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Underground Coal Mine Ventilation—Safety Standards for the Use of a Belt Entry as an Intake Air Course To Ventilate Working Sections and Areas Where Mechanized Mining Equipment Is Being Installed or Removed; Final Rule

DEPARTMENT OF LABOR

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Underground Coal Mine Ventilation—Safety Standards for the Use of a Belt Entry as an Intake Air Course To Ventilate Working Sections and Areas Where Mechanized Mining Equipment Is Being Installed or Removed

AGENCY: Mine Safety and Health Administration, Labor.

ACTION: Final rule.

SUMMARY: The final rule will allow the use of intake air passing through belt air courses (belt air) to ventilate working sections and areas where mechanized mining equipment is being installed or removed in underground coal mines. The use of belt air, under the conditions set forth in the final rule, will maintain the level of safety, and therefore not reduce protections, currently afforded miners in underground mines while implementing advances in mining technology. The final rule amends existing safety standards for ventilation of underground coal mines. This final rule also amends other standards.

DATES: This standard is effective June 1, 2004, with the exception of §§ 75.351(e)(3) and 75.351(r) which are effective August 2, 2004.

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You may obtain copies of the final rule in alternative formats by calling his number or downloading the document from our Web site. The alternative formats available are either a large-print version of this document or an electronic file that can be sent to you either on a computer disk or an attachment to an e-mail. The document also is available on the Internet at *http://www.msha.gov/REGSINFO.HTM.*

SUPPLEMENTARY INFORMATION:

Outline of Preamble

This outline will help interested parties find information in this preamble more quickly.

I. Background

The final rule revises §§ 75.350, 75.351, and 75.352 of our existing safety standards for underground coal mines. The rule also amends §§ 75.301, 75.371, 75.372, and 75.380 of our existing safety standards for underground coal mines. These changes provide protection for miners when air is coursed through the belt entry to ventilate working sections and areas where mechanized mining equipment is being installed or removed in underground coal mines (setup or removal areas). Effective ventilation and the quick identification of potential hazards are needed to provide a safe environment for miners. New technology has proven safe and effective in quickly and reliably detecting the products of combustion and providing early warning to miners. The use of belt air under this final rule will increase protection compared to mines that use only point-type heat sensors by quickly detecting products of combustion in the belt entry at an early stage of fire development and by rapidly providing warning. With this final rule in place, mine operators will no longer be required to submit petitions for modification of existing standards in order to use belt air. These changes are in accordance with requirements in section 101 of the Federal Mine Safety and Health Act of 1977 (Mine Act), 30 U.S.C. 811.

The Federal Coal Mine Health and Safety Act of 1969 (the Coal Act), and the Mine Act that superseded it, provided that entries used as intake and return air courses be separated from belt haulage entries, and that air coursed through belt entries be prohibited from ventilating active working places. However, existing mines (pre-Coal Act mines) using belt air were permitted to continue to use belt air, with approval of the MSHA district manager (30 CFR 75.350 and formerly 30 CFR 75.326). This approach of isolating the belt entry was directed at hazards associated with the potential for undetected fires and increased dust levels in conveyor belt entries. The approach was implemented through mandatory safety standard, 30 CFR 75.326. Technology has evolved since the passage of the Coal Act in 1969. Advances in computer-operated atmospheric monitoring systems (AMS) have led to acceptance of AMSs as an effective tool to monitor conditions in mine entries and detect the products of combustion at an early stage of fire development. This final rule establishes the requirements for integrating AMSs into a comprehensive and safe approach to use belt air for ventilation of working sections or setup or removal areas that maintains or increases protection for miners.

MSHA first published a proposed rule to revise the safety standards for ventilation of underground coal mines (including original 30 CFR 75.326) in the **Federal Register** January 27, 1988 (53 FR 2382). As part of that proposed rule, MSHA proposed to allow air coursed through the belt entry to ventilate working places when mine operators have installed carbon monoxide (CO) sensors in the belt entry.

In response to public comments submitted to the Agency on the January 27, 1988 proposed rule, we held six public hearings in June 1988, with the rulemaking record closing in September 1988. Based on public comments received during this period, MSHA's Assistant Secretary called for a thorough review in March 1989 of safety factors associated with the use of air in the belt entry in the working places. MSHA completed this review and announced in an August 25, 1989 Notice in the **Federal Register** (54 FR 35356), the availability of the Belt Entry Ventilation Review (BEVR) Report. The report concluded that ''* * * directing belt entry air to the face can be at least as safe as other ventilation methods provided carbon monoxide monitors or smoke detectors are installed in the belt entry.''

After the BEVR report was issued, we reopened the ventilation rulemaking record and held a seventh public hearing in April 1990, to receive public comment on issues raised in the report. The reopened ventilation rulemaking record for the 1988 proposed rule closed in May 1990.

Comments received during and after the seventh public hearing expressed divergent views on the recommendations of the BEVR Committee. Commenters representing industry and academia concluded generally that the use of air in the belt entry provides positive ventilation and reduces the possibility of a methane (CH_4) build-up in the belt entry. Commenters from labor, on the other hand, maintained that the use of air in the belt entry reduces safety due to increased exposure to products of combustion and greater dust levels.

Due to these divergent views, when the ventilation rule for underground coal mines was finalized in 1992, it did not include provisions that would have allowed mine operators to use belt air to provide intake air to working places. MSHA's existing standards do not allow this practice except as approved on a mine-specific basis through the petition for modification process (30 U.S.C. 811 (c)) or when approved by the MSHA district manager for mines opened on or before March 30, 1970 (pre-Coal Act mines). The final ventilation rule retained the requirements of then-existing 30 CFR 75.326 requiring, in part, that entries used as intake and return air courses be separated from belt haulage entries and prohibiting air coursed through belt entries from ventilating active working places.

MSHA decided that the use of belt air to ventilate working places should continue as an independent rulemaking effort. As part of this effort, the Secretary of Labor appointed an Advisory Committee in January 1992 and charged it to make recommendations concerning the conditions under which air in the belt entry could be safely used in the face areas of underground coal mines. This committee was designated as the Department of Labor's Advisory Committee on the Use of Air in the Belt Entry to Ventilate the Production (Face) Areas of Underground Coal Mines and Related Provisions (Advisory Committee). The Advisory Committee held six public meetings over a six-month period. After reviewing an extensive amount of material, the Advisory Committee concluded in a final report that air in the belt entry could be safely used to ventilate working places in underground coal mines, provided certain conditions are met.

The Advisory Committee made twelve recommendations to support this conclusion. The Advisory Committee submitted its report to the Secretary of Labor in November 1992. We published a December 2, 1992 Notice (57 FR 57078) in the **Federal Register** announcing the availability of the Advisory Committee's final report and stated that we would review its recommendations.

When the Agency published its final revised ventilation rule in March 1996, several commenters urged MSHA to

proceed at that time on the issue of belt air. However, belt air was not addressed in that rulemaking. The issue was placed on MSHA's rulemaking agenda for the development of a separate proposed rule (61 FR 9765).

On January 27, 2003, MSHA published a notice of proposed rulemaking (68 FR 3936) to modify existing ventilation standards to allow the use of belt air, once certain controls were implemented in mines with three or more entries. There were five hearings on this proposed rule: in Grand Junction, Colorado; Charleston, West Virginia; Washington, Pennsylvania; Birmingham, Alabama; and Lexington, Kentucky. The post-hearing comment period closed June 30, 2003.

II. Discussion of Final Rule

A. General Discussion—30 CFR, Part 75, Subpart D—Ventilation

Existing § 75.350 (Air courses and belt haulage entries) requires that entries used as intake and return air courses be separated from belt haulage entries and prohibits air coursed through belt entries from ventilating working places. At the time the Coal Act was passed, there was concern with the increased use of conveyor belts and the potential for propagation of fires along these belts. Room and pillar mining was the predominant form of coal mining and computer-operated monitoring systems, such as the AMS, did not exist. Modern technology now allows for the use of belt air to ventilate working sections and setup or removal areas due to the development of sensitive atmospheric monitoring systems that utilize CO sensors that can readily detect small increases in the products of combustion. As AMSs have become more sophisticated, they have employed computer technology to transmit environmental measurements from remote locations to attended mine locations. These systems provide signals, store and catalogue data, and provide reports.

The final rule continues to allow the existing method of ventilation where belt air is coursed directly to a return air course or to the surface and not onto either the working sections or setup or removal areas. However, it also permits, with additional requirements to ensure miner safety, the use of belt air to ventilate the working sections and setup or removal areas.

Prior to this final rule, a mine operator would file a petition for modification to seek approval to use belt air to ventilate working places in the mine operator's underground coal mine. MSHA grants approval when the petitioned for change provides an alternate method that guarantees no less than the same measure of protection afforded by the existing standard, or when the application of the existing standard will result in a diminution of protection (30 U.S.C. 811(c)). To date, we have granted approximately 90 such petitions. However, a few of these have been revoked because the mine chose not to implement the petition or the mine was closed. Nine petitions are being processed as of the date of this notice.

Under existing § 75.350—Air courses and belt haulage entries, mines opened on or before March 30, 1970, may use belt air to ventilate working places when it is determined that this air is needed to provide adequate ventilation. Currently, pre-Coal Act mines opened before 1970 are ventilated in this manner. In each of these cases, we require the mine operator, through the mine ventilation plan, to continue to provide at least the same level of protection afforded to miners in petitions that we have granted. Under this final rule, the pre-Coal Act mines are not exempted and, therefore, must meet the new standards. This action will effectively increase protections in these mines.

MSHA's proposed belt air rule (68 FR 3936, January 27, 2003) contains further discussion of: MSHA's experience with AMSs, including belt air petitions; a discussion of reportable and nonreportable belt fires; and a section discussing Summary and Considerations of the Advisory Committee Report, Recent Belt Air Petitions, and the BEVR Report. The proposed rule can be located at *http://www.msha.gov/REGSPROP.HTM.* MSHA refers the reader to this discussion for additional information.

1. General Comments

Many comments were received during the public hearings on the belt air proposed rule which were not directly related to specific proposed provisions. While comments were directed at enhancing the health and safety of miners, they were either beyond the scope of the proposed rule or are addressed by existing standards.

a. Respirable dust. Concerns with respirable dust levels for shuttle car and ram car operators working just inby the section loading point were expressed by a number of commenters. This issue is beyond the scope of this rulemaking. The mine operator is still required to meet air quality requirements, including respirable dust (30 CFR part 70, subpart B—Dust Standards). Operators may need to implement additional dust controls in outby areas to use belt air and maintain compliance with existing standards.

b. Replace point-type heat sensors with AMS technology in all underground coal mines, not just those using belt air to ventilate working sections. It was suggested by a number of commenters that AMS technology be required in the place of point-type heat sensors (PTHS) for fire detection in belt lines in all underground coal mines. The Agency encourages the implementation of AMS technology for fire detection because the Agency believes it to be superior to PTHS systems. However applying AMS technology to all underground coal mines is beyond the scope of this rulemaking on belt air and is, therefore, not addressed in this final rule.

c. Battery backup of AMS. A number of comments were received regarding a petition requirement for a 4-hour battery backup for the AMS. The typical language from the petitions is as follows: ''The low-level carbon monoxide system shall be capable of giving warning of a fire for a minimum of 4 hours after the source of power to the belt is removed, except when the power is removed during a fan stoppage or the belt haulageway is examined as provided in 30 CFR 75.1104–4(e)(1) and (2).'' This is not a requirement, as interpreted by the commenters, for a battery backup for the AMS. There are no existing granted petitions known to include such a requirement for a battery backup for the AMS.

This language does not require the installation of an uninterrupted power supply (UPS) for the AMS. If power is removed from the belt, the AMS will function properly if powered from a different electrical circuit than the belt. If, however, the power source to the surface computer is interrupted, the AMS will not function. Without a UPS to power the system, the mine operator would be required to begin patrolling the belt entries, as required by § 75.352(e)(3).

The battery backup requirement is not included in the National Fire Code No. 72A (1967). Although it is not specifically required by this rule, mine operators can consider installation of a UPS to assure system operation in the event of a power interruption.

In addition, if the AMS is used as a communication system under § 75.351(r) of this final rule, then under § 75.1600(c)(2) the system must be provided with means to permit continued communication in event the mine electric power fails or is cut off. The most likely method of compliance is installation of a UPS for the AMS.

d. Require use of both carbon monoxide and smoke sensors. Some commenters suggested that the standard should require the use of both ''carbon monoxide and smoke'' detection as included in the Advisory Committee recommendations, rather than the language in the proposed rule allowing ''carbon monoxide or smoke'' detectors. MSHA did not require both for several reasons. First, researchers at the U.S. Bureau of Mines (RI 9586 and RI 9311) have stated that some smoke sensors are subject to adverse effects of dust and humidity. MSHA is not aware of a commercially-available smoke sensor not subject to dust-related interference that meets the requirements of § 75.1103–2 for use in underground coal mines. Second, CO sensors have proven to be protective for smoldering and flaming coal-type fires. NIOSH research (RI 9622) indicated a detection level of 5 ppm CO was equivalent to the detection level of smoke sensors. This comparison has led the Agency to conclude that the maximum alert level of 5 ppm carbon monoxide will provide at least the same protection to miners as a smoke sensor. For these reasons we have retained the proposed rule language, but we would encourage future research as well as implementation of new technology once it becomes available.

e. District manager discretion. Many commenters were concerned with the level of discretion that the proposed rule would give to district managers. District managers currently are responsible for the biannual reviews of the mine ventilation plans, quarterly safety and health inspections, and other inspection and investigation activities under the Mine Act. This final rule adds ventilation plan requirements that will be reviewed as part of the plan approval process. This final rule provides flexibility for mine operators to tailor ventilation plans to mine-specific conditions, and gives the district manager discretion to approve or disapprove these plans, based on those mine conditions. Such conditions could include: establishment of ambient CO levels; lower CO alert and alarm levels; implementation of other technology, such as DDS in areas of the mine where diesel-powered equipment is used; or hydrogen-insensitive sensors used to monitor battery charging stations. MSHA believes this discretion is necessary to assure that protective, mine-specific ventilation plans are developed and implemented.

f. Use of 1989 BEVR Report and 1992 Advisory Committee Report. Many of the same commenters also strongly opposed MSHA's reference to the 1989 BEVR Report in the preamble of the proposed rule. They repeatedly noted NIOSH's opposition to the conclusions of that report as a basis for their objections. MSHA included the BEVR Report in the preamble of the proposed rule for the sake of a thorough review of existing documentation on the use of belt air. We relied upon the Advisory Committee Report and our extensive experience with granted petitions to write the proposed rule. It is important to note that NIOSH, in comments to the proposed rule, states that the use of belt air may have a positive effect on reducing dust levels in the face area. In addition, NIOSH states ''The development of improved atmospheric monitoring systems with fewer failures and false alarms has addressed previous reliability concerns.''

These same commenters also testified that they never fully endorsed the recommendations of the Advisory Committee Report and perceive Agency inclusion or exclusion of various recommendations as being arbitrary and more dependent upon what ''fits [MSHA's] current rulemaking and enforcement scheme.'' As discussed in the proposed rule, most recommendations of the Advisory Committee were included in the proposed rule and are retained in the provisions of the final rule. In cases where a recommendation was not included, extensive discussion was provided in the proposed rule. In addition, analyses in previous sections of this preamble indicate the differences found between the belt-air related requirements of granted petitions and provisions of this final rule, and the ventilation plan of a pre-Coal Act mine and provisions of this final rule do not reduce protections afforded to miners.

