

REVISED: February 11, 2003

CHAPTER 1 - RESPIRABLE DUST

COAL MINE HEALTH INSPECTION PROCEDURES HANDBOOK

PH 89-V-1(13) (XXXX, XX, 2003)

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Chapter 1

RESPIRABLE DUST

II. Purpose

The purpose of this chapter is to establish procedures and guidelines for:

- Conducting compliance and abatement sampling inspections.
- Evaluating sampling results.
- Providing Compliance Assistance
- Designating entities for operator sampling and removing from sampling status.
- Establishing a reduced dust standards due to quartz.
- Monitoring the operators' respirable dust control and sampling programs.

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

The objectives of the MSHA sampling inspection program in coal mines are to determine whether:

- Mine operators are providing and maintaining work environments free of excessive levels of respirable dust (§§ 70.100, 70.101, 71.100, 71.101, 90.100 and 90.101).
- The conditions and activities within the work environment on the day of sampling are similar to the working conditions experienced by miners during non-sampling periods.
- The dust control parameters specified in the approved mine ventilation plan for underground mines, or in respirable dust control plan at surface mines, or for a Part 90 miner, are being complied with.
- The dust control parameters in the approved ventilation plan or in the respirable dust control plan continue to be adequate and suitable to the current conditions at the mine.
- Proper on-shift examinations (§ 75.362(a)(2)) are being made and whether a record of each such examination is being retained at the surface location of the mine (§ 75.362(g)(2)).
- The required information is being posted on the mine bulletin board (§ 70.217 and 71.210).
- The amount of material produced by each mechanized mining unit (MMU) during each production shift is being recorded and retained (§ 75.370(h)).
- The proper occupation has been assigned as the designated occupation (DO).
- The operator is complying with the drill dust control standards (§72.620 and §72.630).

A. Compliance Sampling

Compliance sampling inspections must conform to the following procedures. Only single-sample measurements will be used to monitor operator compliance with applicable dust standards.

1. Types of Entities Sampled

a. Mechanized Mining Unit (MMU)

A full-shift sample must be collected from the environment of at least five (5) different occupations, if available, on each producing MMU. These must include the designated occupation (DO), any roof bolters not established as designated areas (DAs), longwall jack setters, and any other high-risk occupations.

When sampling the DO, the sampling device must 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. However, if the approved ventilation plan provides for the DO to be under administrative controls, the sampling device must remain with each miner assigned to the DO position.

A full-shift intake air dust sample must also be collected for each producing MMU where intake DAs have not been established and diesel-powered haulage equipment is in use or where belt air is employed to ventilate the face areas. Since these are intake air samples, the sampling device must remain in the intake airway within 200 feet of the working face(s).

b. Designated Area (DA)

A full-shift sample must be collected from each active DA. Since these are area samples, the sampling device must remain at the specified designated location, or at the location specified in the operator's approved ventilation plan or in the petition for modification allowing the use of belt air.

c. Part 90 Miner

A full-shift sample must be collected from the environment of each active 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 sampling device must remain in the *environment of the person* being sampled by placing the sampling device either on the Part 90 miner, on the equipment that the Part 90 miner operates within 36 inches of the normal work position, or at another location that represents the maximum concentration of dust to which the Part 90 miner is being exposed.

d. Designated Work Position (DWP)

A full-shift sample must be collected from the working environment of each producing DWP. The sampling device must 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 engages in a variety of activities during a production shift (e.g., operating a highwall drill, dozer, and truck for part of the shift), none of which are assumed by another miner, the sampling device must remain with the miner assigned to the DWP.

e. Nondesignated Entity (NDE).

A full-shift sample must be collected from the environment of at least three occupations other than the DWP (non-DWP or NDWP) that are at risk of overexposure to respirable quartz dust (e.g., 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. This includes contract workers that are exposed to coal mine dust while on mine property. Samples also must be collected from outby areas (non-DA or NDA) in underground mines where significant dust-generating sources are present and where miners are required to work. The sampling device must 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.

2. Frequency of Sampling

a. Underground Mines (**Normal Sampling Schedule**)

The following entity types must be sampled *bimonthly*, unless stated otherwise:

- (1) MMUs - Approximately 25 percent of the producing units must be sampled during off-shifts (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 first of each month during the bimonthly period.
- (2) DAs located inby the section dump point (i.e., roof bolter and intake DAs) and at least 25 percent of outby DAs (equivalent to sampling each outby DAs once annually).
- (3) Intake air (NDAs) that can be sampled concurrently with MMUs where diesel-powered haulage equipment is in use or belt air is employed to ventilate the face areas.
- (4) Part 90 miners.
- (5) NDEs that can be sampled concurrently with outby DAs.

b. Underground Mines (**Modified Sampling Schedule**)

MMUs and DAs located inby the section dump point (i.e., roof bolter and intake DAs) will be sampled *every other bimonthly* period (or every four months) when either of the following conditions are met:

- (1) PAPRs are used at all times (by all occupation on the MMU) in accordance with a respirator protection program which meets the requirements of § 72.710 and no single-shift measurement for the current bimonthly period (before the application of the protection factor) exceeds 1.71 mg/m^3 for respirable coal mine dust and 87 Fg/m^3 for respirable quartz dust.

- (2) No single-shift measurement for the current bimonthly period exceeds 1.71 mg/m^3 for respirable coal mine dust and 87 Fg/m^3 for respirable quartz dust, after adjusting to account for differences in the observed shift production and airflow quantities and the verification production level (VPL) and plan airflow in accordance with paragraph A.6.d. of this chapter.

Failure to meet these conditions or to comply with the approved plan parameters on each production shift and, in particular, the provisions of the PAPR protection program will be cause MSHA to revert back to the normal sampling schedule for MMUs.

c. Surface Mines, Surface Facilities, and Surface Areas of Underground Mines (**Normal Sampling Schedule**)

Surface mines, surface facilities, and surface areas of underground mines in producing status must 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 first of each month during the 6-month period. Approximately 25 percent of surface mines, surface facilities, and surface areas of underground mines must be sampled during off-shifts and/or weekends if production or normal work activity occurs during off-shift and/or weekends.

NOTE: Sampling at surface mines must be conducted during dry periods to better characterize the dust conditions to which miners are exposed. If any significant rainfall occurs during sampling, the sample(s) are to be voided by the inspector.

