cab is equipped with an ineffective filtration system, because the dust could be due to inadequate housekeeping.

Therefore, since the objective is to assess the adequacy of the cab's filtration system, the sampling device must remain inside the cab during the entire sampling shift. If overexposure is found, the operator will be cited under either §71.100 or §71.101. Any dust control plan submitted following termination of the citation shall specify the dust control measures used to abate the violation. If the operator elects to use a more efficient particulate air filter to achieve compliance, the plan shall describe the type of filter to be used and how it will be maintained to assure that respirable dust levels stay continuously within the applicable standard inside the cab. Additionally, consideration should also be given to including in the plan, provisions requiring the cab's interior to be periodically cleaned to maintain it relatively dust-free.

All inspector highwall drill samples having sufficient weight gain are also analyzed for quartz content. If those results indicate that the standard should be reduced further, the enclosed cab may need to be evaluated again to assess its adequacy under the lower standard, unless the measured dust concentration is less than or equal to the lower standard.

If other miners are working in the immediate vicinity of the drill (within 100 feet) and they are being exposed to the dust, the drill would be in noncompliance with §72.620 because environmental cabs do not control drill dust at the source.

Appendix D

Inspection Procedures for Assessing Compliance With §75.362(a)(2)- Respirable Dust Control On-shift Examination and §75.362(g)(2)- Respirable Dust Control On-shift Certification

Purpose

The Secretary of Labor's Advisory Committee on the Elimination of Pneumoconiosis Among Coal Mine Workers was chartered to "... make recommendations for improving the program to control respirable coal mine dust in underground and surface mines in the United States." On November 14, 1996, the Committee submitted its report in which it recognized the importance for mine operators to examine respirable dust control parameters on a regular basis. This document establishes inspection procedures for 30 CFR §75.362(a)(2) and §75.362(g)(2).

Instructions

§75.362(a)(2) requires the operator of an underground coal mine to perform an on-shift examination of respirable dust control parameters specified in the approved mine ventilation plan. The mine operator may designate a person or persons to conduct this examination. Such persons must be familiar with the respirable dust control parameters specified in the mine ventilation plan for the area they have been designated to examine and must have the instruments necessary to determine that the dust controls are functioning properly.

The provisions of §75.362(a)(2) and §75.362(g)(2) do not require the on-shift examination of respirable dust control parameters to be conducted by a certified person; however, they do require a certified person to direct the respirable dust control on-shift examination and certify by initials, date, and time that the examination was made. MSHA expects that if the certified person is directing this examination, the person will be present at the site of the examination while it is being conducted. The standard does not specify where the mine operator should document this type of certification. However, in order to ensure that the miners on the section can verify that the required on-shift examination was made, the certification should appear at or near a place on the section where the miners would be able to make such a determination.

When a shift change is accomplished without an interruption in production, such as when miners change out at the face, i.e. "hot seat," the required examination is to be made within 1 hour after the shift change. Some of the dust control parameters can be evaluated without ceasing production. If the evaluation of the parameters cannot be determined through a continuous monitoring system or established operating relationship, production must cease in order for the examiner to make these determinations. In those instances when there is an interruption in production during the shift change, such as when miners leave the section before the oncoming shift arrives, or

the section was not producing on the previous shift, the required examination must be made before production begins on the section.

The required examinations shall be sufficient to ensure that all dust control parameters, specified in the approved mine ventilation plan, are in place and functioning properly. Some of the parameters may only require a visual observation to ensure the parameters are in place and functioning properly. However, other parameters such as air quantities, air velocities, spray nozzle water pressures, and water system flow rates require measurements in order to ensure they are functioning properly.

All deficiencies identified as a result of the on-shift examination of the dust control plan parameters shall be corrected before production begins or resumes. The standard does not require a mine operator to record the identified deficiencies unless a determination has been made that the deficiencies create a hazard for the miners. In such cases, the mine operator would be required to record the identified hazard(s) under the requirements of §75.363 Hazardous Conditions; Posting, Correcting, and Recording.

During each inspection or investigation activity being conducted on a producing mechanized mining unit (MMU) the inspector shall determine if the coal mine operator conducted the required on-shift examination of the dust control parameters stipulated in the mine ventilation plan. This determination should be made as soon as practical after the working places are checked for imminent dangers.