In addition, commenters have stated that ''the Agency gives no consideration to the protections miners and their representatives have been able to attain at the mine sites through the 101(c) petition process.'' They continue that ''the recommendations of the Advisory Committee coupled with language currently used in these petitions should have been the basis for MSHA's writing of this proposed rule.'' MSHA used all relevant information available to draft the proposed safety standard. MSHA has painstakingly evaluated all evidence in the record. Numerous changes have been included in the final rule that were not included in the proposed rule based on this analysis of, and response to, public comments. These changes will be discussed in detail in the section-by-section discussion. However, the final rule now provides for a maximum allowable air velocity in the belt entry, notification and withdrawal of personnel on working sections to a safe location if two consecutive sensors signal in the alert mode, installation of lifelines in return entries when used as alternate escapeways, and a 50% limit on intake air provided by the belt air course. Many of these changes will increase miner safety and in no case will the changes reduce the current level of protections afforded miners.

g. Slippage switches. Finally, while neither the proposed rule nor any granted petition included a requirement to monitor slippage switches, the Advisory Committee recommended the integration of slippage switches that detect belt slippage into the early-warning fire detection system. If this was not feasible, the Advisory Committee recommended that the switches be visually examined each production shift. MSHA did not propose a provision on slippage switches but did solicit comments on this issue in the proposed rule. Only a few commenters submitted information on this issue. They stated that monitoring slippage switches would be inexpensive and should be required by this final rule. Such monitoring would indicate if the belt drive would be shut down in case of slippage. Another commenter was not certain whether it was contemplated that a belt slippage would trigger an alert or alarm. MSHA believes that the monitoring of slippage switches provides little relevant information, since the belt is shut down if slippage is detected. Therefore, no such requirement is added to the final rule.

2. Comments Comparing the Differences Between the Final Rule's Provisions and Requirements Found in Either Granted Petitions or in a Pre-Coal Act Mine's Approved Ventilation Plan

The following discussion reviews comments that were received during this rulemaking that address the level of protection afforded by the final rule in comparison to levels of protection provided by granted petition requirements or ventilation plan requirements of a pre-Coal Act mine. The areas discussed are:

a. Protections under the final rule are at least equal to those contained in granted belt air petitions for modification (granted petitions) and, therefore, provide the same level or an increased level of protection currently afforded miners;

b. The role of atmospheric monitoring systems in granted belt air petitions and in the final belt air rule;

c. Granted belt air petition requirements not included as provisions in the final belt air rule; and

d. The effect of the final belt air rule on pre-Coal Act mines that use belt air to ventilate working sections.

a. Protections under the final rule are at least equal to those contained in granted belt air petitions for modification (granted petitions) and, therefore, provide the same or an increased level of protection currently afforded miners.

The Agency received a variety of opinions on the need for this rule and its legal basis. Some commenters supported the proposed rule, but suggested existing requirements in granted petitions be grandfathered. The commenters argued that these older requirements, such as the 2,000-foot spacing of sensors, still provide an adequate degree of safety required to use belt air. Their position is that if companies have operated successfully under the existing provisions of a granted petition, there is no need to change these requirements to conform to the new standards. We cannot dispute that some mines have effectively discovered fires using the parameters in older granted petitions. However, research and our experience gained through the petition for modification process (petition process) have shown the final belt air provisions discussed in this preamble are more protective than those requirements in older granted petitions.

In addition, these commenters suggested there will be a significant increased burden on the operators without a significant benefit to be gained by implementing the final rule. It is clear that many older granted petitions do not include significant improvements mandated in the newer petitions granted since 1996. Some older granted petition requirements have been modified by operators who recognized safer operating parameters could be implemented. These mines are operating at a level of safety exceeding the requirements of their respective granted petitions. For example, the petition granted to one mine required alert and alarm levels at 10 and 15 parts per million (ppm), respectively. The mine operator has since reduced the levels to 7 and 12 ppm, respectively, thus increasing the early-warning fire capability of the AMS. In addition, another mine operator reduced sensor spacing from 2,000 feet to 1,000 feet to reduce the distance that the products of combustion would need to travel before being detected by an AMS sensor. This increased the early-warning fire detection capability of the AMS.

Other commenters endorsed the concept of promulgating a rule, indicating that the rule was needed because of the high number of petitions filed. This final rule eliminates the need to apply for a petition and the corresponding delay in implementing the use of belt air due to the time required to process the petition.

Different commenters demanded that the Agency withdraw the proposed rule and continue to allow the use of belt air only through the petition process due to many mine-specific health and safety concerns. One post-hearing commenter stated that the use of belt air at the Jim Walter Resources No. 5 mine (JWR No. 5 mine) was a contributing factor in the explosion that killed 13 miners in September 2001. The commenter asserts that if belt air was not used, at least one or two additional entries would have needed to be developed in order to provide adequate intake air to the section.

MSHA evaluated the comments and determined that it is highly unlikely that additional entries on the longwall development would have prevented the explosions. According to the MSHA investigation report (United States Department of Labor, Mine Safety and Health Administration, Coal Mine Safety and Health. Report of Investigation—Fatal Underground Coal Mine Explosions, September 23, 2001—No. 5 Mine, Jim Walter Resources, Inc., Brookwood, Tuscaloosa County, Alabama—ID No. 01–01322.), the initial build-up of methane in the section was due to damaged ventilation controls between the intake and return entries. This damage was caused by a roof fall. This allowed intake air to short-circuit from the intake track entry into the return between the entries two crosscuts outby the last open crosscut, as noted in the accident investigation report. It was not due to blockage of the intake airway as suggested by the commenter. It is likely that any additional intake entries would have been on the opposite side of the large coal pillar, and the short-circuiting would have still occurred following the roof fall and damage to the stopping. The first explosion damaged additional ventilation controls which further affected ventilation and created the conditions for the larger second explosion.

The commenter further suggests that the AMS did not work to protect miners in the JRW No. 5 mine. MSHA disagrees. The AMS is designed to detect low-level CO concentrations in the event of a fire along the belt air course. It was not designed to withstand the forces of an explosion, and on September 23, 2001, the AMS was damaged by the initial explosion. According to MSHA's accident report, the AMS correctly identified the damage and reported the failure of the system to communicate with its components. The AMS records indicated that alert and alarm signals from other sensors exposed to CO from the explosion were received at the surface location. The system was determined to be operating properly and as designed at the time of the accident.

In addition, the commenter asserts that the use of belt air contributed to a build-up of float coal dust in the belt and return air courses that contributed to the severity of the fatal explosion. The findings in the accident report show that rock dusting was not performed properly to maintain the incombustible content in the mine. This was due to a lack of rock dust application, and not to the use of belt air. Even in the situation where the belt air is coursed in the outby direction, the return and intake entries would still need to be dusted. Both return air courses could be continually dusted while production continued 24 hours a day. As cited in the accident report, ''If the 4 Section had been adequately rockdusted, coal dust would not have contributed to the second explosion and the severity of the accident. The number of fatalities would have been reduced.''

One commenter asserted that the proposed rule violates section 101(a)(9) of the Mine Act because it allegedly reduces the protections afforded miners under mine-specific modifications to the application of the existing standard. MSHA disagrees. The final rule does not violate section 101(a)(9) of the 1977 Mine Act because that provision does not call for a comparison of a new standard with mine-specific modifications of the application of an existing standard. Section 101(a)(9) states: ''No mandatory health or safety standard promulgated under this title shall reduce the protection afforded miners by an existing mandatory health or safety standard.'' The plain language of section 101(a)(9) calls only for a comparison of a new standard with an existing standard. The plain language of section 101(a)(9) is corroborated by the statutory placement of section 101(a)(9). Section 101(a)(9) is part of the subsection which pertains to mandatory health and safety standards—*i.e.*, section 101(a)—and is one of a series of procedural and substantive requirements which apply to such standards. The placement of section 101(a)(9) indicates that it was intended to require a ''no less protection'' comparison with existing mandatory standards promulgated under section 101(a), and was not intended to require such a comparison with mine-specific modifications of the application of

existing standards granted under section 101(c).

Accordingly, section 101(a)(9) requires that, in promulgating a new rule permitting the use of belt air, the Secretary weigh the net effect on safety under the new rule against the net effect on safety under the existing standard limiting the use of belt air. In promulgating this final rule, MSHA has done just that. MSHA has compared the protections provided by this final rule with the protections afforded by the existing standard and has concluded that, for the reasons set forth below, the final rule does not reduce the protection afforded by the existing standard.

Some commenters argued that this final rule did not address mine-specific concerns which were better addressed in petitions for modification. It should be noted that petition language is proposed by mine operators as an (alternative method of achieving the level of safety provided by 30 CFR 75.350). Under the ''alternative method'' of achieving compliance contemplated by Section 811(c), however, the mine operator need only establish that an alternative method achieves the result of the standard and guarantees a net ''equivalence'' in mine safety, taking all effects on mine safety into account.

Although mine-specific modifications of the application of a mandatory safety standard, together with any requirements imposed in those modifications, have ''the same effect as a mandatory safety standard'' at the particular mine (30 CFR 44.4(c)), such modifications have never been held to constitute a mandatory safety standard of general application. A mandatory safety standard is generally applicable to all covered mines, whereas a mine-specific modification applies to only the one mine for which it was tailored.

In addition, MSHA has determined that other safety and health provisions that may have been included in the granted petition after negotiations between the mine operator and miners' representatives are not germane to the safe use of belt air. Therefore, it is not appropriate, as well as not legally required, to include them in this final rule. For example, two petitions require an intake travelway on a longwall tailgate. An existing standard, § 75.384, already requires travelways. Also, stopping construction is limited in some petitions to solid-block construction. Stopping construction is already addressed by an existing standard, § 75.333.

The Secretary acknowledges that some mine-specific modifications of the application of the existing standard contained conditions that, from a safety standpoint, went beyond what was required to achieve net equivalence with the existing standard. While the Secretary encourages the regulated community to institute safety measures that exceed what is required by her mandatory standards, the Secretary has determined that such measures are not required to achieve safety levels deemed adequate under the existing standard and the new rule.

Some commenters contend that one-size-does-not-fit-all when it comes to using belt air in a variety of different mines. MSHA agrees. For example, the final rule allows flexibility for determining how the ambient, alert and alarm levels are established. This gives the district manager discretion in approving different levels in the ventilation plans for different mines, tailoring plans to mining conditions in each individual mine.

In general, existing § 75.370—Mine ventilation plan; submission and approval, requires that mine operators develop and follow a mine-specific ventilation plan that has been approved by the district manager. Section 75.371—Mine ventilation plan; contents, sets out the information that must be included in the ventilation plan. Additionally, the district manager is given discretion under § 75.371 to require additional provisions in submitted plans, if they are necessary to protect workers from methane and respirable dust.

b. The role of atmospheric monitoring systems (AMSs) in granted petitions and in the final belt air rule.

The cornerstone for allowing the use of belt air as intake air ventilating working sections and setup or removal areas in either a granted petition or this final rule is the proper installation, operation, maintenance, and examination of an AMS. An AMS provides for early-warning fire detection along the belt air course using sensors that detect low levels of CO or smoke. Signals from these sensors are transmitted to a designated surface location at the mine so that an AMS operator can notify appropriate personnel so that they can take required actions, depending on the type of signal received. These actions could range from an investigation of a malfunctioning sensor to evacuation of affected miners to a safe location in the mine due to an alarming sensor. Existing § 75.351—Atmospheric monitoring system (AMS), establishes performance requirements for these systems used to comply with existing §§ 75.323(d)(1)(ii)—Return air split alternative, 75.340(a)(1)(ii) and 75.340(a)(2)(ii)—Underground electrical installations, or 75.362(f)—On-shift examination. As explained in the section-by-section analysis of this final rule, existing § 75.351 is revised to require the installation and operation of an AMS if the mine operator chooses to use belt air to ventilate working sections and areas where mechanized mining equipment is being installed or removed in underground coal mines. This requirement increases the level of safety provided miners in that an AMS, when used to comply with the automatic fire sensor requirements referenced in § 75.1103–4(a)(2), can detect the products of combustion much faster than the more-common point-type heat sensors which require a significant level of heat to activate. Some commenters stated that belt air has been successfully used over many years and that only minor issues have developed concerning the AMS. An example was given that false alarms, or alarms that signal non-fire events, have been a problem in the past; but they have been ''addressed.'' The National Institute for Occupational Safety and Health (NIOSH) commented that ''The development of improved atmospheric monitoring systems with fewer failures and false alarms has addressed previous reliability concerns.'' One commenter stated that the AMS has helped to limit the number of belt fires at his mine. The use of modern AMSs helps to minimize alarms due to non-fire related CO production (nuisance alarms) and therefore, increases confidence that the signals reflect potentially hazardous conditions.

Under § 75.351(m) of this final rule, when a demonstrated need exists, such as the use of diesel-powered equipment, that can cause nuisance alert and alarm signals, time delays of up to 3 minutes (180 seconds) may be incorporated into the AMS. These time delays reduce the number of non-fire related CO sensor signals, therefore making the system more reliable by reducing nuisance alert and alarm signals.

In addition, this final rule also reduces alert and alarm levels to 5 and 10 ppm above ambient CO levels, respectively, from higher levels specified in some existing granted petitions, thus increasing protection to miners. These are the maximum alert and alarm levels allowed by this final rule. Lower alert and alarm levels can be required by the district manager if conditions in the mine warrant such a reduction. One such condition would be air quantities sufficient to dilute CO produced by a fire which could delay the early detection of the fire.

All alert and alarm values for particular CO sensors take into account

the ambient CO level (average concentration in ppm in the air course containing CO sensors) for that area of the mine where the sensors are located. Maximum alert and alarm values will be 5 and 10 ppm above ambient CO levels. For example, with an ambient CO level of 2 ppm, the alert and alarm levels will be 7 and 12 ppm, respectively. For an ambient CO level of 4 ppm, the alert and alarm levels will be 9 and 14 ppm, respectively. Both of these sets of values provide equivalent protection because the alert and alarm signals are provided when the CO concentration in the belt air course rises 5 and 10 ppm above the ambient for that area of the mine, respectively.

Also, the final rule reduces sensor spacing required by some of the older granted petitions from 2,000 feet to 1,000 feet. These additional safety requirements increase the level of fire safety in mines that choose to use belt air to ventilate working sections and setup or removal areas. We believe that there will be a reduction in the number of reportable belt fires and their severity due to the reduced sensor spacing and lowered alert and alarm levels. These provisions will provide increased early warning of the presence of the products of combustion.

Some commenters stated that more regulation is needed to make sure that the AMS is maintained and that miners are trained. They recommended that MSHA review the most stringent granted petition and adopt its training requirements into law. We believe the final rule's maintenance and training provisions are appropriate. This final rule requires the AMS to automatically signal the AMS operator of electrical malfunction of the system. If malfunction signals are received at the surface location, the AMS operator must notify appropriate personnel who have the responsibility to take immediate action to investigate the signals and correct any problems. Furthermore, the final rule requires that personnel must be trained to maintain the system and that the system must be maintained in proper operating condition. Training provisions in this final belt air standard are consistent with existing training requirements in granted petitions. As will be discussed later, it is the Agency's position that current training requirements in part 48 are sufficient to train miners and that the emergency drill requirements in existing standards are sufficient to give miners practical experience in the mine during non-emergency situations.

c. Granted belt air petition requirements not included as provisions in the final belt air rule.

In the preamble of the proposed rule, we summarized our analysis of the latest granted petition requirements from 2000 and 2001. Some commenters to the proposed rule questioned why we limited our analysis to petitions granted during 2000 and 2001. They identified specific petitions granted prior to 2000 and referenced some of these requirements. Some commenters suggested we should not have limited the analysis to that period, and that we should review all of the granted petitions. In response to these comments, we have reviewed nearly all of the petitions granted since 1978 in order to determine if there are any provisions not included in the final rule that are directly related to the safe use of belt air and are not already addressed by existing standards.

We identified these requirements and considered whether they should be included in the final rule. Some of the early petition requirements identified are strengthened by the final rule, and some, while not specifically covered by this rule, are addressed in the mine ventilation plan approval process or by existing standards. Three phases of belt air granted petition requirements exist: those before the 1989 BEVR Report, those granted after publication of the BEVR report but before the 1996 revision of part 75 subpart D—Ventilation, and those granted after 1996. Requirements increased during each time period and became more consistent after 1996.