The following entity types, except for Part 90 miners, must be sampled the equivalent of *once every 6 months*:

- (1) DWPs
- (2) Part 90 Miners (sample *bimonthly*)
- (3) 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 must be sampled at least *once* annually.

3. Pre-Inspection Preparation

Prior to any scheduled sampling inspection, review the following information and records:

- a. The dust control parameters specified in the approved ventilation plan or in the respirable dust control plan for a surface mine or for a Part 90 miner, and whether the use of supplementary controls (i.e., PAPRs, administrative controls, or both) are authorized. If authorized, note the specific occupations under supplementary controls.

If approval to use PAPRs was granted under special circumstances (§ 70.212), the operator is required to notify, in writing or by electronic means, the district manager and the representative of miners within 24 hours of determining that current conditions necessitate use of PAPRs. Use of PAPRs under this provision for compliance purposes is limited to 30 consecutive days. The district manager may revoke the operator's authority to use PAPRs under special circumstances for failure to comply with this requirement.

- b. Recent operator quarterly and MSHA sampling results.
- c. MSHA Form 2000-86 (Revised) from the previous compliance sampling inspection.
- d. Most recent production records, if available, to establish the average production during the last 30 production shifts and determine if the verification production level (VPL) used in approving the operator's dust control parameters continues to reflect typical production levels at the MMU to be sampled. The VPL represents the 10th highest production level recorded in the most recent 30 production shifts.
- e. Citation history for excessive dust and for failure-to-submit quarterly samples.
- f. Listing of entities on a reduced dust standard.

- g. Weekly listing of inspector and operator samples containing more than 100 $\mu\text{g}/\text{m}^3$ of quartz.
- h. The Uniform Mine File notebook to obtain the latest information on conditions at the mine.

4. Sampling Inspection Procedures

- a. 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 should be documented in the inspector's notes or in a notebook maintained in the field office.
- b. Use properly maintained and calibrated sampling devices (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 according to 30 CFR Parts 70, 71, and 90. The sampling devices must be secured in accordance with established procedures to minimize tampering.
- c. Use only filter cassettes that were pre-weighed to the nearest 0.001 mg. The dust data card accompanying the filter cassette should be "blue" and stamped with the Field Office number in the lower, right-hand portion of the data card.
- d. Secure one *control* filter cassette for *each* 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 will be subtracted from the change in weight of the exposed filter. Therefore, it is important that the control filter have the same *pre-weight date* (noted on back and front of dust data card) as all the other cassettes to be used for sampling on the same inspection.
 - (1) Do not remove the inlet or outlet plugs from the 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.

- (2) Carry the control filter in a shirt or coverall pocket during the period of sampling; keep the control filter together with the exposed filters after sampling; and treat the control filter the same as the exposed filters after returning to the office or laboratory.

NOTE: If the above procedures are not followed, the sampling results cannot be used to assess compliance with the applicable standard.

- e. Upon arrival at the mine, the inspector should discuss with mine management and representatives of the miners the general purpose of the sampling inspection, stressing the need to have the approved dust control parameters in effect and operating on every production shift, and the importance of collecting samples that reflect dust conditions to which miners are normally exposed. During this time, the inspector should confer with miners and mine management to review the results of any previous compliance sampling inspection and, if currently on a reduced standard, explain the significance of controlling quartz dust. The inspector should also review records of on-shift examinations and of the amount of material produced by each MMU to ensure such records are being maintained as required and are current, as well as verify the length of the production shift of the MMU to be sampled.

The inspector should solicit miners' cooperation in wearing the sampling device. If a miner objects to wearing the sampler unit, determine the reasons for the objection. Explain the reason for the sampling (see page 1.1). If the cooperation of the miner cannot be obtained, the sampling device should 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 should take the following actions:

- (1) Explain to the miners that when either the DO (in particular at longwall MMUs) or DWP is being sampled, the sampling device must always remain in the environment of the DO (unless under supplementary controls) 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 should wear the sampling device the entire shift.

- (2) 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 and not to invert it. If this occurs, it should be reported immediately to the inspector. Care should be exercised to prevent the sampling device from presenting a safety hazard. Place the device such that the tubing will not catch on equipment or other objects.
- (3) 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.
- (4) Inform the miners of when and where the sampling device will be removed, and that you will be checking it throughout the shift.
- (5) Distribute health hazard information cards or other educational material. Talk to miners about black lung and silicosis, and the importance of complying with the approved dust control parameters on every shift.
- (6) Determine if the following information is posted on the mine bulletin board:
 - (a) Report of the latest results of all operator- and MSHA-collected samples (for at least 31 calendar days following receipt) and the end-of-shift exposure data if using a personal continuous dust monitor (PCDM) under § 70.220 (for at least 7 calendar days). The corrective action taken when a quarterly sample exceeds the applicable standard by at least 0.1 mg/m^3 . Results of verification sampling may be removed after the District Manager approves the dust control parameters specified in the ventilation plan.
 - (b) The engineering controls and their measured quantities, including other dust control parameters that were being used in the MMU when sampled by the operator or by

MSHA (copy of completed MSHA Form 2000-86 (Revised)).

- (c) If any MMU is undergoing verification sampling, all written notifications from the District Manager regarding any aspect of the plan verification process, including all correspondence requesting approval to use PAPRs as a supplementary control. The operator may remove this information after the District Manager approves the dust control parameters specified in the plan.
 - (d) Current ventilation plan and/or respirable dust control plan.
 - (e) The approved x-ray plan or NIOSH Notice for medical examinations (underground operations only).
- f. Record the cassette number, the time the sampling device was turned "ON", and location of the sampler by sample type and occupation code for each sample collected in the inspector's notes.
- g. Check the pump flow rate when first turned "ON" and before turning it "OFF" at the end of the sampling period. On-shift checks of the sampling devices should be made as frequently as necessary to ensure that:
- (1) The pump is operating properly and at the correct flow rate;
 - (2) The pump has remained in the same environment as recorded earlier;
 - (3) The pump has not been tampered with;
 - (4) The tubing is not pinched and connections are not leaking; and
 - (5) The sampling head (cyclone inlet) is not covered with a coat or other garment, or inverted.

If the pump is not operating properly when first turned "ON" (after allowing the pump to reach the set point value), it must be adjusted using the flow rate control (8 and 9) switch buttons. If the proper flow rate was not being maintained during the final check, the sample must 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 must 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."