When an inspector is conducting a health-related inspection activity (collecting respirable coal mine dust samples, monitoring the mine operator's sampling program, or conducting a respirable dust technical investigation) he/she shall complete in its entirety, MSHA Form 2000-86, July 93 (revised). A separate MSHA Form 2000-86 shall be completed for each producing MMU and shift that the inspector visits.

A copy of the completed MSHA Form 2000-86 shall be filed with the appropriate inspection or investigation report as currently required.

During these inspections or investigations, inspectors must evaluate and record the respirable dust controls in use. This includes their placement, condition, and ability to actually control the dust levels.

All primary section dust generating sources, such as continuous and longwall mining machines, roof and rib bolters, coal drills, cutting machines, rock dust equipment, and the section loading point must be inspected for compliance with the respirable dust control parameters specified in the plan. The inspection shall include an examination of airflow quantities and velocities, water pressures and flow rates, water spray size and orientation, section ventilation and dust control device placement, and any other dust controls specified in the mine ventilation plan. This may include, but is not limited to, work practices, physical conditions, and enclosures.

The actual airflow delivered by scrubbers is critical to the performance of dust control and ventilation systems. Coal mine inspectors shall measure the airflow of scrubbers and dust collectors during respirable dust inspections and investigations. Mine ventilation plans that include air-directing spray systems, such as shearer clearer and fan sprays, usually specify spray angles. CMS&H does not expect inspectors to measure precise spray angles during each respirable dust inspection or investigation. However, inspectors shall determine that sprays are directing the ventilation as stipulated in the plan. A sketch of the water spray system should be provided in the space available on Form 2000-86. The inspector shall also determine the water pressure and flow used on the dust control system. These may be measured indirectly by the mine operator based on a relationship or remote sensor. The inspector shall determine, during the inspection, if such indirect method is accurate and take appropriate enforcement action if such method is inadequate.

There are a number of ventilation requirements in Part 75 Subpart D-Ventilation that have a significant effect on respirable dust levels and that are not required to be addressed in the mine operator's approved mine ventilation plan since they apply generally to all coal mines. Accordingly, mine operators are not required by §75.362(a)(2) to certify, prior to beginning production, that these controls, which are not included in the plan, are in place and properly functioning. However, mine operators are required to maintain compliance with these provisions at all times. If an inspector determines that the mine operator is not maintaining compliance, the inspector shall take appropriate enforcement action.

When an inspector determines that the mine operator has failed to conduct the required on-shift examination of the dust control parameters, or has failed to complete the examination prior to beginning or resuming production, the inspector shall take appropriate enforcement action under §75.362(a)(2). If the examination was completed but the person directing the on-shift examination does not certify by date, time, and initials that the examination was conducted, appropriate enforcement actions shall be taken under §75.362(g)(2).

If the inspector determines that the mine operator failed to correct any identified deficiencies found during the required examination prior to beginning or resuming production, the inspector shall take appropriate enforcement action under §75.362(a)(2). The inspector shall include the appropriate provision of the mine ventilation plan that was not being complied with in the narrative of the violation.

In addition to the on-shift requirements required by this standard, many ventilation plans contain more frequent examination requirements for the dust controls at various times during the mining cycle. The mine operators must continue to comply with the provisions as outlined in the mine ventilation plan. If the inspector determines that the mine operator failed to maintain compliance with the requirements of

the approved mine ventilation plan, the inspector shall take appropriate enforcement action under §75.370(a)(1). The inspector shall include in the violation narrative, the appropriate parameter(s) of the approved mine ventilation plan that were not being complied with.

Appendix E

Maintenance of Dust Controls on Roof Bolters and Machine-Mounted Dust Collectors on Continuous Mining Machines

Purpose

On November 14, 1996, the Advisory Committee on The Elimination of Pneumoconiosis Among Coal Mine Workers submitted its report to the Secretary of Labor recommending actions that should be taken to improve the current MSHA program to control respirable coal mine dust.

In that report, the Advisory Committee recognized that there continues to exist a "significant silica exposure hazard in coal mining, especially for some operations such as roof bolting." The Committee also noted a substantial potential for silica exposure among continuous miner operators and selected other occupations. Accordingly, the Advisory Committee recommended that efforts be made to target enforcement actions to reduce such exposures. This document implements part of that recommendation by stressing that increased emphasis should be placed by all CMS&H personnel on the examination of dust controls on roof bolters and machine-mounted dust collectors (scrubbers) on continuous mining machines.