We have reviewed differences between the final rule's provisions and the requirements in granted petitions and a generic petition that was submitted as a post-hearing comment. While we have adopted a majority of requirements contained in the 79 granted petitions reviewed, there are requirements in some of these granted petitions that we did not include in the final rule. We discuss these requirements below. It should be noted that the generic petition language is comparable to requirements in granted petitions.

(1) Granted petition requirement: Sensors shall be installed ''* * * as near to the roof as feasible (efforts toward monitoring within 12 inches of the roof) * * *'' or, sensors shall be installed ''* * * in the upper third of the entry * * *''

Research on fire detection has shown the placement of sensors is critical to effective early fire detection. Buoyancy of heated air is recognized as a significant force in spreading products of combustion. For this reason, most granted petitions contain language requiring sensors to be installed in the upper third of the entry. Comments were received from both industry and labor indicating the ''upper third'' requirement from existing petition language was adequate. We have included language in the final rule requiring the installation of sensors in the upper third of the entry rather than language from the proposed rule (as close to the roof as feasible). For example, in a seam height of 6 feet, sensors must be installed within 24 inches of the roof, while as in a seam height of 48 inches, the sensor must be installed within 16 inches of the roof. This would not preclude operators from installing CO sensors as close to the roof as practicable, so long as the installation of the sensors was done in a manner to appropriately monitor air flow within that entry. Accordingly, in either situation, the location of the sensor would not reduce protections found in existing granted petition requirements. The final provision language reflects our response to public comments and our experience with granted petition requirements.

(2) Granted petition requirement: Tables are used to determine alert and alarm levels in many granted petitions.

The tables identifying alert and alarm levels for mines with various air flow velocities and belt entry dimensions were developed from the nomographs published in the Bureau of Mines document, RI 9380—Fire Detection for Conveyor Belt Entries. These tables were included in a large number of granted petitions. This fire detection research set alert and alarm levels based upon air velocity, cross-sectional area, and CO generation rates from smoldering and burning fuel sources. This research was presented as nomographs used to set CO sensor settings for different sensor spacings using air velocity and entry area parameters. Tables were derived in an attempt to simplify the application of research data because the nomographs were difficult to use. For example, the maximum velocity allowed by the tables for alert and alarm levels of 5 and 10 ppm CO is 700 feet per minute (fpm). A reduction to 4 and 8 ppm alert and alarm levels would allow velocities as high as 1,680 fpm according to the tables. Because of overlap in the tables, conflicting determinations for alert and alarm settings can occur. Though the tables provided a method for reducing alert and alarm settings based on increased air flow quantities and cross-sectional areas, they have not always proven to be accurate because of variations in entry configuration and air velocity in an air course. MSHA believes that the mine ventilation plan

offers the best tool to handle special circumstances, such as when alert and alarm levels lower than 5 and 10 ppm, respectively, are needed due to increased air volume. Reduced alert and alarm levels will offset the effects of dilution caused by a higher air volume, thus maintaining the effectiveness of the AMS. These tables have not been specifically included in the final rule, but the information provided by the Bureau of Mines research will be considered by MSHA district managers when approving mine ventilation plans, including the alert and alarm levels established for compliance with the final rule.

Some older granted petitions required alert and alarm levels to be set at 10 and 15 ppm CO above the ambient levels, respectively. These operations will be required by the final rule to increase protection by reducing these levels to 5 and 10 ppm above ambient or lower, respectively. Some granted petitions required the use of RI 9380 to set alert and alarm levels. The Agency believes there may be cases where the alert and alarm levels may need to be further reduced below 5 and 10 ppm, respectively, and the district manager should have available all research information to assist in determining the most appropriate settings.

(3) Granted petition requirement: The method used to determine ambient level.

Many granted petitions include specific language on the method for determining the ambient CO levels. Other granted petitions allow a specified method to be used, or an alternate method approved by MSHA. Many mines have already established appropriate ambient levels and methods that are included in approved mine ventilation plans, as required since 1992 by existing § 75.371(hh). For example, if a mine operator submits in the ventilation plan an ambient concentration of zero ppm, there will be no need to document the determination. If an operator requests an ambient concentration of eight ppm, MSHA would require documentation to approve such an ambient including the method used and CO levels measured. A single method for determining the ambient is not included in the final rule to give mine operators and district managers flexibility in establishing appropriate ambient levels that account for mine-specific situations. Any additional requirement on this issue is likely to be duplicative of former § 75.351.

(4) Granted petition requirement: Consideration of multiple entries is specifically addressed.

The effect of common entries on air flow is a complex issue. We have evaluated one entry in common (not separated by stoppings) with the belt entry and have discovered there is continual communication (air flow) between the two entries. MSHA has discouraged excessive numbers of common entries in the mine ventilation plan approval process, especially in mines using an AMS for fire detection. Air velocities can be difficult to maintain at or above 50 fpm in many of these mines. According to the results of recent NIOSH research (Edwards *et al.*, 1999), CO sensors have proven effective at lower air velocities, when sensor spacing is reduced. Our experience is that the mine ventilation plan approval process assures the safe use of belt air by requiring AMS sensor locations that reflect the actual ventilation pattern in the mine. The Agency conducts ventilation surveys in many mines to determine the adequacy of a variety of mine ventilation plan specifications. The district manager has the authority to require either lower alert and alarm settings, additional CO sensor installations, or a combination of the two depending on the results of the MSHA survey.

(5) Granted petition requirement: Requirement for implementation of diesel-discriminating sensors.

Neither the proposed rule nor the final rule require the use of diesel-discriminating sensors (DDSs). However, some commenters suggested that the Agency require the use of such sensors. Currently, only three non-two-entry granted petitions require diesel-discriminating sensors. One of these mines is closed, one mine never implemented the granted belt air petition, and one is active. This active mine benefits from the use of DDS because diesel-powered equipment emissions contaminate the belt entry, thus increasing the occurrence of non-fire alert and alarm signals if standard CO sensors were used. DDS technology reduces the incidence of these non-fire alert and alarm signals. Not all mines that use diesel-powered equipment would benefit from installing these sensors because the exhaust emissions in some mines are isolated from the belt entry due to the mining system employed. For this reason, the final belt air rule gives the mine operator the option of using such a sensor in reducing nuisance alert and alarm signals. Using DDS to detect non-fire alert and alarm signals is not required because some mining systems either do not use diesel-powered equipment or do not use such equipment near the belt entry. Mine operators are encouraged to explore all methods for reducing the occurrence of alert and alarm signals due to diesel-powered engine exhaust emissions and other mine gases. As stated above, DDSs are effective in detecting fires while reducing the frequency of nuisance alert and alarm signals. Other methods and new technology may be equally or more effective, so limiting the technology to DDS in the final rule would inhibit the future application of technology providing increased protection. In addition, by requiring the mine operator to meet the requirements of § 75.352—Actions in response to AMS malfunction, alert, or alarm signals, this final rule maintains protections currently afforded miners covered by these three granted petitions.

Research is continuing on fire detection technology in both the public and private sectors. In 2003, MSHA evaluated a sensor designed to measure CO in areas where hydrogen could be present, such as in the vicinity of battery charging stations. The sensor was found to be insensitive to hydrogen while providing accurate measurements of CO in gas mixtures. Any methods for reducing nuisance and false alert and alarm signals, including the implementation of the DDS technology and hydrogen-insensitive technology, must be approved in the mine ventilation plan.

(6) Granted petition requirement: Requirement for notification of miners of alert signals.

The proposed rule did not require automatic notification of personnel on working sections and setup or removal areas in the event of a single alerting sensor, but did require such notification in the event of an alarming sensor. Similarly, the final rule does not require notification of personnel on working sections and on setup or removal areas following an alert signal from a single sensor. However, the final rule requires an investigation of the cause of the alert signal and the appropriate personnel are expected to investigate the cause of the alert signal. In response to comments received on the proposed rule and current petition requirements, an additional requirement to the provision (§ 75.352(c)) has been added to the final rule. During the alert mode, notification and removal of miners to a safe location is required only if two or more consecutive sensors reach and maintain alert status. This situation suggests a possible developing fire, thus removal of miners to a safe location is required and investigation of the signaling sensors is required to determine the cause. Automatic section signals are required by recently granted petitions

for alarm signals, which is consistent with both the proposed and final rule. Many older granted petitions required the sensor located near the section tailpiece to automatically activate the section alarm unit upon alert or alarm levels of CO being detected. These same mines utilized alert and alarm levels of 10 and 15 ppm, respectively. At 10 ppm CO, miners would be withdrawn to an area either outby the alerting sensor or to the section loading point. In either event, miners withdrawn to these locations may still be in danger, depending on where the fire is located. This final rule exceeds the requirements in these older granted petitions because miners are removed to a safe location pending investigation of a potential fire. In addition, an investigation would have been initiated by the AMS operator upon receiving an alert signal at 5 ppm CO. This further increases protections afforded miners beyond those set forth by the petition requirements.

The newer petitions simply require notification of the affected working sections and investigation of the cause of the actuation. No additional actions are required for the affected sections. Because of this, MSHA sees no benefit of notification of miners in the affected sections unless these miners are necessary to investigate the alert signal. The primary reason for not requiring notification on an affected working section of a single alert signal is that it will reduce the incidence of the ''cry wolf'' syndrome, in which alert and alarm signals are discounted by miners as related to non-fire sources, such as diesel-powered equipment or welding fumes, and not to a real fire event. The final rule maintains the existing level of protection.

(7) Granted petition requirement: Requirement for automatic activation of section alarm for sensors on panel; sensors 4,000 feet outby during initial development.

The final rule exceeds these granted petition requirements in that any outby or upwind sensor indicating CO alarm levels requires activation of the working section alarm for all affected areas. For example, if the most outby sensor on the belt was to detect an alarm level of CO, and air passing this sensor could travel to all working sections and setup or removal areas, then all alarms in the mine must activate to notify miners.

(8) Granted petition requirement: Mine phones are required to be located at intervals not to exceed 2,000 to 2,500 feet when mine personnel patrol and monitor the belt on system malfunctions.

The final rule requires maximum phone spacing of 2,000 feet when mine personnel monitor by patrolling if AMS components are inoperative for any reason. Many older granted petitions do not include phone-spacing requirements. Others require specific spacing of 2,000 feet as the granted condition. Many existing granted petitions have duplicative requirements that are already required in existing § 75.1600—Communications, including requirements for the repair and location of the phone system.

(9) Granted petition requirement: Hand monitoring for products of combustion only permitted for a short period of time.

The final rule, as in the proposed rule, does not limit the length of time allowed to hand monitor the belt entry in cases of sensor or system failure. Hand monitoring is considered to provide equivalent protection because similar sensor technology is used during hand monitoring and alert and alarm levels are reported immediately to the AMS operator. No specific comments were received regarding the duration of hand monitoring. However, we believe it is in the best interest of the operator and miners to repair the AMS as quickly as possible. Hand monitoring is considered a safe alternate method that provides the same level of protection as the AMS. However, it is labor intensive and therefore, far more costly than the AMS in monitoring the belt entry, so we believe that mine operators will limit the duration of hand monitoring.

(10) Granted petition requirements: Pressure differentials maintained from escapeway to the belt air course when practicable; limit the pressure drop to lowest attainable level to escapeway from the belt when not feasible; and limiting total airflow to 50 percent of the total section intake.

Recently granted petitions include some combination of these requirements. The pressure differential requirement was thoroughly discussed in the Advisory Committee report and the proposed rule preamble. The Agency agrees that it would be prudent to minimize leakage from the belt air course to the primary escapeway to the greatest extent possible. Absolute control on the pressure drop is nearly impossible. However, the Agency has included in the final rule the provision that unless otherwise approved by the district manager, the belt entry can contribute no more than 50% of intake air that ventilates working sections and setup or removal areas. This requirement is included in many granted petitions but was not included in the proposed rule because at the time MSHA believed it was best addressed on a mine-by-mine basis through the ventilation plan process. However, the requirement is included in this final rule due to commenters' concern that operators could provide a majority of the working section intake air from the belt air course, which would more likely create a pressure drop from the belt air course to the primary escapeway. This new provision is consistent with the intent of the proposed rule. The pressure differential from the belt air course to the primary escapeway will be minimized to the extent feasible. This will help to assure that the primary escapeway will be kept free of the products of combustion by balancing the pressures between the air courses, thereby minimizing leakage to the extent possible. Proper stopping construction and maintenance along with ventilation system design considerations can properly protect the integrity of the primary escapeway. Further clarification of this new provision is provided under the section-by-section discussion of § 75.350(b)(6).

(11) Granted petition requirement: ''Stopping'' construction specified.

In some granted petitions, stopping construction techniques and materials used for stoppings were specified, and some required approval of such in the mine ventilation plan. One granted petition required stoppings to be built of ''* * * six-inch wide block and coated ⅛ inch thick on both sides with an approved sealant for dry-stacking applications. Equivalent ventilation controls may be used provided they meet American Society for Testing and Materials (ASTM) testing standards on durability (ASTM E72–80) and flammability (E162–87).'' The provisions of current § 75.333, revised in 1992, include these same ASTM testing standards.

Some commenters to the proposed rule stated that the construction and maintenance of stoppings are not sufficient for proper control of air leakage. However, existing § 75.333(e)(1)(i) sets minimum construction requirements for stoppings. The requirements include an ASTM test that can be used to determine the strength of a stopping. Additionally, § 75.333(h) sets the maintenance requirements for stoppings. If stoppings are constructed and maintained as prescribed, leakage is minimized.

A few commenters asserted that some stoppings do not protect miners during a mine fire. They stated that stoppings do not provide adequate protections to prevent a ''burn through'' during a fire.

One commenter stated, based on his experience with the January 2003, Mine 84 mine fire in Pennsylvania, that the panel-type metal stoppings would not

have held up during the fire. However, from the miners' testimony associated with MSHA's investigation of the Mine 84 fire, the steel-panel stoppings would have provided ample protection for miners during escape. Existing § 75.333(e)(1)(ii) requires that stoppings be constructed of noncombustible material. Existing § 75.301 provides a definition of ''noncombustible material'' when it applies to a ventilation control. The definition states that the control must continue to serve its intended function for one hour when subjected to a fire test incorporating an ASTM E119–88 time/temperature heat input, or equivalent. The Agency believes that the 1-hour period provides time for escape during a fire and that the ASTM E119–88 heat input is an appropriate test for noncombustible material.

One commenter stated that some miners were not trained in the proper procedures to build stoppings. The commenter offered examples of construction inadequacies when building concrete block stoppings. Another commenter stated that he observed stoppings in his mine that were constructed incorrectly. The Agency acknowledges that miners who build stoppings must be trained in the proper method to construct stoppings. Stoppings must be built to meet the requirements of existing standards. Failure to properly build stoppings can result in air loss and compromise the separation of air courses. Existing standards under § 75.333—Ventilation controls, address these concerns about stoppings.

One commenter asserted that the investigation of the JWR No. 5 Mine explosion found that metal stoppings were ineffective. The commenter stated that the metal stoppings were not hitched into the coal rib as prescribed by the manufacturer. Existing standards require that the stoppings be installed to serve the purpose to which they are intended, § 75.333(h). Further, the commenter states that this type of ventilation control can fail easily during an explosion. Metal stoppings must meet the same construction requirements as other stoppings, including concrete block stoppings. Another commenter stated that metal stoppings are not adequate to withstand an explosion. Stoppings, including those constructed of concrete blocks or metal, are not designed or required to withstand explosion forces.

(12) Granted petition requirement: Section alarms can be seen and heard.