- h. Accompany the miners to the MMU and remain on the section for the entire period of sampling to accomplish the following tasks. This, however, should not prevent the inspector from performing other inspection work while on the section.
 - (1) If the entity to be sampled is a MMU that is under a PAPR protection program, verify that the operator has posted warning signs with the statement "**RESPIRATORY PROTECTION REQUIRED IN THIS AREA**" in locations where PAPRs must be worn.
 - (2) Ensure that the sampling devices are located in the correct environments and not being mishandled.
 - (3) Observe working conditions and activities, and document any changes that may occur during the sampling shift which may affect the level of respirable dust to which miners are exposed.
 - (4) Observe miners during the shift to verify the job classifications previously recorded.
 - (5) 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.
- i. Verify early in the sampling shift that all dust control parameters specified in the approved ventilation plan are in place and whether or not they seem adequate. Also, evaluate the operator's compliance with the requirements for conducting proper on-shift examinations of dust control parameters

and recording the results. (Refer to Appendix C for specific guidance). If the plan requires the use of a machine-mounted dust scrubber, the inspector must follow the procedures in Appendix D when performing the required visual checks and measurements to verify that the scrubber is being maintained and is operating properly. Properly record your measurements and findings on MSHA Form 2000-86 (Revised), *Respirable Dust_Sampling and Monitoring Data*, as a copy of the completed form will be provided to the operator for posting on the mine bulletin board. Other dust controls or work practices (i.e., frequency of scrubber screen cleaning, wetting roadways or shields, bolting procedures, respirator use, etc.) that are in use but not included in the approved plan must also be recorded.

- j. If the operator is in violation of the approved ventilation plan, a citation should be issued that requires the taking of immediate corrective action while sampling is taking place. If this occurs, the inspector must document in his/her notes what specific action was taken and when it was taken during the sampling shift.
 - (1) 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 particular, if it involves a MMU under supplementary controls . In determining whether the violation should be designated as S&S, the inspector shall 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 inspector observes PAPRs not being worn properly by those occupations under a PAPR protection program, the violation should be designated as S&S because its impact on the miner's dust exposure may be significant. On the other hand, 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. If the 3 inoperative sprays were all 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.

- (2) When deciding on the degree of negligence, consideration must be given to a high negligence finding if the operator was in a position to be aware of the conditions based on the results of the on-shift examination and there were no mitigating circumstances. Because of the on-shift exam requirement, the operator should be well aware of the dust control parameters required by the approved ventilation plan.

If there are unique aggravating circumstances associated with the violation, such as repeated violations of the same standard, serious consideration must be given to recommending the violation for special assessment.

- k. When sampling DWPs and outby DAs, an inspector normally should not remain with the entity for the entire sampling period. Instead, the inspector should spend sufficient time to either properly place the sampling device 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 adequate, and identify other potential sources of dust exposure.

If the work position to be sampled involves a highwall drill operator, the inspector must first determine if the operator is complying with the requirements of the drill dust control standard (§72.620) as explained in Appendix B of this chapter.

- (1) 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 must be sampled to determine if the pressurized cab is equipped with an effective air filtration system that is being properly maintained.
- (2) If the dust control appears to be effective, samples should be collected from work positions where miners are exposed to drill dust to determine whether the operator is maintaining compliance with the applicable dust standard.

1. If during the shift an inspector observes another entity being sampled by the operator under Part 70, 71 or 90, the following actions should be taken:
 - (1) Record the location and general condition of the sampling device, the time the device was observed operating, and the cassette number in the inspector's notes;
 - (2) Check whether the pump is operating at the proper flow rate and, if not, record the company's pump identification number;
 - (3) Document any abnormal conditions that exist in the sampling area and note worker activities;
 - (4) 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; and
 - (5) If deemed necessary, take appropriate enforcement action.

NOTE: If any sampling irregularities are observed, the inspector must immediately inform the responsible field office supervisor so that appropriate follow-up enforcement action can be taken. This may involve meeting with the operator to discuss findings, initiating a special investigation, or conducting a monitoring and/or sampling inspection, etc.

- m. All intake air samples collected at DA locations must be coded as "Type 3" samples on the dust data card, and the entity block (Block 10) must be identified using the 801-0 through 899-9 numbering series in the following manner:
 - (1) The first digit must always be an "8." This indicates that the sampling entity is located in intake air and is recognized by the computer for the purpose of applying the 1.0-mg/m³ dust standard.
 - (2) The next two digits, in this case "01," indicate that this intake air "DA" is associated with MMU 001-0.
 - (3) 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 those instances, the fourth digit must always be a "9" to denote this fact.

- (4) Other "intake air" samples collected from areas that are not established as a DA must 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) must be entered in Block 10.
- n. Full-shift samples are 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 sampling devices 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, the inspector should turn the sampling devices "**OFF**" and remove them from the occupations being sampled at the end of the 8-hour sampling period. Once the sampling device is removed, the inspector must exercise care to protect the devices from mishandling, particularly the sampling-head assembly. The inspector must record in his/her notes that the pump was turned off in the mine at the end of the 8-hour sampling period.

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

- o. At the conclusion of the 8-hr sampling period, record the time, examine the condition of the sampling device for any evidence of mishandling, and note any findings in your notes. When sampling MMUs, estimate only the amount of material in tons that was mined during the period that the sampling device was located on the section based on either the number of feet advanced, number of passes, number of cars loaded or actual measurement available from devices such as belt scales. Tonnage for sampling purposes includes all mined material (both rock and coal). Record this information on the dust data card and MSHA Form 2000-86 (Revised).

5. Post-Inspection Procedures

- a. Complete the dust data card for each exposed filter cassette and review the information for clarity, legibility, and accuracy. Refer to paragraph 4.d above for completing the dust data card for a control filter cassette.
- (1) Cassette Number: This number is supplied by the manufacturer and must correspond to the number on the filter cassette bearing the identical serial number.
 - (2) Mine ID Number: The seven-digit number assigned by MSHA.
 - (3) Contractor Code: No entry required.
 - (4) Mine Name: Name of the mine being inspected.
 - (5) Company Name: Name of the company that operates the mine.
 - (6) 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]).
 - (7) Sample Start Time: The hour as a two-digit number, based on a 24-hour clock, that the sampling unit is started. This entry ranges from 00 for midnight to 23 for 11 p.m. Minutes are not recorded. For example, if the start time is between 7:00 a.m. and 7:59 a.m., record "07," or if it is between 4:00 p.m. and 4:59 p.m., record "16" in the two boxes. For a start time between midnight and 1 a.m., record "00."
 - (8) Sampling Time: The actual elapsed time in minutes between when the sampling device was turned "ON" and when it 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 production shift or the Administrator for CMS&H has granted written permission to run the sampling device 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 equivalent concentration will be determined by using a maximum time of 480 minutes.