Instruction

Environmental control measures continue to be the primary means of maintaining compliance with respirable coal mine dust levels in the mine atmosphere. Inspection personnel are required to examine respirable dust control parameters as part of regular health and safety inspections (E01). These controls are also checked during technical sampling and non-sampling inspections. This document outlines the areas which should be examined to properly inspect these controls. It is imperative that these controls be properly installed and maintained. Dust controls on roof bolters and machine-mounted dust collectors on continuous mining machines are two primary engineering controls utilized by mine operators to reduce respirable coal mine dust in the active workings of the mine environment. Roof bolting machines normally utilize either dry dust collectors or wet drilling methods. Both methods have been shown to be effective in controlling the dust generated from drilling holes for roof bolts.

Dry dust collection systems on roof bolters have numerous components critical to effective operation that must be regularly examined. Inspection of the dry dust collector should include an examination of the seals around the dust box, the mechanism utilized to keep the door of the dust box secure, the hoses from the drill pod to the dust box, the hoses from the dust box to the vacuum pump, and the hoses from the pump to the mufflers to ensure that there are no holes or leaks. If these components are not maintained, a violation of §72.630(b) should be cited.

The muffler is an excellent barometer for indicating whether the operator is maintaining the dry dust collector properly. Visual observations can be made on the clean side of the dry dust collector to determine if the filter has been damaged or bypassed. If dust is present on the inside of the muffler exhaust, the filter associated with the dry dust collector has been bypassed. When this occurs, the system should be thoroughly cleaned from the exhaust back to the filter. If dust is not present on the inside of the muffler exhaust, the system should still be checked. The filter should be checked for holes and removed to check the seal between the filter and the exhaust. If the filter has holes or the seal is missing or damaged, the dry dust collector is not being properly maintained. A violation of §72.630(b) exists if these conditions are observed.

The vacuum pressure of the dry dust collection system should also be checked. Pressure readings at the drill pod can be taken and these readings compared to the manufacturer's specifications. If pressure readings cannot be taken, the inspector can still check the system by blowing smoke or sprinkling rock dust over the inlet at the drill pod and observing if the smoke or dust is captured by the system. If the vacuum associated with the dry dust collector is not maintained, a violation of §72.630(b) should be cited.

Emptying the roof bolter dry dust collector box is important in limiting exposures to drill dust. This dust may routinely contain a high quartz content. Mishandling of such dust can contaminate the section ventilating air, increasing the potential exposure to excessive quartz levels. In order to address this problem, the method utilized to empty the dust box and the location where this process takes place should be addressed in the approved ventilation plan. If the section or roof bolter is on a reduced standard, incorporating such procedures in the approved plan is even more important. If these procedures are contained in the approved plan and the operator does not follow these procedures, a violation of §75.370(a)(1) should be cited.

Some roof bolters are equipped with an automatic dump box. These units have been found to have improperly fitting filters which sustain damage when the door closes. The damage allows the dust to bypass the filter and be introduced into the working environment. The failure to maintain the dust collection system as approved is a violation of §72.630(b).

Wet drilling methods have fewer working components and therefore require less maintenance. However, it is still imperative that the wet drilling system be properly installed and maintained. The water delivery system should be checked to ensure no leaks are present that would prohibit sufficient water from reaching the drill steel. If multiple pieces of drill steel are utilized, this could be a problem area for the bolter operator since water loss can occur at the connection. Proper water pressure and volume, as well as the ability to control these variables, are critical when utilizing wet drilling

methods. Observation of dust while drilling with a wet drilling system may indicate an insufficient dust control system and may be a violation of §72.630(a).

The type of drill bit used affects the dust generation and capture efficiency of drill dust control systems. Research by the former United States Bureau of Mines has shown that drill bits that have openings on the bit at or near the cutting surface generate less dust when compared to bits that capture dust at the end of the drill steel. The research also indicated that these bits have a better capture efficiency. Accordingly, mine operators should be encouraged to utilize the most effective respirable dust control methods, procedures, and components for drilling in rock that are available.

Continuous mining machines equipped with machine-mounted dust collectors are common in underground mining. As auxiliary controls, flooded bed scrubbers on continuous mining machines have allowed the mine operator to take cuts in excess of 20 feet. The scrubber has also allowed the operator to operate the continuous mining machine with line curtain or tubing distances up to 50 feet from the deepest point of penetration without decreasing the level of protection afforded miners from respirable dust. As with any respirable dust control measure, the scrubber must be properly installed and maintained. If operators are utilizing scrubbers for these curtain setbacks, maintenance requirements should be incorporated in the approved mine ventilation plan.