As previously discussed, the proposed rule indicated section alarms must be ''capable of being seen and heard'' by miners working on working sections and setup or removal areas. This is consistent with the majority of granted petitions whose language required ''visual and audible signals that can be seen and heard on the working section.'' To clarify the intent of the signaling device requirement, the final rule states that both visual and audible signals must be provided to working sections and to setup or removal areas and that these signals ''must be seen or heard'' by miners. This modification recognizes the fact, as supported by comments, that not every miner on a working section or in setup or removal areas is able to both see and hear the alarms. Both types of signals must be provided to working sections; however, MSHA acknowledges that in practice not all miners will be able to see and hear both signals. For example, if an alarm occurs in a mine with a granted petition that requires miners to both see and hear alarms, the miners working at the section loading point would be able to both see and hear both signals, but other miners working at the face may not be able to either see or hear the signals. Our intent is that the signals must be seen or heard by miners who will be able to notify other miners in affected areas who may not be able to see or hear the signals. This maintains the existing level of protection for miners working in mines with granted belt air petitions which require both signals to be seen and heard because it is recognized that all miners cannot see and hear both signals at all times.

(13) Granted petition requirements: ''Wall-of-water'' fire suppression system required at all belt drives; actuation of deluge system causes section alarms activation.

Existing § 75.1101—Deluge-type water spray systems, requires that deluge-type water sprays or foam generators be installed at main and secondary belt-conveyor drives. These deluge-type water spray systems must automatically be actuated by a rise in temperature, or other no less effective means of controlling fire. These systems must be approved by the Secretary. Therefore, MSHA did not require in the proposed rule any particular deluge fire suppression system (wet or dry) for protecting belt drives in mines using belt air. The mine operator should select a fire suppression system appropriate for the specific operation. In some cases, a dry-powder fire suppression system may be more appropriate due to mine conditions that would result in freezing of water lines. Since a ''wall-of-water'' fire suppression system is not appropriate for all mines, it is not required by this final belt air rule.

The proposed rule did not require that the fire suppression system be monitored with the AMS. Only three granted petitions contain this requirement. One of these mines is closed, one mine has not implemented the granted petition, and one mine is active. Actuation of any fire suppression system (wet or dry) causing section alarm activations is not necessary since the early-warning fire detection system will likely detect a fire before the fire suppression system is activated. In the accident investigation report for the VP 8 mine fire, it was concluded that the fire started at the belt drive. The dry-powder fire suppression system activated at that drive 32 minutes after detection by the AMS. The Agency has no data that support monitoring the deluge system with the AMS provides an added safety benefit.

Though not proposed, we have included in the final rule a new requirement that all fire suppression systems (wet or dry) must be compatible with air velocities within the belt air course, § 75.350(a)(3), based on comments and Agency investigation into the VP 8 mine fire. There is additional explanation in the section-by-section discussion on § 75.350(a)(3).

(14) Granted petition requirement: Smoke sensor technology study conducted.

The final rule allows for implementation of smoke sensor technology and recognizes that smoke sensor detection levels can be equivalent to CO sensor detection levels at 5 ppm. The Agency believes mine operators would be prudent to evaluate the effectiveness of these sensors as a possible improvement to the AMS and fire detection capabilities. This is the reason the final rule has been written to allow their use.

(15) Granted petition requirement: Velocity Caps.

Eleven of the 79 granted petitions reviewed included velocity caps (limitations on velocity of air in the belt entry). These caps ranged from 250 to 725 fpm. In the case of a few early granted petitions, early research studies did not evaluate the effects of air velocities in excess of 300 fpm. Therefore, a velocity cap of 300 fpm was placed on air velocity. Later petitions did not typically include this 300 fpm cap due to additional research which indicated that higher velocities could be safely used. Later petitions that did include a velocity cap typically limited the air velocity to 500 fpm. We have included in the final rule a limit of 500 fpm unless higher velocities are specifically approved in the mine ventilation plan. This cap was

determined from data obtained in large-scale fire testing conducted by the U.S. Bureau of Mines that showed, in part, that smoldering coal fires would not be detected in a timely manner to provide early warning by CO sensors signaling at 5 ppm in velocities exceeding 500 fpm.

(16) Granted petition requirement: Phone; phone lines in intake (primary) escapeway.

The proposed rule required two means of communication, with one being the AMS and the second the two-way voice communication system required under existing § 75.1600. Like the proposed rule, separation of the trunk lines for these systems is required in the final rule. However, we have changed the language in response to comments received on the separation of the AMS and the communication system, because the sensor in the primary escapeway and those used to monitor point feeds are part of the AMS. Installation of the phone line and these sensors in the escapeway would have been a violation of the proposed standard. The final provision was revised to allow for installation of the two-way voice communication system in the same entry (non-belt entry) where the intake sensors required by §§ 75.350(b)(4) (primary escapeway) or 75.350(d)(1) (point feeding) are installed.

Some commenters suggested there is no need to require separation of AMS and voice-communication cables. However, as the MSHA investigation of the Fairfax mine fire determined, communication was lost because the phone line was installed in the belt entry and damaged due to the fire. In the Blue Diamond mine fire, as well as other documented mine fires, the AMS trunk line in the belt entry was damaged, causing communication failures early in the fire's development.

Many commenters suggested the requirement should be grandfathered, to allow operators to provide separation of these cables starting on the final rule's effective date. A concern of some of the commenters is the cost of moving one of the cables. Some mines reportedly use a single multi-conductor cable for both the AMS and phone system. The Agency disagrees with the commenters on this issue, due to the reasons stated above. However, we are allowing a longer implementation period to allow mine operators time to separate AMS and voice communication cables as required by the final rule.

(17) Granted petition requirement: Maintenance of belt entries.

The granted petition requirement states, ''The operator shall develop and implement a special belt entry maintenance program to control combustibles and fire sources in the belt conveyor entries.'' The following specific items are listed in the granted petition as part of the program and include: inspection of fire suppression systems, maintenance of belt components, maintenance of electrical installations, and inspection of belt components. MSHA already has existing standards that cover these granted petition requirements on routine belt cleaning, belt maintenance and rock dusting under §§ 75.360—Preshift examination at fixed intervals, 75.362—On-shift examination; and part 75 subpart E—Combustible Materials and Rockdusting.

(18) Granted petition requirement: Flame-resistant conveyor belting.

Another granted petition requirement includes the use of conveyor belt material that has passed MSHA's new flame-resistant test once the material becomes commercially available. Although, this granted petition requirement was included in 59 granted petitions, the requirement was never implemented in practice. The reason is that the referenced conveyor-belt flammability test was part of a flame-resistant conveyor belt proposed rule that MSHA subsequently withdrew in 2002 for the reasons set forth in the withdrawal notice. (67 FR 46431). The granted petition requirement cannot be implemented since the requisite flame-resistant conveyor belt test has not been promulgated.

Even without a rule on flame-resistant conveyor belt material, monitoring the belt entry for the products of combustion has become more prevalent. The most notable improvement in belt monitoring is the mining industry's increased use of AMSs in belt entries. Monitoring systems, in general, give advance warning of a developing fire in a belt entry allowing for earlier response, thereby limiting injuries to miners and fire damage. An AMS also provides advanced warning of increasing CO concentrations, thereby alerting mine operators to potentially hazardous situations.

(19) Granted petition requirement: Location to measure velocity in the belt conveyor entry.

This petition requirement relates to the use of tables to set alert and alarm levels based on the area of the entry and air velocity. The granted petition requirement reads, ''Measurements to obtain the average air velocity in a conveyor belt entry shall be taken at three or more locations which are representative of the cross sectional areas found throughout the entry and not at locations where the entry is abnormally high (*e.g.* belt drives) or low (*e.g.* under overcasts).'' This final rule, as in the proposed rule, does not use tables to establish alert and alarm levels; therefore, this petition requirement is moot.

(20) Granted petition requirement: Miner training.

The granted petition language requires that miners be trained in initial and refresher training regarding compliance with conditions specified in the petitions. This includes proper evacuation procedures. Sixty-two granted petitions contain this requirement. However, these requirements are covered either under existing 30 CFR part 48 training provisions or under evacuation training provisions included in the recently finalized § 75.1502—Mine emergency evacuation and firefighting program of instruction.

(21) Granted petition requirement: Prior MSHA inspection of AMS before use in belt air mine

The granted petition requirement requires that, prior to implementing the use of belt air, MSHA inspect the AMS to see if it is fully operational and in compliance with the terms and conditions of the granted petition. This requirement is included in 59 granted petitions. The proposed rule did not include this specific requirement and neither does the final rule.

The ultimate responsibility for assuring proper installation and operation of the AMS rests with the mine operator. MSHA already enforces standards to assure the mine operator maintains the system as required. As required by §§ 75.350(b)(1) and 75.351 of this final rule, the AMS must be installed, operated, examined, and maintained if belt air is used to ventilate working sections and setup or removal areas. Some commenters to the proposed rule asserted that this inspection prior to the use of belt air should be in addition to the quarterly safety and health inspections of underground coal mines. Many belt air petitions required that the AMS fire detection system be inspected prior to belt air being used to ventilate working places as part of the conditions of the granted petition. However, when this rule becomes final, an operator will be able to start developing a mine with belt air being coursed onto the working sections and setup or removal areas, provided the final standards are followed. MSHA's regular inspections will be conducted during the initial development of the mine and the AMS will be inspected as part of these inspections.

The Agency believes that an additional startup inspection prior to coursing belt air onto a working section would be duplicative of the inspections already conducted for mines that already have granted belt air petitions (approximately 45 active mines) and for pre-Coal Act mines (approximately 2 mines) that use belt air. The AMSs in these mines have already been inspected and are currently inspected quarterly. In addition, for mines that convert to belt air following publication of this final rule that have existing CO monitoring systems used to comply with existing § 75.1103–4, MSHA currently inspects these systems quarterly (approximately 15 mines). The primary differences in the provisions between § 75.1103–4 and this final rule could be in the alert and alarm levels and sensor spacing. For mines that seek to use belt air and do not have an existing CO monitoring system used to comply with § 75.1103–4 (approximately 6 mines), MSHA believes that a start-up inspection offers no additional safety benefit because of the numerous inspections that MSHA already conducts on an annual basis to these mines. For these mines, the MSHA presence will be significant, especially during mine development when the AMS would be installed prior to belt air use. In addition, these inspections would include a review of the AMS system in use at the mine site through review of the mine's ventilation plan and emergency evacuation plan. Therefore, a requirement for prior inspection of all of these AMSs in not necessary and would not further safety. In addition, MSHA will continue to inspect these systems to ensure that they are installed, operated, examined, and maintained according to the requirements of this final rule.

Additionally, commenters urged MSHA to inspect the AMS to make sure it is working appropriately and to inspect the system more frequently than each regular inspection. Again, MSHA personnel inspect the AMS as part of the regular inspections of the mine pursuant to section 103(a) of the Mine Act (30 U.S.C. 813(a)). The Agency believes that additional inspections are not necessary and would be duplicative of existing Agency actions. This action will not diminish protections afforded miners because prior to the use of belt air, the mine operator must assure that the AMS is installed, operated, examined, and maintained according to the requirements in §§ 75.350(b) and 75.351 of this final rule.

d. The effect of the final rule on pre-Coal Act mines that use belt air to ventilate working sections.

In the case of mines opened on or prior to March 30, 1970, the effective date of the Coal Act of 1969 (pre-Coal Act mines), the use of belt air is allowed through the mine ventilation plan approved by the MSHA district manager. As noted earlier, under the final rule, these pre-Coal Act mines using belt air to ventilate working places and/or setup or removal areas with working sections developed using three or more entries are not exempted from the rule and must meet the new standards, thus maintaining protections afforded to miners. This final rule also applies to pre-Coal Act mines that use belt air as a result of a granted petition. Some commenters stated that the proposed rule may lessen the protection provided at pre-Coal Act mines, such as the Gary 50 mine (now known as Pinnacle Mine) in southern West Virginia. We reviewed the mine ventilation plan requirements for the Gary 50 mine to identify the differences between the Gary 50 mine ventilation plan requirements and this final rule's provisions. We discuss the differences below.

(1) Mine ventilation plan: Use of time-delays, visual alert signal, audible alarm signal required at the surface location.

The approved ventilation plan for the Gary 50 mine allows short time delays of 30 to 90 seconds before all affected persons need to be notified following an alarm signal to limit situations that may cause nuisance or false alarms. AMS sensors that utilize time delays allow alert or alarm levels of CO to exist for a specified period of time prior to the computer acknowledging at the surface location that an actual alert or alarm signal was being received. If welding is being conducted within the belt entry by a sensor causing momentary increases in CO, a time delay would decrease the number of times the computer would signal an alert or alarm, and subsequently decrease the occurrence of non-fire related alert and alarm signals. However, such delays are not always necessary. The final rule allows the use of time delays only where there is a demonstrated need and the delays are specified and approved in the mine ventilation plan. The Gary 50 ventilation plan does not require that a demonstrated need for the time delay exists. In addition, the final rule allows for a time delay that does not exceed 3 minutes (§ 75.351(m)) only when a demonstrated need exists. Under this final rule, the Gary 50 mine would need to demonstrate a need for this time delay. If a mine operator demonstrates a need for a time delay, the time delay will reduce the number of nuisance and false alert and alarms the mine experiences. This will increase confidence in the AMS and will therefore help to assure appropriate responses during fire-related alert and alarm conditions.

The final rule requirement that both visual and audible alert and alarm signals be transmitted to the surface location where the AMS operator is located is more protective than the Gary 50 mine ventilation plan. This final rule requires both visual and audible signals for both alert and alarm levels be seen or heard at all times at the surface location. The Gary 50 plan requires only that a visual alert signal and an audible alarm signal be provided at the surface location. Only the CO sensor at the section loading point is required to automatically give a notification to the section for alert signals in the mine ventilation plan. The final rule requires immediate automatic notification of alarms in all affected areas, while the plan requires notification within a 90-second time delay.

(2) Mine ventilation plan: Alert and alarm levels of 4 and 8 ppm CO; respectively.

The district manager has required these reduced alert and alarm levels in the approved mine ventilation plan, and can continue to require them after the effective date of the final rule. The plan and final rule are compatible in this regard. Under final § 75.351(i)(2) the district manager may require reduced alert and alarm levels.

(3) Mine ventilation plan: Miners withdrawn on alert to a safe location where communications are available.

The plan approval requires that the AMS operator notify miners of an alert signal and that the miners withdraw to a safe location in the primary escapeway. The final rule requires withdrawal to a safe location identified in the emergency evacuation and firefighting program of instruction when two or more consecutive sensors are in alert mode or when any sensor is in the alarm mode. In the event of an alarm both the plan and this final rule require withdrawal to a safe location, unless the alarm is known not to be a hazard to the miners. Following withdrawal both the plan and the final rule require that an investigation be conducted to determine whether the alert or alarms are fire-related. They differ only in that the plan requires that miners be withdrawn when the AMS indicates one sensor is in alert mode. The final rule requires that miners be withdrawn when the AMS indicates two consecutive sensors are in alert mode, thereby reducing the ''cry-wolf'' syndrome. The ''cry-wolf'' syndrome occurs when alert and alarm signals are discounted by miners as

related to non-fire sources, such as diesel-powered equipment or welding fumes, and not to a real fire event. It will reduce nuisance alert and alarm events, thus increasing the effectiveness of the AMS as a early-warning fire detection system. The final rule addresses the need to assure that temporary non-fire-related events do not cause withdrawal that could result in unnecessary panic among miners and that miners are assured that an order for withdrawal means there is an actual fire-related event. Therefore, the plan and final rule provide equivalent safety.

(4) Mine ventilation plan: Section alarm signals on deluge system activations.

The Gary 50 mine ventilation plan requires that the mine operator monitor deluge system activations with the AMS or alarms on activation of these systems. The Agency believes that actuation of the deluge system causing section alarms activations is not necessary since the early-warning fire detection system will likely detect a fire before the deluge system is activated, thereby making the monitoring of deluge system activations unnecessary. This issue was discussed in MSHA's report on the VP 8 mine fire, which started at a belt drive. The fire at the belt drive was detected by the CO system 32 minutes before the fire suppression system activated due to heat from the fire. Mine operators may choose to monitor deluge system activations to provide data to evaluate the effectiveness of deluge systems. This does not reduce protections for the reasons stated previously.

(5) Mine ventilation plan: AMS Malfunction—Phones located at belt drives; midpoint of development section.