- (9) 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 no material was mined but other dust-generating activities were ongoing, the actual production must be reported as [0 0 0 0 1] because the automated computer processing system will not accept zero production for an MMU.

- (10) 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

- (11) 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.

- (12) Occupation Code: Enter the appropriate three-digit occupation code. This block is not filled out for DAs samples.

- (13) 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 is entered, one digit in each box.

- (14) Certified Person - Enter the certification number of the inspector taking the sample.
- (15) 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.
- (16) All MSHA-collected samples are considered valid, 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)

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 the inspector determines that a sample should be voided, the appropriate void code must be entered in the "Void Code" box located in the lower right-hand portion of the dust data card.

- (17) Review the dust data card information for clarity, legibility and accuracy, and then reattach the *control* filter and each exposed filter to the data card via the hole in the card.
- b. Package all cassettes from each sampling inspection along with the *control* filter 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
Cochrans Mill Road
Building 38
Box 18179
Pittsburgh, PA 15236-0179

Multiple sampling 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.

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

- c. Complete all applicable sections of the computer-generated report, *Respirable Dust Sampling Inspection Results*, and MSHA Form 2000-86 (Revised) or MSHA Form 2000-142 (MMU/DA/DWP Data), and other required information and send it to the appropriate office for filing and mailing.

6. Evaluation of Sampling Results

- a. After receipt of the *Respirable Dust Sampling Inspection Results* report, refer to the table below and compare each valid concentration measurement with the listed CTV corresponding to the applicable dust standard in effect to determine if any sample demonstrates, at a high level of confidence, that the dust standard was exceeded. If the sampled entity is on a reduced standard, also refer to paragraph a.(5) of this section.

When an entity is under an approved PAPR protection program, each reported valid concentration measurement must first be adjusted by the inspector to account for the expected workplace level of respiratory protection being provided the wearer before referring to the CTV table. As illustrated in the example below, this is accomplished by dividing the concentration measurement by the protection factor (PF) that is assigned to the particular MMU. The PF is specified in the operator's approved PAPR program.

For example, suppose that the DO under a PAPR program is exposed to an equivalent concentration of 2.16 mg/m³ and the MMU was assigned a PF of 2. Therefore, the equivalent concentration of 2.16 mg/m³ is divided by

2, which yields 1.08 mg/m³, the equivalent concentration to which the wearer of the PAPR is exposed.

**Citation Threshold Values (CTV)
For Citing Violations Based On Single, Full-Shift Measurements**

Dust Standard (mg/m ³)	CTV (mg/m ³)
2.0	2.33
1.9	2.22
1.8	2.11
1.7	2.00
1.6	1.90
1.5	1.79
1.4	1.68
1.3	1.58
1.2	1.47
1.1	1.36
1.0	1.26
0.9	1.15
0.8	1.05
0.7	0.94
0.6	0.84
0.5	0.74
0.4	0.64
0.3	0.53
0.2	0.43

NOTE: If the control filter was either missing or invalid, the notation "**DO NOT CITE ON THIS SAMPLE**" will appear on the report of sampling results, indicating that the measurement(s) cannot be used for enforcement purposes. Therefore, if this notation appears on the report and one or more sample results meet or exceed the CTV, the particular entity should be re-sampled immediately.

- (1) If **any** measurement meets or exceeds the CTV that corresponds to the applicable standard in effect, the operator shall be cited for violation of the dust standard. The affected environment shall be specified in the citation.

- (2) If measurements from two or more occupations from the same MMU meet or exceed the appropriate CTV, one of which involves the DO, and it is determined that both occupations are exposed to

the same dust generating sources, issue **one** citation. Specify the occupation most affected by these sources as the affected working environment. In most cases this will be the working environment of the DO. This is consistent with current practice.

- (3) If measurements from two or more occupations from the same MMU, which are exposed to the same dust generating sources and which do not involve the DO, meet or exceed the CTV, issue **one** citation. Specify the occupation with the highest dust concentration as the affected working environment.
- (4) In either 6.a.(2) or a.(3) above, if the occupations were exposed to different dust-generating sources, issue **separate** citations for each occupation that is in violation of the dust standard.
- (5) If the sampled entity is on a reduced standard, the inspector should first review the results of quartz analysis, which will be reported at the same time as the corresponding concentration measurement, before taking any enforcement action. If the percentage of quartz found in the sample that met or exceeded the applicable CTV would not cause the dust standard and the corresponding CTV to change if used by itself, the operator would be cited for excessive dust. On the other hand, as illustrated in the example below, if the percentage of quartz found in the sample would cause the dust standard and the corresponding CTV to be higher (less quartz) so that the single-sample measurement would no longer indicate noncompliance, a citation should not be issued.

For example, suppose that the MMU is on a 0.9-mg/m³ standard and a concentration measurement of 1.25 mg/m³ is obtained. Since this measurement exceeds the 1.15-mg/m³ CTV corresponding to the 0.9-mg/m³ standard, the operator is in violation of the standard. However, the quartz analysis of the sample shows it contained 7.5 percent quartz which, if used by itself, would result in a 1.4-mg/m³ standard. Based on this analysis, there is indication that the level of quartz in the environment of the MMU has changed, suggesting that the current standard may no longer be valid. Therefore, since the original measurement of 1.25 mg/m³ is less than the 1.68-mg/m³ CTV corresponding to the 1.4-mg/m³ standard that should have been in effect on the shift sampled, a citation is not warranted.

- b. If one or more measurements are above the applicable dust standard but below the CTV, no enforcement action should be taken. Instead, the MMU should be re-sampled within 15 calendar days of receiving the results to adequately assess operator compliance with the applicable standard under the prevailing conditions, with special emphasis being directed to working environments required to comply with standards below 2.0 mg/m^3 . Compliance assistance will be offered to the operator to help identify the cause of the elevated dust levels and possible control measures.

If follow-up sampling of an MMU indicates that the applicable standard continues to be exceeded, a thorough review should be undertaken of the dust control parameters specified in the approved ventilation plan. The operator may be required to initiate verification sampling under § 70.206 if it is determined that the dust control parameters originally approved are no longer adequate to maintain respirable dust levels at or below the applicable standard under current operating conditions at the MMU.