Inspectors should perform the following visual checks on the scrubber system to verify that the scrubber is being maintained. The inlets, exhaust, and ductwork of the scrubber must be free from obstructions.

This requires the operator to routinely flush or wash the inside of the ductwork in its entirety to remove any materials that have been deposited in the duct, as well as clearing the inlets and exhaust. These deposits cause restrictions in the system and will not allow the proper air quantity or velocity to be maintained. The scrubber screen should also be cleaned on a regular basis. The inspector should also check the screen to ensure that the water spray hits the entire screen and not just the center of the screen. If the screen is not completely covered by the water spray, dust may pass through the screen and become entrained in the section air flow. Surveys have shown that without proper cleaning of the ductwork, scrubber screen, inlets, and exhaust, the efficiency of the scrubber is greatly reduced. The flooded bed scrubber is also equipped with a de-mister.

Inspection personnel can check the de-mister by checking the exhaust of the scrubber system. If the exhaust contains water mist, the de-mister is not working properly. A common problem encountered is for the sump to be clogged by material that will not pass through the system. A thorough cleaning of the sump should correct this problem.

Routine maintenance of the scrubber system is critical for the proper and effective operation of scrubbers. If scrubber maintenance requirements are incorporated in the plan and the operator is not performing the maintenance, a violation of §75.370(a)(1) exists.

Appropriate inspection personnel should also take measurements of engineering parameters to determine if the operator is maintaining the scrubber system properly. Pitot tube readings can be taken on the scrubber to determine if the scrubber is producing the correct amount of air as stipulated in the approved mine ventilation plan. If the operator submits the name plate quantity of the machine-mounted dust collector as the operating volume, this is the minimum quantity that must be maintained at all times. If the measured operating capacity reveals that the name plate quantity is not indicative of actual conditions, or if respirable dust samples indicate that this quantity is not sufficient, appropriate enforcement action shall be taken and plan revisions may be necessary. (Examples: require the operator to take periodic pitot tube readings on the scrubber, increase the air required to be maintained behind the line curtain or tubing, require more frequent cleaning of the filter and ductwork (manufacturers routinely call for scrubber screens to be changed at least every 4 hours), etc.)

Providing and maintaining adequate ventilation for roof bolters and continuous mining machines continues to be an integral part of any effective respirable dust control strategy to limit miners' exposure to respirable coal mine dust. During the inspection of respirable dust controls for roof bolters and continuous mining machines, inspection personnel should take sufficient air readings to verify that the operator is maintaining adequate ventilation as stipulated in the approved mine ventilation plan. If the approved quantity of air or mean entry air velocity, if required, is not maintained, a violation of §75.370(a)(1) should be cited for a failure to follow the approved ventilation plan provisions required by §75.371(g) or §75.371(h), respectively. In addition, §75.362(a)(2) requires that deficiencies in dust controls shall be corrected before production begins or resumes on a section. When deficiencies discovered during an on-shift have not been corrected and production is underway, §75.362(a)(2) should be cited. §75.362(a)(2) should also be cited when the on-shift examiner conducts an inadequate examination of respirable dust control parameters specified in the approved mine ventilation plan.

Appendix F

Evaluation of an Acceptable Respiratory Protection Program

Purpose

The purpose of this document is to inform CMS&H employees of the basic elements of an acceptable respiratory protection program as set forth in American National Standards Institute (ANSI) Z-88.2-1969 which is incorporated into 30 CFR 72.710. This document does not replace the requirements of Z-88.2 but merely highlights those elements that form the core of an acceptable respiratory program that provides positive and reliable protection. This document can assist in a determination to extend an abatement time or to classify a violation as non-S&S.

Instruction

Section 72.710 of 30 CFR provides that approved respirators shall be selected, fitted, used and maintained in accordance with the provisions of ANSI Z-88.2, "Practices for Respiratory Protection." Paragraph 1.3 of Z-88.2-1969 provides that the provisions of Z-88.2 are mandatory in nature where the word "shall" is used and advisory where the word "should" is used.