The Gary 50 mine ventilation plan allows phones to be spaced up to 5,000 feet apart in cases where longwall panels could be 10,000 feet in length. The final rule requires that communication be available in the belt entry at intervals not to exceed 2,000 feet in case of AMS malfunction. The final rule meets the plan requirement, and exceeds it in most cases.

(6) Mine ventilation plan: Requires administrative controls for welding, cutting, or other known sources of CO.

The final rule does not require operators to implement administrative controls to reduce false or nuisance alert and alarm signals. These controls could include notification of the AMS operator prior to welding and cutting activities near sensors.

The mine operator is expected to adjust mining activities to comply with all the provisions of this final rule. This includes the implementation of time delays, if approved. All alert signals are received by the AMS operator and must be investigated by appropriate personnel to determine what caused the alert and to correct the situation. The Gary 50 ventilation plan also requires the AMS operator to initiate an investigation by appropriate personnel of alert signals to verify whether or not the situation poses a hazard to miners. The Agency believes that pre-notification of non-fire related CO such as produced by welding activities may be of benefit to the AMS operator, but may provide little additional protection to miners, since all alerts must be investigated and are not automatically communicated to affected areas. The rule does not prohibit notice to the AMS operator about cutting and welding activities. Mine operators who required that this information be supplied to the AMS operator may continue to do so.

(7) Mine ventilation plan: Point feeding prohibited from primary escapeway to belt; Stopping maintenance.

Point feeding, the process of providing additional intake air to the belt air course from another intake air course through a regulator, is permitted by the final rule with safeguards. These include a minimum air velocity through the regulator, monitoring the regulator for CO, and specific approval in the mine ventilation plan. Point feeding from the primary escapeway is safe when monitored with other controls in place, as specified in the final rule.

Point feeding is permitted in the Gary 50 mine ventilation plan from intake entries other than the primary escapeway, but monitoring of the airstreams is not required. In this area the final rule provides greater protection than the requirements of the approved plan.

(8) Mine ventilation plan: Stoppings.

The Gary 50 mine ventilation plan requirements include a provision to inspect and reseal stoppings. Existing § 75.333(h)—Ventilation controls, requires all ventilation controls to be properly maintained, so the plan merely repeats an existing standard that covers all underground coal mines.

(9) Mine ventilation plan: Travelway provided and maintained on tailgate of longwall sections; Intake air split.

This Gary 50 mine ventilation plan requirement also allows the established travelway to be ventilated with return air if needed. Existing § 75.384 already requires a travelway to be maintained on the tailgate side of the panel when both escapeways are located on the headgate side. This travelway can be ventilated with either intake or return air.

While some commenters claimed that the proposed rule may not provide the same level of protection as the requirements contained in the mine ventilation plan for mines in existence on the effective date of the 1969 Coal Act, we disagree. In the discussion above, we examined nine requirements in the mine ventilation plan for a pre-Coal Act mine, the Gary 50 mine. We conclude that the final rule increases the protection for miners for 2 of those requirements, produces the same level of protection for 7 of those requirements, and in no case reduces the level of protection afforded miners.

B. Section-by-Section Discussion

The following portion of the preamble discusses each provision of the final rule. The text of the final rule is included at the end of the document.

PART 75—MANDATORY SAFETY STANDARDS—UNDERGROUND COAL MINES

Section 75.301 Definitions

This final rule will add six new definitions to the list of definitions contained in the existing standard. As with other definitions in this section, the new definitions only apply to the standards contained in part 75, subpart D—Ventilation.

Like the proposed rule, the final rule defines the *AMS operator* as the person(s) designated by the mine operator and located on the surface of the mine to monitor the AMS signals and to notify appropriate personnel in response to a malfunction, alert, or alarm signal.

The AMS operator could be the person designated under § 75.1501—Emergency Evacuations, to be in charge during a mine emergency evacuation, however the final rule does not require the AMS operator to be this person. Likewise the AMS operator could be considered ''appropriate personnel'' designated by the mine operator to respond to AMS signals under § 75.351. MSHA did not receive comments on the specific language of this definition and therefore it remains as proposed.

Like the proposed rule, the final rule defines *appropriate personnel* as the person or persons designated by the operator to perform specific tasks in response to AMS signals under § 75.351. No comments on the specific language of this definition were received. However, the final language has been modified to reflect the new language in §§ 75.1501 and 75.1502, as a result of the September 9, 2003 publication of the final Emergency Evacuations rule (68 FR 53049).

We have added a clarification in this definition of *appropriate personnel* ''[a]ppropriate personnel includes the responsible person(s) required by § 75.1501 when an emergency evacuation is necessary.'' This change is consistent with the responsibilities set forth in §§ 75.1501(a) and (b) of the Emergency Evacuations final rule. These sections require that ''For each shift that miners work underground, there shall be in attendance a responsible person, designated by the mine operator to take charge during mine emergencies involving a fire, explosion or gas or water inundations. The responsible person shall have current knowledge of the assigned location and expected movements of miners underground, the operation of the mine ventilation system, the location of the mine escapeways, the mine communications system, any mine monitoring system if used, and the mine emergency evacuation and firefighting program of instruction * * * The responsible person shall initiate and conduct an immediate mine evacuation when there is a mine emergency which presents an imminent danger to miners due to fire or explosion or gas or water inundation.''

The responsible person is one of the many individuals that meets the definition of appropriate personnel. Appropriate personnel have numerous and varied tasks depending on the type of signals received from the AMS, including checking a malfunctioning sensor, patrolling the belt air course in the event of AMS failure, and responding to mine emergencies. As a result, different situations will require different individuals having the designation as ''appropriate personnel.'' In the event of mine emergencies involving a fire, explosion or gas or water inundations, the duties of one person meeting the definition of appropriate personnel could be the same person as a ''responsible person'' under § 75.1501.

Like the proposed rule, the final rule defines an *atmospheric monitoring system (AMS)* as a network consisting of hardware and software capable of: measuring atmospheric parameters, such as carbon monoxide and methane concentrations, and smoke optical density; transmitting the measurements to a designated surface location; providing alert and alarm signals to designated locations; processing and cataloging atmospheric data; and providing reports that can be used in the maintenance and calibration of the system by the mine operator. Each of these capabilities is important and an AMS used to comply with the requirements of this standard must provide the functions contained in the rule. In addition, as in the proposed rule, the final rule makes provision for new technology. Early-warning fire detection systems using newer technology that provides equal or greater protection, as determined by the Secretary, will be considered an atmospheric monitoring system for the purposes of this subpart. Unlike provisions in a granted petition, this provision allows the mine operator to use technology as it becomes commercially available and is of a type and installed in a manner approved by the Secretary that increases safety without the need to amend the existing granted petition.

A commenter requested clarification concerning whether a mine using an AMS would also be required to use point-type heat sensor (PTHS). A system that meets the requirements of § 75.350 meets the requirements of § 75.1103–4; therefore an additional system using PTHS to comply with § 75.1103–4 is not needed. In addition, the commenter requested clarification as to the use of the battery backup (standby power source) during fan maintenance and mine emergencies. The AMS is required under § 75.1103–4(e) to give warning of fire for a minimum of 4 hours after the source of power to the belt is removed, unless the belt haulageway is examined for hot rollers and fire as provided in §§ 75.1103–4(e)(1) or 75.1103–4(e)(2). MSHA has included a reference to these sections in § 75.350(b)(1). MSHA did not receive any comments on the specific language of this definition and, therefore, it remains as proposed.

Like the proposed rule, the final rule includes a definition for the *belt air course.* The belt air course is defined as the entry in which a belt is located and any adjacent entry(ies) not separated from the belt entry by permanent ventilation controls, including any entries in series with the belt entry, terminating at a return regulator, a section loading point, or the surface. No comments on the specific language of this proposed definition were received. Therefore, the final language remains unchanged from that of the proposed rule.

The final rule defines *carbon monoxide ambient level* as the average concentration in parts per million (ppm) of CO detected in an air course containing CO sensors. The CO ambient level is an average that is representative of the composition of the mine atmosphere over a designated period of mining activity during non-fire conditions. The proposed rule language is almost identical to the final rule language with the exception that ''in parts per million (ppm)'' was included in the definition to state the units of measurement of CO. In addition, the final rule language states that the average ''concentration'' of CO is representative of the composition of the mine atmosphere ''over a period of mining activity during a non-fire condition'' as opposed to ''during a non-fire condition.''

An effective early-warning fire detection system must be based upon reasonable operating parameters, which include the evaluation of ambient CO levels. One commenter suggested that the CO ambient level be determined by monitoring the air for a specified period of time, such as two to four weeks, within the entry or entries to be protected. This monitoring would occur prior to the commissioning of the installed CO system to help achieve an accurate average ambient level for CO. MSHA agrees that there needs to be a method to determine the ambient level. However, there are several ways to establish this level. The ambient level and ambient determination method are already required by existing § 75.371(hh) to be included in the mine's ventilation plan. Due to different mining systems, it is the mine operator's responsibility to determine which method is best for the mine and to determine the ambient level subject to approval of the district manager. This provides flexibility in establishing the ambient CO level.

The definition of CO ambient level includes the term ''average concentration.'' Ambient CO levels can vary from mine to mine and even within an individual mine. For example, one area of a mine may contain higher concentrations of CO at all times due to a variety of reasons (*e.g.*, naturally-occurring CO in the area or increased use of diesel-powered equipment in the area). Accordingly, the ambient level in these areas of the mine will be higher. The ambient level and the method used to determine it must approved in the mine ventilation plan. Unless the ambient level is specified as zero ppm, documentation must be provided to the district manager that the specified ambient level requested reflects the true conditions of the mine atmosphere. For many mines, the average concentration will be the same throughout the air course and will be at or near zero ppm. If a mine operator chooses to set the mine's ambient level at zero ppm, or less than the actual ambient level, this action will provide increased sensitivity for fire detection.

There may be more than one ambient level per mine because the mine

operator may establish separate ambient levels for different areas of the mine. We recognize that in some mines, CO occurs naturally as a characteristic of the coal seam and that higher average concentrations will exist. Also, diesel-powered equipment produces CO when operating and thus may raise the average concentration of CO within the air course. Operation of diesel-powered equipment near a CO sensor might cause ''spike'' concentrations of CO to occur. In-mine tests have shown that these spikes account for a small part of the sample concentrations. Thus, if the CO ambient level is determined using a reasonable duration of time that is representative of mining conditions, the average will represent the concentration in ppm approximating that most often found in the air course.

In order for an AMS with CO sensors to be effective as an early-warning fire detection system, the ambient level must represent conditions over a broad range of mining activities. We recognize that the CO level may vary from shift to shift depending on the type or amount of work being done. While some petitions established the method for determining the ambient level(s) for a mine, we believe approval of the ambient level and the method used to establish it are most appropriately addressed in the mine ventilation plan due to varying mining conditions and activities. Therefore, MSHA will continue to require that the CO ambient level and the method for determining the ambient level be specified and approved in the mine ventilation plan, § 75.371(hh), as already required by former § 75.351. A commenter asked for clarification in the rule language itself that would state that there could be more than one CO ambient level in the mine thus giving mine operators the flexibility to establish more than one ambient. MSHA acknowledges that a mine may have multiple ambient levels such as when diesel-powered equipment is used in certain areas of the mine. Such equipment, when in use, increases CO levels in that area of the mine, thereby increasing non-fire alert and alarms unless the ambient CO level is modified. The following language has been added to the definition of CO ambient, ''Separate ambient levels may be established for different areas of the mine'' to clarify this issue. The language in the final definition remains modified as stated above, from the language in the proposed rule.

It needs to be noted that the actual alert and alarm values for particular sensors will depend upon the ambient level for the area where these sensors are located. The ambient level represents the sum in ppm of both the naturally-occurring and man-made sources of CO, such as diesel-powered mining equipment in a particular area of a mine. Both the proposed and final rule take into account the ambient levels when alert and alarm levels are established. For an ambient level of 2 ppm, the alert and alarm levels will be 7 and 12 ppm, respectively. For an ambient level of 4 ppm, the alert and alarm levels will be 9 and 14 ppm, respectively. Both of these sets of values provide equivalent protection because the alert and alarm signals are provided when the CO concentration in the belt air course rises 5 and 10 ppm above the ambient, respectively.

No comments were received on the proposed definition for *point feeding* and it is unchanged in the final rule. As defined by the final rule, point feeding is the process of providing additional intake air to the belt air course from another intake air course through a regulator. Point-feeding allows the mine operator to increase airflow within the belt entry from other intake entries. This additional air is needed in many mines to dilute methane, coal dust, and diesel-powered engine exhaust. In addition, point feeding from one intake air course to another reduces the pressure differentials between these entries, which limits uncontrolled leakage from one air course to another air course. Sometimes providing additional air to the belt air course to increase air velocity in the belt entry is necessary to maintain the needed air velocity to assure compatibility with fire-detection sensor spacing. Although we acknowledge that point-feeding may be necessary, we think that the number of point-feed regulators should be kept to a minimum to maintain the integrity of the primary escapeway. This is important because if a fire develops in the belt air course, the primary escapeway is protected from smoke contamination due to a minimum number of point-feed regulators which can be closed remotely.

Because the point-feed regulator is a permanent ventilation control, the point-feed regulator must be constructed according to the requirements of existing § 75.333(e)(1) (Ventilation controls) which states the method and material requirements for the construction of permanent stoppings and regulators.

Section 75.350 Belt Air Course Ventilation

This final rule revises § 75.350 that prohibits air coursed through belt entries from ventilating working places, except as approved on a mine-specific basis through the petition for modification process (30 U.S.C. 811(c)) or when approved by the MSHA district manager for mines opened prior to March 30, 1970 (pre-Coal Act mines). As noted under the Background section of this preamble, MSHA has a long history of evaluating the safe use of belt air through the petition for modification process.

In promulgating this final rule, MSHA has evaluated the requirements in approximately 80 granted petitions to determine which requirements can be safely applied to all underground coal mines with three or more entries that seek to use belt air. This issue was discussed earlier in this preamble in the subsection entitled ''A. General Discussion—30 CFR, part 75, Subpart D—Ventilation'' found under the section entitled ''II. Discussion of Final Rule.''

As used in the existing standard, the term ''belt entries'' refers to the belt air course. Under the final rule, the belt air course can be used to ventilate working sections, if the mine operator meets specified requirements. The term ''working sections,'' and not ''working places,'' was used in the proposed rule and is used in the final rule to include the area inby the section loading point. Existing § 75.380(g) requires separation of the primary escapeway from the belt entry beginning at the working section to the escape facilities or the surface. Thus, if the mine operator wishes to course belt air inby the end of the separation of the primary escapeway from the belt, the safety requirements of this final rule apply.

The final rule also permits belt air to be used to ventilate mechanized mining equipment setup or removal areas if the mine operator meets the same specified safety requirements. If intake air passes through a belt entry where the belt is not operable, and is coursed onto a setup or removal area, the specified requirements do not apply. However, if any of the air that passes through the belt air course has passed over a belt that is being operated and will ventilate either working sections or equipment setup or removal areas, the specified requirements of this final rule apply. This maintains the protections set forth in this final rule.

Existing § 75.350 requires that the air velocity in the belt entries be limited to the amount necessary to provide an adequate supply of oxygen in these entries and to assure that the air contains less than 1.0 percent methane. Existing §§ 75.321 and 75.323 require that oxygen and methane be kept within specified limits, respectively. Therefore, this final rule is consistent with

§§ 75.321 and 75.323. It would not increase miner protection to repeat these requirements in the new § 75.350. Miners receive the same level of protection.

Separation of the belt air course from the primary escapeway is required by existing § 75.380(g). Under the existing § 75.350, the belt air course must be separated with permanent ventilation controls from return air courses and from other intake air courses.

Section 75.350(a) of this final rule prohibits the use of the belt air course as a return air course. It also requires that belt air cannot be used to ventilate the working sections or setup or removal areas except as specified in § 75.350(b). Section 75.350(a)(1) requires separation of the belt air course from return air courses and other intake air courses with permanent stoppings. When the mine operator meets the requirements specified in § 75.350(b), separation of the belt air course from intake air courses, other than primary escapeways (covered under existing § 75.380(g)), is not required.