- c. If any measurement exceeds 1.71 mg/m^3 but not the applicable standard and the actual level of production during the period sampled is less than 60 percent of the average production based on the last 30 production shifts, the MMU should be re-sampled during the current bimonthly period.
- d. If no measurement exceeds 1.71 mg/m^3 for respirable coal mine dust and 87 F g/m^3 for respirable quartz dust after adjusting to account for differences in the observed shift production and airflow quantities and the verification production level (VPL) and plan airflow, the MMU and associated DAs may qualify to be sampled less frequently under the **Modified Sampling Schedule** as discussed in paragraph A.2.b. above. As illustrated in the example below, this adjustment is accomplished by multiplying the maximum concentration measurement of respirable coal mine dust and quartz dust by the ratio of the VPL to the observed shift production and again by the ratio of the observed airflow to plan airflow. The adjusted concentration values serve as an approximate indicator of whether or not the approved plan parameters would continue to be effective in maintaining compliance with the applicable dust standard if the MMU was producing at the VPL and with airflows at plan quantities.

The following example illustrates how to make this adjustment:

<i>VPL:</i>	1200 tons	<i>Plan Airflow:</i>	4500 cfm
Shift Prod:	850 tons	Observed:	5000 cfm

<u>Occupation</u>	<u>Dust Conc (mg/m³)</u>	<u>Quartz Conc (Fg/m³)</u>
036 (DO)	0.90	45
035	0.70	35
012	0.75	45
014	0.85	50
054	0.70	45

Adjustment of maximum dust conc: $0.90 \times \frac{1200 \text{ tons}}{850} \times \frac{5000 \text{ cfm}}{4500} =$
 $0.90 \times 1.41 \times 1.11 = \mathbf{1.51 \text{ mg/m}^3}$

Adjustment of maximum quartz conc: $50 \times 1.41 \times 1.11 = \mathbf{78 \text{ Fg/m}^3}$

Since both adjusted values meet the concentration criteria, the MMU would be exempt from bimonthly sampling. Instead, sampling would be conducted under the **Modified Sampling Schedule**, or every other bimonthly period.

- e. 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 should generally be designated as "significant and substantial" (S&S). The proper use of personal protective equipment (PPE), if not already under supplementary controls, should, however, 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, unless already under a PAPR protection program, 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 must evaluate the effectiveness of the PPE (Refer to Appendix E). This evaluation should 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 should 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, violations shall be reviewed for special assessment.

- f. If a NDE is cited, MSHA Form 2000-142, must be completed. The violation information must be promptly entered in the computer before it will accept abatement dust samples from the NDE.
- g. Since MSHA has assumed responsibility for all compliance-related sampling, when an operator is cited, §§ 70.218 and 90.207 require the operator to notify the District Manager of the specific actions taken to correct the excessive dust condition within 24 hours after implementation. This information should be reviewed to determine, with regard to MMUs, if abatement sampling should be scheduled to assess the adequacy of the operator's corrective actions or whether to require the operator to initiate the plan verification process in accordance with § 70.206. This determination should be made after reviewing:
 - (1) The information on the implemented corrective actions provided by the operator;
 - (2) The latest MSHA inspection report documenting the measured quantities of the dust control parameters and other conditions that were in effect at the time of sampling that resulted in MSHA issuing a citation for excessive dust; and,
 - (3) The operator's history of complying with the dust control parameters.

If the corrective measures taken by the operator are expected to achieve and maintain compliance, abatement sampling must be scheduled and conducted in accordance with Section III.B. below to determine whether the operator's actions were sufficient to gain compliance. For example, if the operator believes that the overexposure was caused by improperly following work practices, and this was the first occurrence, the appropriate course of action would be to review these work practices with the affected miners rather than require the operator to revise the plan. Since there

would be no need to change the plan parameters, MSHA should initiate abatement sampling in this particular case.

However, if the District Manager determines that the dust control parameters will not maintain respirable dust levels at or below the applicable dust standard and requires the operator to upgrade the dust control portion of the ventilation plan, the operator would be required to initiate the plan verification process in accordance with § 70.206.

B. Abatement Sampling

Conduct of abatement sampling inspections in underground mines must conform to the following procedures. Only *single-sample measurements* will be used to determine whether the operator's abatement actions were sufficient to gain compliance with applicable standards. However, operators will continue to be responsible for collecting abatement samples at surface mines, facilities, and surface areas of underground mines.

1. Sampling Inspection Procedures

- a. Since sampling for abatement purposes will be conducted in the same manner as compliance sampling, follow the sampling procedures described in Section III.A.4. of this chapter. As with compliance sampling, all abatement samples must be collected over an 8-hr period (portal-to-portal).
- b. For MMUs, sample the cited occupation and, if available, four other occupations (to include the DO). Unlike compliance sampling, for an abatement sample to be valid, it must be taken on a shift during which the amount of material produced is at least 80 percent of the average production recorded in the most recent 30 production shifts.
- c. For DAs, outby occupations, and Part 90 miners, sample the environment of the cited DA on a production shift, and the outby occupation and Part 90 miner while performing normal work duties or duties performed on a routine day-to-day basis. With regard to a DA, a production shift is a shift during which material is produced and routine day-to-day activities occur in the DA.
- d. If the minimum production conditions are not achieved or normal work duties are not being performed, the inspector may need to sample the cited

entity more than one shift to adequately assess the suitability of the operator's corrective action(s).

- e. When onsite, the inspector should 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 must take appropriate enforcement action.

2. Post-Inspection Procedures

Follow the procedures described Section III.A.5. of this chapter.

3. Evaluating Sampling Results

- a. A citation for excessive dust will be terminated when all valid concentration measurements are at or below the applicable standard. If compliance is demonstrated, the subsequent action form should clearly and fully describe the action(s) taken by the operator to abate the violation. Depending on the type of corrective action(s) taken, the operator may be required to revise the plan parameters. This should include, at a minimum, the actual dust control parameters that were observed in use MSHA sampled the particular entity.

NOTE: It is important to recognize that a determination of noncompliance based on a single-sample measurement does not automatically necessitate the revision of a plan. Instead, it should first result in a thorough review of the plan's continued adequacy and cause a plan to be revised after an examination of all factors including but not limited to the number of occupations overexposed and magnitude of concentrations, actual amount of material mined during sampling compared with the VPL specified in the approved ventilation plan, results of operator quarterly samples, operator compliance with the approved ventilation plan parameters, and type of corrective actions taken to abate the violation. The inspector should then evaluate whether any changes in the plan are necessary to protect miner health.