This document is provided to guide the inspector through the review of an operator's respirator program to assess whether miners are provided protection against the full extent of exposure to airborne hazards. While all of the listed elements are necessary to have an acceptable program, each incidence must be reviewed in relation to the specific citation or exposure situation to determine that miners were protected from contaminant levels exceeding the appropriate standard. The use of personal respiratory protection will not prevent the issuance of citations for exceeding the applicable respirable dust standard. 30 CFR Parts 70, 71, and 90 require that respirable dust levels be controlled at or below the applicable standard in the mine atmosphere.

The items listed below comprise the minimum requirements necessary to determine that a personal respiratory program is acceptable:

- A. Written procedures detailing the selection and use of available respirators which include an evaluation of:
 1. the nature of the hazard;
 2. the limitations of the respiratory protection device;
 3. the job duties potentially requiring the use of respirators;
 4. where the personal protection is needed; and

5. who is responsible for each respirator program area (training, fit-test, maintenance, selection, etc.).
- B. Provisions for training of all persons associated with the use and/or selection of personal respiratory protection which include:
1. explanation of the type of hazard, i.e., is the hazard quick acting or does it require a long duration exposure;
 2. the limitation of each available personal respiratory protective device;
 3. explanation of when the respirator is to be used;
 4. hands-on experience of putting the respirator on, exercising while wearing the respirator, and testing for proper facepiece-to-face seal; and
 5. the cleaning, disinfecting, and maintenance procedures used and how to determine that the respirator being provided is clean and functioning properly.
- C. Provisions for a facepiece fit-test for each miner prior to being expected to utilize each such respirator. The test should be conducted on each miner required to wear a personal respiratory protective device at least every 12 months. The test shall be conducted by subjecting each miner, while wearing the appropriate respirator, to a test atmosphere as specified by a scientifically acceptable test method. Note however, that a fit-test is not necessary for the use of some respirators such as an Airstream helmet. Examples of two widely accepted test methods are:
1. Qualitative Fit Test - the fit is acceptable if the miner, while wearing a respirator fitted with high efficiency particulate filters, is subjected to a test atmosphere of irritant smoke from a stannic chloride smoke tube and does not cough.
 2. Quantitative Fit Test - the fit is acceptable if the miner, while wearing a fitted respirator which has been outfitted with a sample port, is subjected to a test atmosphere (usually mineral oil mist) and the concentration of test atmosphere inside the respirator is negligible.

The miner must perform exercises while wearing the respirator in the test atmosphere to determine if the respirator is properly fitted. Exercises should simulate at least the work of lifting, bending over, talking, movement

of the head in all directions and exhibiting various facial expressions.

- D. Provisions require miners who wear a respirator to maintain the facepiece-to-face seal at all times by maintaining the facial surfaces free of hair or other interferences at the face to respirator contact points and in areas that may cause interference with the respirator valves or flow characteristics.
- E. A program for the maintenance and care of all respirators which includes:
 - 1. provisions for the inspection of each respirator for defects conducted prior to and after each use;
 - 2. provisions for cleaning and disinfecting each respirator after each use and at periodic intervals if not used for an extended period of time (30 days);
 - 3. provisions for storage of respirators in a convenient, clean and sanitary location; and
 - 4. provisions for a person to perform the maintenance and cleaning of respirators who is trained for such duty and is knowledgeable in the respirator manufacturer recommendations for the use, care and maintenance of each model of respirator provided by the mine operator.
- F. Records of actions taken in relation to the respirator program including at least:
 - 1. records of fit-test which identify:
 - a. the exact model and size respirator;
 - b. date of testing;
 - c. the fit-test method; and
 - d. whether the miner passed or failed the test.
 - 2. records of training provided which include at least:
 - a. identification of miners;
 - b. date of training; and
 - c. topics covered.
- G. A statement of use which includes:

1. a requirement that an assigned respirator will be worn by miners at all times while in the normal work area such as the face area of an MMU; and
2. a requirement that management personnel will make frequent checks of the work area to ensure that miners, mandated by the mine operator to wear respirators, are wearing such respirators.

Background

Provisions of 30 CFR require that respiratory protection be made available to affected miners when an area has been determined to be in noncompliance with the applicable respirable dust standard. Such protection, when utilized properly, may justify extensions of time to abate the excessive respirable dust conditions. Respiratory protection properly provided and utilized may also result in a condition being considered as non-S&S. These requirements detail what MSHA inspectors need to review to assess the adequacy of the operator's program to provide an appropriate degree of protection for the miners exposed. 30 CFR Section 72.710 requires that respirators be selected, fitted, used and maintained in accordance with the provisions of ANSI Z88.2-1969.