The proposed rule did not set velocity caps, or maximum air velocities, within the belt air course. Some commenters agreed with the proposed rule, affirming that there should not be a limit imposed on the air velocity or quantity. Others maintained excessive velocities created a float coal dust hazard as well as increasing respirable dust levels within the air course, and that a cap on velocities should be set.

The Agency is persuaded that there is a need for a velocity cap and that the cap will increase miners' protection. Section 75.350(a) is being revised by adding a new § 75.350(a)(2) to the final rule based on a review of the rulemaking record. Once this final rule becomes effective, the air velocity in the belt entry must be limited to 500 fpm, unless higher velocities are approved by the district manager through the ventilation plan process.

Velocity caps were required in a small percentage of granted petitions over the last 25 years. In the Agency's review of nearly all granted petitions, a total of 11 mines were limited to velocities ranging from 250 to 725 fpm. The original belt air velocity cap of 300 fpm was required in a few granted petitions in the late 1980s based on the equivalency testing conducted by MSHA. The 300-fpm limit was the maximum velocity created in the test facility, and because the effects of higher velocities on belt fires were not known, the velocity cap was established. Results of large-scale testing by the U.S. Bureau of Mines at higher velocities (as high as 1,200 fpm) indicated the 300-fpm velocity cap was not warranted, and so it was typically not required in subsequent granted petitions. However, some recently granted petitions included velocity caps ranging from 250 to 500 fpm to address mine-specific conditions.

We have included the 500 fpm velocity cap requirement in § 75.350(a)(2). This requirement applies to all mines. We reviewed numerous research publications, granted petitions, ANSI standards, a NIOSH research report, and mine fire investigation reports. The velocity limit was ultimately determined by MSHA's analysis of RI 9380 and existing granted petition requirements for sensor alert and alarm levels.

The results of U.S. Bureau of Mines research report RI 9380 were based on large scale fire testing which used velocities in a wind tunnel up to 1,200 fpm. The report stated that when the belt entry air velocity exceeds about 2.54 meters/second (500 fpm), the smoldering stage would not be detected by either 5 ppm CO sensors or 0.044/meter smoke optical density smoke detectors. For this reason, to provide an early-warning fire detection system, the maximum velocity in the belt entry must not exceed 500 fpm, when alert and alarm levels are 5 and 10 ppm, respectively, and sensor spacing is set at 1,000 feet. Higher velocities would be allowed only with approval of the district manager. We expect that approval of velocities in excess of 500 fpm would require reduced CO alert and alarm levels. Alternatively, other detection technology with increased sensitivity could be used to replace the CO sensors in these areas.

In addition, ANSI/ISA–92.02.01, Part I—1998, prescribes a test procedure to determine the effects of air velocity on the performance of CO monitors. The maximum velocity tested in this procedure is approximately 1,000 fpm. Therefore, the performance of the monitors is not verified above this limit when tested to that standard. While the district manager may approve velocities in excess of 500 fpm, in mines using belt air the Agency recommends that air velocity not exceed 1,000 fpm unless the fire detection system is known to be compatible with such air velocities.

While we are persuaded that there is a need for velocity caps, we looked at the relationship between velocity caps and fire detection systems. MSHA found that the effectiveness of the fire detection system is dependent upon air velocity. As a result, though not proposed, we have included, in § 75.350(a)(3), a requirement that air velocities must be compatible with fire detection systems as well as fire suppression systems used in the belt entry. MSHA has included the requirement that air velocity be compatible with fire suppression systems due to the findings of our report on the VP 8 mine fire (Non-Injury Mine Fire Accident; April 9 & 10, VP 8, I.D. 44–03795, Island Creek Coal Company; Mavisdale, Buchanan County, Virginia; July 15, 2003). It was determined that the air velocity at the belt drive where the fire started was in excess of 1,100 fpm. Testimony given during the fire investigation indicated that this velocity adversely affected the dispersion of the dry-powder chemical fire suppressant during the fire. MSHA's accident investigation report stated that, ''Section 17 of the National Fire Protection Association handbook assumes that the protected area will be guarded from adverse air flow influences unless engineering considerations are made for ventilation which would assure proper location and rates of chemical application'' (MSHA's Non-Injury Mine Fire Accident Report, Pg. 22). By including this provision, we are assuring the compatibility of velocity caps with fire suppression systems to maintain protections afforded to miners.

Like the proposed rule, final § 75.350(b) addresses the safety requirements that apply when belt air is used to ventilate a working section or an area where mechanized mining equipment is being installed or removed. Final paragraph (b)(1) requires that the mine operator equip the belt entry with an AMS installed, operated, and examined and maintained as specified in § 75.351.

One commenter suggested that MSHA include the following requirements: safeguard AMS cables by installing Kellam grips (braided wire cable securing device) any time a cable enters or exits a box; securely mount outstations to withstand an explosion; require that a six-foot loop of cable be hung in every crosscut during cable installation on a shear-pin hanger to prevent quick-snapping of the cables in the event of an explosion; additional standards for cable installation need to be developed and followed; and testing with known forces on hard-mount versus flexible-mount sensors. These suggestions are focused on the components of the system being able to withstand explosion forces. MSHA did not propose these requirements and has not included them in the final rule because the purpose of early-warning fire detection systems is to provide early warning of fire in the belt entry. The ability of some system components to withstand the forces of an explosion will not guarantee additional protection

to miners in mines that use belt air to ventilate working sections and setup or removal areas.

In addition, based on a commenter's request for clarification concerning battery backup, we have referenced § 75.1600–2(c) in § 75.351(r) when the AMS is used as a communication system. It was MSHA's intent to require operation of the system up to 4 hours after removal of power to the belt, but not to specify that the system be powered by batteries where other alternatives may be as effective. There were no additional comments specific to proposed § 75.350(b)(1); the language in the final section remains as proposed.

Paragraph (b)(2) of the final rule requires the training of all miners annually in the basic operating principles of the AMS, including the actions required in the event of activation of a system alarm. This training must be conducted before miners work underground. This training must be conducted as part of a miner's part 48 new miner training (§ 48.5), experienced miner training (§ 48.6), annual refresher training (§ 48.8), or training conducted as part of the approved emergency evacuation and firefighting program of instruction, § 75.1502. The training should include the purpose of the system, the type of information that it provides, and what responses to specific signals from the AMS are necessary.

The proposed provision received much comment regarding the appropriate training and the need for drills. Generally, commenters expressed concern about an increase in the number of subjects to be covered in the annual eight-hour training session required by 30 CFR part 48. They contend that it is difficult to incorporate new standards, such as the new emergency evacuations standard (§ 75.1502), or requirements contained in new granted petitions into this training time period. Many of the commenters believed there was a need for drills and simulations in the training. MSHA agrees that drills increase the effectiveness of fire-fighting response and currently requires drills in existing standards. Currently both existing § 75.383—Escapeway maps and drills and § 75.1502—Mine emergency evacuations and firefighting program of instruction include a requirement that the mine operator conduct a drill based on the mine's emergency evacuation and firefighting program of instruction. Including drills in this final rule would duplicate these existing requirements.

The Agency's response to these commenters is that current training requirements in part 48 are sufficient to train miners and that the drill requirements in existing standards are sufficient to give miners practical experience in the mine during non-emergency situations. This provision increases protection for miners working at mines with granted petitions. Such granted petition requirements state that ''* * * miners shall be trained in proper evacuation procedures, including instruction and drills in evacuation and instruction in precautions to be taken for escape through smoke.'' In addition, ''Personnel stationed at the surface location shall also be trained in the operation of the carbon monoxide monitoring system and in the proper procedures to follow in the event of an emergency or malfunction and, in that event, shall take appropriate action immediately.''

The proposed language was that ''All miners, including newly hired miners must be trained annually in the basic operating principles of the AMS, including the actions required in the event of activation of a system alarm. This training may be conducted as part of a miner's 30 CFR part 48 new miner training (§ 48.5), experienced miner training (§ 48.6), or annual refresher training (§ 48.8).'' Due to the large number of comments received on this proposed language, MSHA has clarified the language of this provision to more clearly express that all miners must receive this training prior to any work underground in a mine that uses belt air to ventilate working sections or areas where mechanized mining equipment is installed or removed. Existing part 48 training requirements already include training on the use of mine communication systems and warning signals. While the proposed rule suggested that this training could be done outside part 48 training, a further review of existing part 48 indicates that this training is currently required. The AMS is considered by this final rule to be a communication system that generates alert and alarm signals, or warning signals, in response to the presence of products of combustion and methane. The final rule states ''All miners must be trained annually in the basic operating principles of the AMS, including the actions required in the event of activation of any AMS alert or alarm signal. This training must be conducted prior to working underground in a mine that uses belt air to ventilate working sections or areas where mechanized mining equipment is installed or removed. It must be conducted as part of a miner's part 48 new miner training (§ 48.5), experienced miner training (§ 48.6), or annual refresher training (§ 48.8).''

We have added the term ''of any AMS alert or alarm signal'' instead of ''any system alarm'' to clarify the possibility that miners on working sections may act as appropriate personnel have to investigate malfunction or alert signals. It is the responsibility of the mine operator to assure that these training requirements are met.

Final paragraph (b)(3) is unchanged from the proposed rule. It requires that the concentration of respirable dust in the belt air course be maintained at or below 1.0 mg/m^3 because air in the belt entry is intake air. A permanent designated area (DA) for dust measurements must be established at a point no greater than 50 feet upwind from the section loading point in the belt entry when the belt air flows over the loading point or no greater than 50 feet upwind from the point where belt air is mixed with air from another intake air course near the loading point. We require that this DA be specified and approved in the mine ventilation plan.

Two commenters submitted information on this provision. One commenter suggested that the DA should be located at the tailpiece or just inby the tailpiece in order to give a accurate representation of the dust exposure in the entry. Another commented that in the mine where he works, this level is exceeded because the use of belt air increases respirable and nonrespirable coal dust exposure. However, the commenters did not provide data to support their claims or to refute studies conducted by NIOSH and MSHA which show that dust exposures were not increased by the use of belt air above allowable levels. The existing standard, § 70.100(b), specifies that the average concentration of respirable dust in the intake airways within 200 feet of working faces of each section must be continuously maintained at or below 1.0 mg/m^3 in intake air. However, the use of the air from the belt air course as intake air to ventilate working sections or setup and removal areas requires that coal dust sampling be conducted at a location prior to the air reaching these areas or before mixing with other intake air. This means that sampling must be conducted at a point no greater than 50 feet upwind from the section loading point or no greater than 50 feet upwind from the point where belt air mixes with air from another intake air course near the loading point. This new provision is not in conflict with § 70.100(b) because this is an additional requirement to measure the concentration of respirable dust in only the belt air. Therefore, the language

of this final rule remains as proposed and will provide the same level of protection as the existing standard.

Paragraph 75.350(b)(4) requires monitoring of the primary escapeway as described under § 75.351(f), that is, for CO or smoke within 500 feet of the working section or area where mechanized mining equipment is being installed or removed, and within 500 feet of the beginning of the panel. The sensor used to comply with § 75.351(f) may be used to comply with this § 75.350(b)(4) if located in the primary escapeway within 500 feet of the working section or within 500 feet of the beginning of the panel. The point-feed sensor required by § 75.350(d)(1) may be used to meet the requirement of § 75.350(b)(4) if the sensor is located within 500 feet of the beginning of the panel. Alarms activated by these sensors would warn miners of a fire in the primary escapeway upwind of the working section or setup or removal area and give them earlier warning and therefore more time to escape. These sensors will provide significant additional protection for a minimal cost.

One commenter contended that monitoring of the primary escapeway should not be tied into those areas of the mine using belt air to ventilate the working faces. However, as stated above, the intake escapeway is monitored to afford an additional level of protection; therefore, the language of this provision remains as proposed.

Paragraph 75.350(b)(5) is included to limit the use of belt air to areas developed using at least three entries for development in order to provide more protection because two-entry development is considered unique and requires additional protections. Therefore, all existing two-entry petition requirements are unaffected by this rule. Future two-entry mines will need to continue to file petitions to use belt air, since final § 75.350(a) prohibits placing the belt in the return. The Agency believes the two-entry mining system provides a unique set of issues and needs to be approved on a mine-by-mine basis in order to protect miners in these types of mines.

This section has been rewritten to clarify our intent because of concerns that two-entry developments would be affected by the proposed language. Our intention is still that in order for two-entry development systems to permit return air to flow over the belt, a petition for modification will be required. Commenters indicated two-entry mines should also be permitted to use belt air without a petition for § 75.350. We agree that although most of the same provisions of this final rule would apply to these mines, because the two-entry petitions for modification are filed under diminution of safety criteria and not alternate equivalent means (§ 44.4), the granting of such petitions goes beyond the safe use of belt air. In such petitions the mine operator states that development of a three-entry system would be more dangerous, or a diminution of safety, than to develop a two-entry system due to ground control conditions. The mine operator will need to file a petition for modification for § 75.350. Based on these comments, the wording of the proposed provision has been changed to clarify our intent from ''the section must be developed with three or more entries'', to ''the area of the mine with a belt air course must be developed with three or more entries.''

Paragraph (b)(6) requires in areas of the mine developed after the effective date of this final rule, that unless approved by the district manager, no more than 50% of the total intake air, delivered to the working section or to areas where mechanized mining equipment is being installed or removed, can be supplied from the belt air course. The proposed rule did not include this requirement; however, in the preamble, MSHA discussed the issue and concluded that pressure differential issues would be better addressed in the mine ventilation plan approval process. The intent of the proposed rule was that the design of the ventilation system would be specified in the mine ventilation plan. Most existing granted petitions limit the quantity of air from the belt entry to no more than 50 percent of the total section intake in areas of the mine developed after the effective date of the petition. This requirement was included in nearly all of the petitions granted since 1996. In these 37 granted petitions the mine operator needs to assure the integrity of all intake air courses is maintained, including the primary escapeway. The requirement helps to maintain the pressure drop from the primary escapeway (*i.e.*, higher pressure in the escapeway) to the belt air course. In addition, in the event that this pressure drop cannot be maintained, the requirement also helps to minimize the pressure drop from the belt air course to the primary escapeway. In the event of a fire in the belt air course, this requirement minimizes the contamination of the primary escapeway with the products of combustion.

Many commenters suggested that this requirement should be included in the final rule. Because of the number of commenters urging MSHA to include this requirement in the final rule, MSHA reconsidered this issue. We concluded that the ratio requirement to limit the contribution from the belt air course to total intake quantity to working sections and setup or removal areas should be included in the final rule. The new provision, § 75.350(b)(6), will help maintain the integrity of the primary escapeway. We also recognize, consistent with the granted petitions, that in some instances the portion of intake air maintained in the belt air course may need to exceed 50 percent of the total. In these instances we believe the district manager must have the authority to approve greater contributing quantities in the mine ventilation plan. A corresponding provision has been added to § 75.371. The location for measurements to determine compliance with this provision must be specified in the mine ventilation plan as required by new § 75.371(kk).

The magnitude of leakage between air courses is a function of both the pressure drop across the stopping line separating the air courses, and the resistance of the stopping to air flow. In the event of a fire, a very low pressure drop with poorly constructed or maintained stoppings can be a greater danger to miners than a higher pressure drop with substantial stopping integrity. This hazard is created due to the leakage of the products of combustion through the poorly constructed or maintained stoppings. The products of combustion will not contaminate the adjacent entry as fast through well constructed and maintained stoppings. Stopping construction and maintenance is addressed in existing § 75.333. We believe that these provisions are sufficient for stopping construction and maintenance in all coal mines.