- b. If, instead of MSHA conducting abatement sampling, the operator initiated verification sampling under § 70.206, the citation would be terminated after the revised plan parameters were verified by the operator.

- c. If measurements demonstrate continued noncompliance, the inspector should 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. MSHA may proceed to revoke approval of the dust control provisions of the ventilation plan. The operator may be required to initiate verification sampling if it is determined that the dust control parameters originally approved are no longer adequate to maintain dust levels at or below the applicable standard under current operating conditions at the MMU. MSHA would terminate the citation after the revised plan parameters were verified by the operator.
- d. If an extension of time is not justified to permit the operator to revise the plan further and verify its effectiveness, the inspector must issue a withdrawal order under Section 104(b). The inspector must 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.
- e. 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 standard before the order is terminated. Therefore, the inspector must take the following action:
 - (1) 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.
 - (2) Ensure that the mine operator implements the corrective actions.
 - (3) Modify the order to allow production in the affected area so that abatement sampling can be conducted by MSHA to determine if the violation has been abated. The inspector must 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.

- (4) Record on MSHA 2000-86 (Revised) the dust controls that are actually used by the mine operator to abate the violation.
- f. If the condition that caused the violation has been corrected and compliance is achieved, the inspector must 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. The operator may be then be required to conduct verification sampling. If the operator fails to submit a revised plan after the order has been abated, the District Manager must notify the operator that his current plan is inadequate following the procedures discussed in paragraph 3.h. below.
- g. If compliance is not achieved, the inspector must 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 e.(1) thru (4) above until the order can be terminated.
- h. 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 shall send written notification to the operator that changes are needed in the plan. The notice shall 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 and then conduct verification sampling.

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 must send a second written notification to the operator. This notification must

- (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.

4. 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:

- a. 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 should be the standard practice whenever an inspector returns to the mine to conduct additional sampling.
- b. 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.
- c. 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 later 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.

C. Monitoring Inspections

One-day monitoring inspections should be conducted at least once during the fiscal year at selected MMUs to observe the operator's verification and quarterly sampling activities. Every effort should be made to monitor during regular AAA inspections and report the time actually devoted to the monitoring activity under the CBD event code. When monitoring sampling activities, the inspector should remain on the section for the entire work shift to ensure that the operator is in full compliance with the Part 70 requirements dust control provision of the ventilation plan.

One or more MMU's from each of the following mines should be selected for onsite monitoring:

1. Employing longwall mining.
2. Sampled by independent contractors.
3. Submitting low-weight samples.
4. Failing to submit quarterly samples.
5. Under supplementary controls.
6. Under reduced dust standards below 1.0 mg/m³.
7. Where operator and MSHA sample results differ significantly.

D. Selecting Designated Occupations

In some cases the DO specified by section 70.206(d) may not be the occupation exposed to the most dust. The following procedure will ensure that the proper occupation is selected for sampling.

1. After each sampling inspection of an MMU, the results should be reviewed to verify that the correct occupation was assigned as the DO.
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 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 to changing the DO to the shuttle car operator.
3. If a decision is made to change the DO, the operator must be notified in writing in accordance with Section 70.206(d) using MSHA Form 2000-96, *Designated Occupation Change Notice*. This change should be entered in the computer using MMU/DA/DWP Status Form (MSHA Form 2000-142).

E. Establishing Designated Areas (DAs) or Designated Work Positions (DWP)

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

1. After each inspection, the sampling results should be reviewed to determine if additional work locations need 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 should be established.
 - b. When an MMU uses belt air to ventilate the face areas, a DA should be established, unless already required by a petition for modification. The intake air coursed through a belt conveyor haulage way must be sampled within 200 feet outby the active working face(s), unless stipulated otherwise in the petition for modification allowing the use of belt air.
2. When a new DA or DWP is to be established, the District Manager or his authorized representative shall 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 4" for DWP samples;
- c. The codes the mine operator will use to correctly identify the MMU/DA/SA entity in question 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 applied to DWPs only and normally is the first day of the next bimonthly sampling period); and
- f. Requiring the mine operator to submit a short addendum to the approved ventilation plan that shows the location of any new 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/m³ dust standard, Item 7B on MSHA Form 2000-142 shall be marked "Yes."

Examples:

- a. The sample concentration of the roof bolter occupation on an MMU with double-split ventilation exceeds 1.0 mg/m³ or the applicable dust standard, and the DO on the MMU and the roof bolter occupation are on different splits of air. Since the dust levels 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 must be established on the roof bolter.
- b. A reduced standard is established for the roof bolter at an MMU with single-split ventilation. Since the roof bolter is under an applicable dust standard that is significantly lower than that of the DO and the environment to which the DO is exposed does not contain over 5 percent quartz, the roof bolter must established as a DA.
- c. A sample is taken on the highwall drill-helper occupation on a reduced standard and is found to exceed the applicable dust 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 shall 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.

F. Removing DWPs from Sampling Status

It may be necessary to withdraw the designation of a work position 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 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 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 DWP being sampled.
4. Collect a sample from the DWP. If the concentration measurement is at or below 1.0 mg/m³ when the entity is on 2.0-mg/m³ standard or at or below the applicable standard when on a standard of 1.0 mg/m³ or less, the District Manager must notify the mine operator in writing that the entity is being removed from bimonthly sampling status.

The notification must include the following information:

- a. The cassette numbers and concentration measurements of all operator and MSHA samples that were used in making the determination;
 - b. The entity ID (Item 10 on Dust Data Card); and
 - c. 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 DWP is no longer required to be sampled by the operator, the entity must be placed in "D" status (Sampling not required) by checking Item 6D on the form.

G. Designating Mechanized Mining Units (MMUs) for Operator Sampling

After evaluating the results of a sampling inspection, it may be necessary to designate an MMU for operator quarterly sampling when it is determined that the approved dust control parameters may no longer be effective in maintaining compliance, placing miners at risk of being overexposed on individual shifts. The purpose for requiring quarterly sampling is to confirm the suitability of the approved plan parameters to the current operating conditions at the MMU by evaluating plan adequacy under the same production conditions and dust control parameters that were in effect when the entity first underwent verification sampling. That is, the amount of material produced during the shift sampled must equal or exceed the verification production level (VPL) and using only the dust control parameters listed in the approved ventilation plan, at levels not exceeding 115

percent of the specified quantities. Follow the procedure outlined below to ensure the proper designation of an MMU for sampling under § 70.215.

1. After each inspection, the results of respirable dust samples, along with the measured parameters that were in effect, should be reviewed to determine whether the particular MMU meets the criteria for quarterly sampling. If any sample collected by the inspector is found to exceed the applicable dust standard by at least 0.1 mg/m^3 , the MMU must be designated for quarterly sampling.
2. When an MMU is designated for sampling, the District Manager or his authorized representative must 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 designate the particular MMU;
 - b. The code to be used to identify the sample type (Item 9 on dust data card) which should be either "Type 1" for DO or "Type 2" for NDO, both of which are MMU samples;
 - c. The entity code to be used to correctly identify the designated MMU (i.e., 001-0 to 099-0);
 - d. The code(s) to be used to identify the occupation(s) to be sampled (Item 11 on dust data card); and
 - e. The quarterly period when sampling must begin for the newly designated MMU, which normally is the next full 3-month period following MSHA notification of the entity's designation. The quarterly periods are:
 - January 1 - March 31
 - April 1 - June 30
 - July 1 - September 30
 - October 1 - December 31
3. Enter the required information in the computer using MSHA Form 2000-142 on the first day of the next quarterly sampling period following MSHA notification of the MMU's designation.

H. Removing MMUs from Sampling Status

It will be necessary to remove an MMU from operator quarterly sampling upon finding that the operator has demonstrated continuing compliance with the applicable dust standard and that miners are no longer at risk of being overexposed on individual shifts. To ensure that the proper MMU is exempted from quarterly sampling, each sample collected by the operator and by MSHA during at least the previous four consecutive quarters must be at or below the applicable standard.

1. Review computer report MSM035, Review List For Potential Removal From Sampling, to identify the MMUs to be removed from quarterly sampling status. The District Manager or his authorized representative must notify the mine operator in writing that the entity is being removed from sampling status. The notification should include the following information:
 - a. The cassette numbers, occupation code(s), and concentration measurements of all operator and MSHA samples that were used in making the determination; and
 - b. The entity ID (Item 10 on Dust Data Card) and the affected occupation(s).
2. 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 an MMU is no longer required to be sampled by the operator, the entity must be placed in "D" status (Sampling not required) by checking Item 6D on the form.

I. Establishing a Reduced Dust Standard

It may be necessary to establish a reduced dust standard for an entity when an MSHA sample contains more than 5 percent quartz or more than 10 percent quartz for Part 90 miner. Follow the procedures outlined below to ensure that miners are protected from breathing respirable dust containing quartz levels in excess of 5 percent.

The following inspector samples will be analyzed for quartz:

- Samples with at least 0.200-mg weight gain collected from the environment of a DO, roof bolter, DA, DWP, NDE (NDO, NDA or NDWP), or Part 90 miner; and
- Samples 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 in the standard-setting process unless the sample contains at least 25 micrograms (0.025 mg) of quartz.

1. Underground Mines

The standard-setting procedures for underground mines no longer permit operator samples to be used in combination with an MSHA sample to determine the average quartz percentage used to calculate the applicable dust standard. Under the procedures that follow, only MSHA-collected samples, regardless whether for compliance or abatement purposes, will be used to determine the reduced dust standard.

Also, as illustrated in the examples below, the quartz content of inspector-collected samples in underground mines will now be reported to the nearest tenth of a percent, instead of truncating results to the nearest full percent. This will permit MSHA to set reduced dust standards at such levels as 1.1 mg/m³, 1.4 mg/m³, 1.6 mg/m³, and 1.9 mg/m³, which previously was not mathematically possible due to the practice of truncating the average quartz percentage.

- a. If any sample from a DO, DA, or NDE on a 2.0-mg/m³ standard contains more than 5.0 percent quartz, the applicable dust standard will be based on the average quartz percentage of the three most recent MSHA samples as illustrated in the example below. To ensure that the applicable standard is established in a timely manner, the two additional samples must be collected on different shifts within 15 calendar days after receipt of the results of quartz analysis.

Example: If the first DO sample taken in MMU 001-0 in Mine “A” under the revised procedures contains 10.2 percent quartz, the existing standard of 2.0 mg/m³ would continue to remain in effect until two additional samples are analyzed for quartz. Suppose the quartz content of the two additional samples was 12.1 percent and 11.3 percent, respectively, then the average quartz percentage would be 11.2 percent [(10.2% + 12.1% + 11.3%) ÷ 3 = 11.2 %]. This would result in a 0.9-mg/m³ standard (2.0 ÷ 11.2% = 0.9 mg/m³).

- b. When MSHA collects samples from DOs, DAs, Part 90 miners, and NDEs that are already on a reduced standard when these revised standard-setting

procedures takes effect, the new applicable dust standard will be established by averaging the quartz results of the first two MSHA samples taken under the new procedures with the previously-established quartz value used to set the dust standard in effect. If the required additional samples are not taken, the existing applicable dust standard will continue to remain in effect.

Example: Assume MMU 002-0 in Mine “B” is on a 1.0-mg/m³ standard (10% quartz). If the first DO sample contains 7.2 percent quartz, the existing standard of 1.0-mg/m³ would continue to remain in effect. If, however, the next sample contains 16.1 percent quartz, the average quartz percentage would be 11.1 percent $[(10.0\% + 7.2\% + 16.1\%) \div 3]$ or 11.1 percent quartz, resulting in a 0.9-mg/m³ standard $(10 \div 11.2\% = 0.9 \text{ mg/m}^3)$.

- c. After an entity is placed on a reduced standard using the new procedures, the new standard calculation will be done using the three most recent samples. The oldest sample will be dropped and the newest sample will be added. That is, the new applicable dust standard will be calculated by averaging the quartz percentage of the last two MSHA samples used to set the standard in effect with the result of the sample taken during the latest sampling inspection as illustrated in the following example. This will cause the applicable dust standard for an entity to be updated each sampling inspection.

Example: Suppose that MMU 001-0 in paragraph a. above was sampled after being placed on a 0.9-mg/m³ standard. If the quartz content of the DO sample was 14.1 percent, the average quartz percentage would be calculated using the three most recent samples. The oldest quartz percentage of 10.2 percent would be dropped and the newest value or 14.1 percent would be added. The new average quartz percentage of the three most recent samples would now be 12.5 percent $[(12.1\% + 11.3\% + 14.1\%) \div 3 = 12.5\%]$. Using the new average value, the applicable dust standard would change from 0.9-mg/m³ to 0.8-mg/m³.