MSHA has included a new provision, under § 75.350(b)(7), that requires the use of directional lifelines in return entries designated as alternate escapeways. These lifelines must meet requirements in the new section, § 75.380(n). A directional lifeline is most likely a rope made of durable material; marked with a reflective material every 25 feet; located in such a manner for miners to use effectively to escape; and have directional indicators, signifying the route of escape, placed at intervals not exceeding 100 feet. It should be noted that the Advisory Committee's recommendation was to install and maintain lifelines in all underground coal mines, regardless of the use of belt air. The recommendation specified that lifelines had to clearly designate the route of escape. Discussion in the Advisory Committee's report suggested the use of directional

cones to increase the effectiveness of lifelines. In the proposed rule, MSHA solicited information from the public concerning the use and maintainability of lifelines.

Currently, four granted petitions require the use of lifelines in return entries used as alternate escapeways. Many commenters from government, industry, and labor responded to MSHA's request for information on lifelines.

NIOSH commented that lifelines can improve the likelihood of escape from mine fires and suggested that MSHA consider an additional requirement for the installation of lifelines in all escapeways, not just alternate escapeways in return air courses at mines using belt air.

Some commenters testified at the rulemaking hearings that it is difficult to maintain lifelines installed in escapeways where mobile equipment is used, because moving equipment can damage lifelines. One commenter suggested that the idea of lifelines has merit, and if they are used, they must be maintained. Another commenter suggested that lifelines be used in alternate escapeways, not in primary escapeways where equipment transport could damage them. The lifeline at the commenter's mine is located in the main returns and is routed to the closest portal thus avoiding damage from mobile equipment. Other commenters recommended that the use of lifelines is best considered under a separate revision of § 75.380—Escapeways; bituminous and lignite mines.

Another set of commenters voiced disappointment that MSHA did not include a proposed provision that would require the use of lifelines in both primary and alternate escapeways and that these lifelines be maintained. They pointed out that many operations are currently required to install and maintain lifelines as part of the requirements of granted belt air petitions. They claim that MSHA's decision not to include lifelines in the belt air final rule would eliminate that protection, thus reducing safety for the miners working in these mines.

In addition, a witness at the public hearing in Washington, Pennsylvania, testified that the state of West Virginia requires the use of lifelines in a return air course if it is used as an escapeway. The witness reported that West Virginia law requires that lifelines be maintained in the escapeway up until the last open cross cut; be made of a durable material; and be marked with reflective tape once every 25 feet. The commenter also testified that he would like to see lifelines constructed of fire-proof material required in all underground coal mines. Another witness testified at the Birmingham, Alabama, public hearing that he was familiar with situations in other mines where the belts were burned in half and miners had to feel their way out. He is in favor of the use of lifelines in an alternate escapeway. It is his position that during a fire, lifelines could be essential to miners finding their way safely out of a mine.

These commenters maintain that, due to the lack of visibility, lifelines are necessary to escape a smoke-filled atmosphere. A miner testified that at MSHA's Mine Health and Safety Academy at Beaver, West Virginia, he received training for escape at the mine simulation laboratory under simulated smoke conditions. He noted that the lifeline used at MSHA's training facility was a valuable tool in getting him out of very thick smoke. A commenter testified that during the JWR No. 5 mine accident, two miners felt their way out of thick smoke by following a cable out of the mine.

Other miners also testified that the cost of lifelines is insignificant compared to the cost of buying a longwall drive unit or a continuous miner, and that maintenance costs associated with the lifelines are minor. MSHA concurs with the commenter that the cost of a lifeline is far less than that of a longwall unit. However, a longwall drive unit is not purchased to improve miner safety, whereas a lifeline is expected to improve miner safety.

Overall the commenters stated that lifelines could be useful in helping miners escape to the surface of the mine when smoke-filled atmospheres are present. After further review of the granted petitions, reviewing the comments on lifelines, and researching state regulations regarding lifelines, MSHA agrees with the commenters that lifelines can aid in escape during emergency situations, especially in instances of reduced visibility due to smoke. In heavy smoke, a miner can easily become disoriented and cannot determine the proper direction for escape. A directional lifeline gives the miner added safety by directing the miner through the smoke-filled entries to safety. MSHA also recognizes, as did commenters, that there can be maintenance difficulties with lifelines used in the intake entries where the more frequent use of mobile equipment can damage them. Therefore, MSHA, as noted earlier, has added a new requirement under § 75.380(n) to require the use of directional lifelines in return entries when used as alternate escapeways for mines that use belt air to ventilate active working sections and setup or removal areas (§ 75.350(b)(7)). The installation of lifelines in return escapeways will minimize maintenance problems because mobile equipment is seldom operated in return air courses. While the application of lifelines to all underground coal mines is beyond the scope of this rule, the Agency believes, based on the evidence presented during the course of this rulemaking, that it is appropriate to require the limited use of lifelines in this rule.

In the proposed rule, § 75.350(c) would have permitted point feeding air from an intake air course when a mine needs additional air in the belt air course, notwithstanding the provisions of § 75.380(g).

The final rule splits proposed paragraph (c) into two sections, paragraphs (c) and (d) to clearly indicate MSHA's intent. Paragraph 75.350(c) is derived from the proposed paragraph (c) and allows the use of point feeding, notwithstanding the provisions of § 75.380(g), to add additional intake air to the belt air course through a point-feed regulator. The use of point feeding is permitted for all mines as long as the location and use of point feeds are approved in the mine ventilation plan.

Point feeding, as defined in this final rule and allowed under final § 75.350(c), is the process of providing additional intake air to the belt air course from another intake air course through a regulator. Point feeding allows the mine operator to increase airflow within the belt entry from other intake entries at underground locations. This additional air is needed in many mines to dilute methane, coal dust, and diesel-powered equipment exhaust. In addition, point feeding from one intake air course to another reduces the pressure differentials between these entries, which limits uncontrolled leakage from one air course to another air course. Sometimes providing additional air to the belt air course to increase air velocity in the belt entry is necessary to maintain the needed air velocity to assure compatibility with fire-detection sensor spacing. Point feeding must be approved in the mine ventilation plan under § 75.370 and conditions set out in the paragraph must be met.

MSHA believes that point feeds should only be used when needed and the number of point-feed regulators should be kept to a minimum to maintain the integrity of the primary escapeway. This is important because if a fire develops in the belt air course, the primary escapeway is protected from smoke contamination due to a minimum number of point-feed regulators which can be closed remotely. This eliminates

one set of leakage paths for smoke to contaminate the primary escapeway. Point feeding is not meant to compensate for a poorly designed or inadequately maintained ventilation system. Any intake air course can be considered as a source for point feeding. The same requirements will apply to all intake air courses in order to maintain the integrity of the air courses and to facilitate early-warning fire detection capability. Early warning of fire will be facilitated by the required installation of AMS sensors at the point-feed locations in both the intake and belt aircourses.

Paragraph (d) specifies six additional conditions, as proposed under § 75.350(c), which must be met by mine operators if the air through the point-feed regulator enters a belt air course which is used to ventilate a working section or an area where mechanized mining equipment is being installed or removed. The requirements of the final rule are the same as those of the proposed rule. Paragraph (d)(1), formerly proposed paragraph (c)(1), requires monitoring of the air current that will pass through the point-feed regulator for CO or smoke at a point within 50 feet upwind of the point-feed regulator. A commenter recommended that point feeds that introduce fresh air into the belt line need to be monitored regardless of the direction of air flow along the belt. Other commenters agreed that both sides of point feeds need to be monitored due to the dilution effect that air at high quantities have on the products of combustion. Another commenter claimed that MSHA's requirement to monitor CO levels in intake air prior to entering a belt line would not be necessary if the belt air would be monitored using two CO sensors, one located upwind of the point where fresh air is introduced to the belt air course, and one located within 1,000 feet of the point feed on the belt line. MSHA disagrees with this strategy. The protection provided by the sensor required in paragraph (d)(1) located in the intake upwind of the point-feed regulator is needed to identify where a fire is burning. MSHA agrees that both sides of the point-feed regulator need to be monitored, therefore the final language remains as proposed.

Paragraph (d)(2), formerly proposed paragraph (c)(2), requires monitoring of the belt air for CO or smoke at a point within 50 feet upwind of the mixing point with air from the point-feed regulator. The requirements are unchanged from the proposal. If the sensor in the intake air stream gives an alert or alarm signal, the fire in all likelihood will be in the intake air course upwind of the point-feed regulator. If the sensor in the belt entry gives the alert or alarm signal, the source of the contaminants (smoke or CO) is most likely in the belt entry upwind of the mixing point. With this knowledge, the mine operator can take whatever action is appropriate including investigation of the alert, possible evacuation of miners from the affected area, and implementation of firefighting efforts if warranted. Some commenters testified that this provision is not a requirement in existing petitions. This is not correct. Point feeding is a provision included in three recently granted petitions (2001). Monitoring requirements for point feeding have been included in two of these granted petitions.

Another commenter testified that the provision appears to be more appropriate to improving safety for point feeding intake air into a belt air course versus addressing the issue of using belt air at the face. The Agency agrees with this commenter. Approval requirements for point feeding under § 75.350(c) apply to all underground coal mines, regardless of whether or not belt air is used to ventilate working sections or setup or removal areas. Specific provisions under § 75.350(d) apply to underground coal mines that use belt air to ventilate working sections and setup and removal areas. These provisions maintain miner safety by increasing protection when point feeds are used to augment belt ventilation with other intake air that subsequently is delivered to working sections or setup and removal areas. Proper installation and maintenance of point-feed regulators, when used, are critical since they are a major component of a ventilation system. Since point-feed regulators are permanent ventilation controls, the provisions of § 75.333(e)(1) (Ventilation controls) apply. The wording of the final provision remains unchanged from that of the proposed rule.

Final paragraph (d)(3), which was derived from proposed paragraph (c)(3), clarifies the requirements for closing point-feed regulators. The point-feed regulator must be provided with a means to close the regulator from the intake air course without requiring a person to enter the crosscut where the point-feed regulator is located. The point-feed regulator must also be provided with a means to close the regulator from a location in the belt air course immediately upwind of the crosscut containing the point-feed regulator. The modifications to this language from the proposed rule include: ''from the intake air course without requiring a person to enter the crosscut where the point-feed regulator is located'' and ''location in the belt air course immediately upwind of the crosscut containing the point-feed regulator'' where the means to close the regulator are found.

This provision provides protection for those miners who may be required to close the point-feed regulator in case of an emergency. Remote closure is especially important if a fire starts in the intake air course upwind from the point-feed regulator. When the point-feed regulator is installed in such a manner, the person closing the point-feed regulator could approach from the upwind side of the regulator in the belt air course. This would enable the person to close the regulator without being exposed to the products of combustion coming through the point-feed regulator when a fire occurs in the intake air course. By closing the point-feed regulator under these conditions, the amount of contaminants entering the belt air course could be limited, thus providing miners additional time to escape.

Some commenters thought that the requirement mandating remote-closing of the regulator is unrealistic. The proposed rule did not mandate closure of the regulator, but rather that a means would be available to close the regulator if needed. Others questioned MSHA on how best to comply with the provision. Based on these comments, the language of this paragraph has been modified to clarify MSHA's intent. The point-feed regulator must be provided with a means to close the regulator, either manually or by remote control, from the intake air course without requiring a person to enter the air stream passing through the point-feed regulator. New language was added to this provision in response to comments, ''In addition, the point-feed regulator must also be provided with a means to close the regulator from a location in the belt air course immediately upwind of the crosscut containing the point-feed regulator.''

Paragraph (d)(4), formerly proposed paragraph (c)(4), requires that a 300-fpm minimum air velocity be maintained through the point-feed regulator to prevent air reversals and reduce the potential for smoke rollback. No comments were received on this provision, therefore, it remains as proposed.

Paragraph (d)(5), formerly proposed paragraph (c)(5), requires the mine operator to submit a mine ventilation plan that includes the location of all point-feed regulators. The installation of the point-feed regulator must comply

with existing § 75.333 and must meet the performance requirement of remote closure as required by new § 75.350(d)(3). The individual location(s) and use of a point-feed regulator(s) must be approved in the mine ventilation plan to assure that hazardous situations are not created.

In addition, paragraph (d)(5) requires that the locations of point-feed regulators be shown on the mine ventilation map required by § 75.372 (Mine ventilation map). An accurate and complete map enables both the operator and MSHA to evaluate the ventilation system. During escape, it is important that miners be aware of all aspects of the ventilation system that might affect their ability to exit the mine safely, including the location of point-feed regulators. Knowledge of the locations of point-feed regulators will allow miners to efficiently close the ventilation controls in a timely manner to facilitate escape. Although a means for closure is required for all point-feed regulators, closing a regulator, as in making any air change during a mine emergency, should be done only when necessary.

Some commenters believe that this provision is unnecessary. They contend that it will create a number of unnecessary ventilation plan submissions. As an alternative, some commenters suggested that limiting point-feed regulators to one per conveyor belt flight would reduce the number of required plan submissions and allow mine operators to change belt ventilation to accommodate changing methane concentrations on belt lines in a timely manner. They claim that modifying the mine ventilation map to include these point feeds could be done in a timely manner. MSHA disagrees with the commenters. Based on MSHA experience, the installation of point feeds will be infrequent. Modifications to the mine ventilation plan will not be burdensome for operators, since they already submit plans to MSHA under existing § 75.370 that are reviewed twice a year by MSHA. Thus, final paragraph (d)(5) remains unchanged from the proposed rule.

Paragraph (d)(6), formerly proposed paragraph (c)(6), requires an AMS to be installed, operated, examined, and maintained as specified in § 75.351 when point-feed regulators are used. This requirement, which applies to underground coal mines using belt air to ventilate working sections and setup and removal areas, greatly increases protection for miners by increasing the level of atmospheric monitoring of areas where intake air is directed into a belt air course, thereby increasing the ability of the mine operator to detect fires before they can develop into a serious threat to miners and mine property. No comments were received on this provision, and the provision remains unchanged from that of the proposed rule.

Section 75.351 Atmospheric Monitoring Systems

This section of the final rule establishes the installation, location, examination, maintenance, and operational requirements for AMSs. The proper operation of an AMS is the cornerstone on which the safe use of belt air, and other provisions in this final rule, is based. Current AMS technology has proven itself to be reliable. Since 1978, the year when an AMS was first required as a condition for the granting of a belt air petition, we have included performance criteria for an AMS as part of each granted belt air petition. As AMS technology has evolved, the performance requirements in the granted petitions have also evolved. Performance requirements are included in this final rule.

Final paragraph (a) requires that an AMS be in operation whenever personnel are underground and an AMS is used to fulfill the requirements of §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f). At those times the AMS must be operating and a designated AMS operator must be on duty at a location on the surface of the mine where audible and visual signals from the AMS must be seen or heard and the operator can promptly respond to these signals. The Agency intends that ''audible'' means able to clearly hear the signal above the noise of machinery as required by the National Fire Code (1967) which was incorporated by reference in § 75.1103–2 (1972). It is intended that ''visual'' means clearly seen as required by language found in nearly all granted petitions. This language is slightly modified from the proposed rule by specifically indicating that both audible and visual AMS signals must be provided to the surface location. Also, the word ''can'' was replaced with ''must'' while ''and'' was replaced with ''or.'' It was the position of some commenters that the AMS operator should be able to ''see or hear'' AMS signals. It is their position that the AMS operator can do other tasks while monitoring the AMS signals. One commenter also suggested that requiring both signals was ''regulatory overkill'' and suggested that we include the phrase ''and/or'' to allow flexibility to operations that need both audible and visual AMS signals. However, this commenter's suggestion would not require that every mine operator provide both audible and visual signals. Both types of signals have been required by nearly all granted petitions. MSHA agrees that AMS operators can do other tasks while monitoring AMS signals. However, primarily because the AMS operator may be conducting other tasks, it is necessary that both visual and audible signals be available and of sufficient magnitude to alert the AMS operator who must always be in a position to either see or hear both types of AMS signals.

The final requirement of this paragraph is similar to existing § 75.351(d)(1), which requires a person designated by the mine operator be stationed at the surface location while anyone is underground. This final requirement clarifies when the AMS must be in operation and when the AMS operator must be at the designated surface location.