- d. When the applicable dust standard is changed, the effective date of the new standard will be determined as follows:
 - (1) If the new dust standard is lower than the one currently in effect, the new standard would become effective seven calendar days after the data mailer to the operator has been generated. This should

provide the operator sufficient time to make necessary upgrades in the dust control parameters to maintain compliance with the new standard prior to MSHA sampling or operator quarterly sampling, if required.

- (2) If the new dust standard is higher (less quartz) than the one currently in effect, the new standard would go into effect immediately. The operator will be notified of the new dust standard by mail via the data mailer that is used now.
- (3) If any operator quarterly sampling, MSHA compliance or abatement sampling is in process when the new standard becomes effective, the higher of the two standards will be used for making a compliance determination. The new standard will go into effect after completion of sampling, with one exception. When abatement sampling shows continued noncompliance, the new standard will go into effect before any additional sampling is conducted.

d. When results of quartz analysis indicate that a change may be required in the dust standard for a nondesignated occupation or area, the following procedures apply:

- (1) The District Manager must determine whether or not to establish the occupation or NDE as an entity in "temporary" status. Under the temporary status, the district must collect the required two additional samples within the period specified in preceding paragraph 1.a. to determine the average quartz percentage and set the applicable dust standard.
- (2) If the entity is not protected by another entity's standard and the District Manager determines that it should be on a reduced standard, 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 and the applicable standard that must be complied with.

2. Surface Mines and Surface Areas of Underground Mines

Unlike for underground mines, the standard-setting procedures for surface mines and surface areas of underground mines will continue to permit mine operators to

participate voluntarily in the process of setting reduced dust standards. That is, under certain conditions, operator “optional” samples will continue to be used in combination with an MSHA sample to arrive at an average quartz percentage that is used to calculate the applicable dust standard. It also will continue to provide for the automatic reevaluation of DWPs on a reduced standard every six months. These procedures do not apply to Part 90 miners assigned to work at a surface work location.

- a. If any sample from a DWP or NDE (NDWP) on a 2.0-mg/m³ standard contains more than 5 percent quartz, the 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). 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 71 (with the above exceptions) and transmitted to MSHA within 24 hours after the end of the sampling shift(s).

- (1) 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.
- (2) 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.

- (3) 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.
 - (4) 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.
 - (5) 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.
- b. If the operator's first optional sample is not collected in accordance with sampling procedures under Parts 71, 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 sample will be used to set the applicable dust 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 new standard.
- c. When MSHA collects samples from DWPs and NDEs that are already on a reduced dust standard, the applicable standard will be adjusted in the following manner:
- (1) 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.

- (2) 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,
- d. Approximately every 6 months, MSHA will automatically analyze for quartz one valid operator bimonthly sample with sufficient weight gain that was collected under Part 71 from DWPs on reduced standards.
- (1) If the percentage of quartz found in a DWP sample differs by 2 percent or less from the previously-established quartz value used to set the dust standard for that occupation, 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.
 - (2) 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, MSHA will notify the operator via computer message of the option to collect a dust sample from the affected area or occupation within 7 calendar days after receiving MSHA notification.
 - (3) 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 occupations and with the quartz value of Parts 71 samples. Based on the average of these three quartz values, the respirable dust standard will be adjusted.
 - (4) If the operator's optional sample is not collected in accordance with Parts 71, 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.

- e. When results of quartz analysis indicate that a change may be required in the dust standard for a nondesignated work position, the following procedures apply:
- (1) 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.
 - (2) 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.
 - (3) 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.
 - (4) 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 not to submit bimonthly samples on this entity. 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.

- (5) 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 MIS showing the mines and entities that have quartz samples pending over 30 days due to delay in establishing the entity on the data base.
 - (6) 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.
3. When an operator or miners' representative requests a quartz reevaluation based on but not limited to justification listed in paragraph I..5. of this section, and MSHA elects to conduct such reevaluation or when collecting additional samples under the new standard-setting procedures for underground mines, the inspector will also determine if the operator is in compliance with the applicable standard in effect (see paragraph A.6.a. of this chapter). When sampling for quartz purposes, samples should be collected not only from the affected occupation(s) but from other occupations that normally would be sampled during a sampling inspection according to Section III.A.2. of this chapter.
4. 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 the 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 MSHA indicates a violation of the reduced standard at location 2, the inspector should refer to Section III.A.6. 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.
5. 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. - can either increase or decrease airborne quartz levels.
 - b. Improved dust controls - mine operator requests MSHA to resample because of changes in the mining method or improvements in ventilation or engineering controls.
6. 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 the mining conditions that were encountered. This can be used to compare operating conditions observed in subsequent surveys.

Appendix A

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

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

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

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.

- A. 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.

- B. The operator is not in compliance if drill dust controls are not installed.
- C. The operator is not in compliance if drill dust controls are installed but are not operating.

- D. 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.
- E. 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:
1. The MSHA inspector will request assistance from persons with technical expertise, either in the MSHA District Office or from MSHA's Safety and Health Technology Centers, in evaluating the specific drill and its operation at the mine. If MSHA's district personnel with technical expertise or the Safety and Health Technology Center 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.
 2. 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.
 3. 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.
- F. 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.

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.

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

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.

- A. 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.
- B. 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 C

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

§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. The person conducting the examination must record air quantities and velocities, water pressures and flow rates, excessive leakage in water delivery system, water spray numbers and orientations, section ventilation and control devices and any other dust suppression measures required by the ventilation plan. 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 certified person must verify the record of each examination by initials, date and time at the end of the shift for which the examination was made. This record must be retained at the surface location at the mine for at least 6 months.

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.

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 record or certify by date, time, and initials that the examination was conducted, appropriate enforcement actions shall be taken under §75.362(g)(1)/(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 D

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

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 (AAA). 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 U.S. 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, 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 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 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 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 examination 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 the dust control parameters specified in the approved ventilation plan.

Appendix E

Evaluation of an Acceptable Respiratory Protection Program

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 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 contaminate levels exceeding the appropriate standard. The use of personal respiratory protection will not prevent the issuance of citations for exceeding the applicable dust standard. 30 CFR Parts 70, 71, and 90 require that respirable dust levels be maintained 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.