Generally, an AMS installed in accordance with §§ 75.350(b) or 75.350(d) monitors the mine atmosphere at all times that a belt air course is used to provide intake air to a working section or areas where mechanized mining equipment is being installed or removed when miners are underground. This requirement is usually independent of belt operation or coal production. This means the AMS must be monitoring the mine atmosphere whether or not the belt is running or coal is being produced, whenever belt air is provided to working sections and locations where mechanized mining equipment is being installed or removed while miners are underground.

Proposed paragraph 75.351(a) would have required ''for extended idle periods exceeding 24 hours, when the belt is not operating, the requirements of §§ 75.350(b) or 75.350(c) would not apply after the initial 24 hour idle period.'' We received many comments on this proposed requirement. Some commenters testified that the traditional period for monitoring the belt line after shutdown is 4 hours, not 24 hours. Other commenters testified that the belt line should be continuously monitored at all times if the air going down the belt line is being used to ventilate working sections. This is particularly relevant, they argued, when any miner is underground. One miner testified that during idle periods at his mine during vacations an estimated 200 miners are still underground. Another commenter stated that if the AMS system is off, because the belt has been down more than 24 hours, air will still be traveling along the belt and passing through common entries where miners may be doing nonproduction jobs, such as

maintenance or deadwork. It was pointed out that the deadly explosions at JWR No. 5 mine occurred during a maintenance shift. Also, commenters testified that many smoldering fires have been found during periods that the belt has been down; indicating a need to keep the AMS operational. Therefore, some commenters argued that the AMS must be kept operational and records kept during idle periods.

As previously stated, we have reviewed our report on the JWR No. 5 mine accident. It was determined that although the accident had occurred on a maintenance shift, the accident was not related to the use of belt air.

Due to commenter concerns, and the acknowledgment that this issue is covered under existing § 75.1103–4—Automatic fire sensor and warning device systems; installation; minimum requirements, the proposed language has been deleted from the final rule. The proposed requirement was not intended to supersede the requirements in § 75.1103–4(e), which applies to all mines with belts. Section 75.350(a) applies only to mines that use belt air to ventilate working sections and areas where mechanized equipment is being installed or removed.

In addition, the last sentence in the proposed provision, ''All provisions of this section will become applicable one hour prior to belt start-up following this idle period'' has also been deleted since the idle period requirement included in the proposed rule has been deleted from the final language. One commenter was not sure this requirement was necessary. We agree with the commenter that the requirement was not necessary, and therefore it has been deleted.

A number of comments were received urging that we require a four-hour AMS battery backup, a requirement included in recently granted petitions. Other commenters testified that the AMS needs a battery-backup power system of four to five hours in case there is a power failure to maintain system integrity. The typical language from the petitions is as follows: ''The low-level carbon monoxide system shall be capable of giving warning of a fire for a minimum of 4 hours after the source of power to the belt is removed, except when the power is removed during a fan stoppage or the belt haulageway is examined as provided in 30 CFR 75.1104–4(e)(1) and (2).''

It is apparent that this provision has been considered by many as a battery-backup requirement. However, this language does not require the installation of an uninterrupted power supply (UPS) for the AMS. The requirement for a UPS was not included in any known existing granted petitions. If power is removed from the belt, the AMS will function properly if powered from a different electrical circuit than the belt. If powered by the same power source as the belt, § 75.1103 requires a battery backup to provide fire detection for at least four hours. If the power source to the surface computer is interrupted, the AMS will not function. Without a UPS to power the system, the mine operator would be required to begin patrolling the belt entries as required by § 75.352(e)(3). If the AMS is used as a communication system to comply with § 75.351(r), then according to § 75.1600–2(c) a means to provide continued communication in the event the mine electric power fails or is cut off is required. This could be accomplished by installing a battery back-up or UPS.

The quoted requirement from the existing petitions is already in effect as a provision for all mines using an AMS to comply with existing § 75.1103–4(e). This section is referenced in new § 75.350(b)(1), therefore no changes in the proposed language are necessary. Although the battery backup is not specifically required by this rule or by the National Fire Code No. 72A (1967), mine operators should consider installation of a UPS to assure system operation in the event of a power interruption.

Proposed § 75.351(b) would have required the mine operator to designate a surface location at the mine for receiving signals from the AMS sensors or, if the operator wanted, at another location, possibly off mine property, approved by the district manager. In addition, the mine operator would assign an AMS operator to respond to those signals when the system is used to comply with existing §§ 75.323(d)(1)(ii) (Actions for excessive methane, Return air split alternative), 75.340(a)(1)(ii) or 75.340(a)(2)(ii) (Underground electrical installations), or 75.362(f) (On-shift examination), and §§ 75.350(b) or 75.350(d) (Belt air course ventilation). Some commenters to this provision thought that having only one surface location was restrictive. Neither the proposed nor the final rule limit the mine operator to designating a single surface location on the mine property. However, if the mine operator designates more than one location, all of the locations must meet the requirements of the final rule. Other surface locations could also be nondesignated monitoring locations if the mine operator chooses to use data from the AMS for other purposes.

Other commenters questioned the logic of the proposed language allowing the surface location to be located at ''another location approved by the district manager.'' They argued that this would allow the monitoring station to be underground or off the mine property. In a mine disaster, the former (an underground location) could endanger the whole system. The latter (off of mine property) could make the specified location ineffective or increase the time that it could take to respond to a danger underground because the mine operator may be relying on communication systems which may be compromised due to weather, natural disaster (*i.e.*, flood, tornado, hailstorm) or accidental damage to overland communication lines. MSHA agrees with the commenters, and has removed the language on allowing other locations from the final provision because such a designation could reduce the effectiveness in responding to the AMS.

Like the proposed rule, § 75.351(b)(1) of the final rule requires that the AMS operator or other appropriate personnel have access to two-way voice communication with persons on working sections, areas where mechanized mining equipment is being installed or removed, and other areas included in the approved emergency evacuation and firefighting program of instruction, § 75.1502. This is consistent with granted petitions. These areas must be equipped with two-way communication in accordance with existing § 75.310(a)(3). These other areas may include belt drives, belt transfer points, underground dumps, and underground shops. We do not intend it to mean areas where persons are assigned to work on a temporary basis, such as areas where miners are installing supplemental roof supports or where they are making repairs to track haulage systems.

Paragraph (b)(2) requires the mine operator to designate an AMS operator to monitor and promptly respond to all AMS signals. This has been modified from what was proposed in that the phrase ''* * * and be at a location on the mine surface where the AMS operator can promptly respond to all signals from the AMS'' has been rewritten to remove the surface location reference already included in paragraph (b)(1). One commenter asked if the designated AMS operator can be a named person or a position description. For instance, a company may have control room operators who are on duty seven days a week, twenty four hours a day. This would allow designating a position instead of a specific, named individual. The commenter maintained that MSHA needs to clarify this portion of the proposed standard. MSHA agrees that the AMS operator can be a position

description. However, persons filling this position must be listed as required under § 75.351(b)(4) and properly trained to be an AMS operator under § 75.351(q).

We require the AMS operator to notify appropriate personnel in response to a malfunction, alert, or alarm signal. The AMS operator could be the responsible person initiating the approved emergency evacuation and firefighting program of instruction under existing § 75.1502, who could notify the responsible person for initiating the plan. The AMS operator must be on duty while personnel are underground, and must be monitoring the AMS pursuant to the requirements of existing §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), or 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f).

The proposed paragraph (b)(3) stated that the map must be updated daily. Some commenters suggested that the map be updated, instead of daily, to within 24 hours when changes are made, such as adding sensors or changing air flow direction. Because there is no substantial difference between ''daily'' and ''within 24 hours'', final paragraph (b)(3) requires the posting at the designated surface location of an up-to-date map or schematic showing air flow directions and the location and type of all AMS sensors to be updated within 24 hours of any change in this information. It is as protective as the proposed language, in that all changes are updated in a similar time frame. The map or schematic could be displayed or stored in the AMS computer and retrieved when needed. By posting an up-to-date map showing the locations and types of AMS sensors and the intended air flow direction, the appropriate personnel will be better able to identify the affected areas of the mine. This requirement also applies to §§ 75.350(b) and 75.350(d).

Paragraph 75.351(b)(4) requires that certain information be provided at the designated surface location. That information includes: the names of the designated AMS operators; appropriate personnel, such as section foreman, maintenance foreman, mine manager, and safety director; the responsible person referred to in § 75.1501; and the method to contact these persons. This will provide a means for an AMS operator to promptly contact the appropriate personnel in the event of an emergency. Some commenters thought that it was unnecessary to require a method of contact because it would require the appropriate personnel to always be positioned by a mine phone. It is MSHA's intent that during each shift miners work underground, there must be at least one appropriate person on site who can be contacted in case of an emergency. This does not preclude appropriate personnel from being underground; however, this person's location must be known and he/she must be able to be contacted by the AMS operator from the designated surface location. If this person is not able to be in contact with the AMS operator, then the mine operator must designate another appropriate person in his/her place who is able to be contacted by the AMS operator.

Other commenters emphasized that the AMS operators must have specialized training that includes mine-specific knowledge of equipment and personnel locations as well as what actions are needed for different AMS signals. The Agency agrees with this comment. The proposed rule included provisions that required specialized training for the AMS operators under § 75.351(q). The final rule is unchanged from the proposed rule.

Paragraph 75.351(c) establishes minimum operational requirements for an AMS installed in accordance with existing §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f). MSHA has developed a tiered response to address malfunction, alert, and alarm signals in order to require proper action by the AMS operator, appropriate personnel, and miners. Malfunction and alert signals from single sensors are addressed in a similar manner in this final rule. It is important to investigate to determine the cause of either the malfunction or alert signal and to correct the condition causing the signal as soon as possible. The AMS operator must be able to tell, by sight or sound, if a signal is the result of a malfunction, alert, or alarm in order to respond correctly to the situation. Malfunction, alert, and alarm signals can be customized by assigning different tones or lights so that the AMS operator can easily distinguish them in order to respond appropriately. For example, while all signals would be indicated by the same audible device, a malfunction could be identified as a communication failure on the computer screen, whereas an alert CO level would be indicated by yellow text on the computer screen, and an alarm CO level would be indicated by red text on the computer screen. Normal conditions would be indicated by green text on the computer screen. Alarms on working sections and on setup or removal areas must be discernable by sight or sound by the miners so that appropriate actions outlined in the § 75.352(c) can be taken.

The proposed rule language in § 75.351(c)(1) stated that alert and alarm signals ''* * * can be seen or heard by the AMS Operator * * *''. It was our intent that the system would at all times be capable of notifying the AMS operator that action was required in response to a signal. This signal could be either a visual or audible signal, but at a minimum, one of these signals must be seen or heard at all times. The Agency believed that the notification could be in either the visual or audible mode, and the proposed rule was written to require alert and alarm signals that would be adequate for making this notification. The final rule clarifies this intent, by changing the language to ''* * * must be of sufficient magnitude to be seen or heard by the AMS operator * * *.'' In this way it is assured that the AMS operator will be notified of a possible problem.

Proposed § 75.351(c) has been revised in this final rule to clarify the intent of the standard. The final rule specifies that the AMS must provide visual and audible signals in the event of any interruption of circuit continuity and any electrical malfunction of the system. In addition, the final rule specifies the AMS must provide visual and audible signals in the event of the detection of carbon monoxide or methane at the established alert levels, or detection of carbon monoxide, smoke, or methane at the established alarm levels. The final paragraph also requires the signals to be provided at the specified locations as was stated in the proposed rule.

Many comments were received regarding alert and alarm signals at the surface and underground locations. Most commenters suggested the alert and alarm signal requirement should be ''seen or heard'' rather than ''seen and heard''. Of utmost importance is that the system must make the required notification. The intent of the proposed rule was to require two signals at the surface location, and that at least one of these signals would effectively provide notification of an emergency or malfunction condition. The language ''capable of being seen and heard'' and ''can be seen or heard'' were intended to require substantial and appropriate signal devices, and not that the signals be both seen and heard. The language used was intended to require the signals to be sufficient for the purpose, such as the language in existing § 75.1600–2(b) which states ''The incoming communication signal shall activate an audible alarm, distinguishable from the surrounding noise level, or a visual alarm, that can be seen by a miner regularly employed on the working section''.

The same modification was made to the alarm signals provision for underground locations under § 75.351(c)(4). The proposed rule stated that the AMS must automatically provide signals that can be seen and heard on all affected working sections and at all affected areas where mechanized mining equipment is being installed or removed when the CO, smoke, or methane concentration reaches alarm levels. It is known that not all miners can see and hear all audible and visual signals at all times. For example, a shuttle car operator may be emptying a load of coal at the tail piece where noise may prevent the operator from hearing the audible signal, yet the operator should be able to see the visual signal. Another example would be a shearer operator who may not be able to see or hear either alarm. However, the stageloader operator would be able to see or hear one of the alarms and notify others on the longwall face. It was the intent of the proposed rule to require that both audible and visual signals be supplied to the affected working section or setup or removal area. It was also intended that at least one of these signals would be seen or heard by at least one of the miners working in the affected area. This miner would then immediately notify other miners in the affected area.

Paragraph (c)(1) requires that the AMS automatically provide visual and audible signals at the designated surface location for any interruption of circuit continuity and any electrical malfunction of the system. These signals must be of sufficient magnitude to be seen or heard by the AMS operator working at this designated surface location. Paragraph (c)(1) also requires the system to identify, at the designated surface location, the operating status of all sensors. As discussed previously, when an AMS is used, it is an integral part of the overall safety program for the mine. It is important that the AMS operator be aware of the operational status of all system components. Without this knowledge of the operational status of the AMS, the AMS operator cannot appropriately respond to alert and alarm signals from the system. As such, it is imperative that the system is in proper operating condition or that the AMS operator knows when it is not operating properly so that remedial measures can be started. By having an automatic monitoring system, this information is more readily available and the AMS operator can notify appropriate personnel.

One commenter agreed that the AMS operator should be required to see or hear malfunction, alert, and alarm signals from the AMS. This would allow the AMS operator to perform other tasks and yet quickly respond to AMS signals. The language of this provision has been modified from that proposed by specifying that both ''visual and audible'' signals must be provided at the designated surface location.

Final paragraph (c)(2) requires that the AMS automatically provide visual and audible signals at the designated surface location when the carbon monoxide concentration or methane concentration at any sensor reaches the alert level as specified in § 75.351(i). These signals must be of sufficient magnitude to be seen or heard by the AMS operator working at the designated surface location. The language of the final rule has been modified from the proposed rule by specifying that both ''visual and audible'' signals must be provided. Also, the requirement to have the alert signal be distinguishable from the alarm signal has been moved to § 75.351(c)(3). The final rule language is consistent with language in recently granted petitions by requiring that the AMS provide both types of signals at the designated surface location. Therefore, there will be no reduction in protection afforded miners working at mines with granted petitions containing such a requirement once this final rule is effective.

Final paragraph 75.351(c)(3) requires the AMS to automatically provide visual and audible signals at the designated surface location distinguishable from alert signals when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in § 75.351(i). These signals must be of sufficient magnitude to be seen or heard by the AMS operator working at the designated surface location. The language of the final rule has been modified from the proposal by specifying that both ''visual and audible'' signals must be provided. Also, the requirement to have the alert signal be distinguishable from the alarm signal has been moved here from proposed § 75.351(c)(2). MSHA agrees with the commenters that suggested that the AMS operator must ''see or hear'' the required alarm signals instead of ''see and hear'' both of them.

Final § 75.351(c)(4) requires that the AMS automatically provide visual and audible signals at all affected working sections and at all affected areas where mechanized mining equipment is being installed or removed when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in § 75.351(i). These signals must be of sufficient magnitude to be seen or heard by miners working at these locations. Methane signals must be distinguishable from other signals, due to the explosive nature of the methane gas. The only changes from the proposed language is that the miners underground must either ''see or hear'' the alarm signal instead of ''see and hear'' and the signals must be ''of sufficient magnitude to be'' seen or heard by miners working at these locations. A commenter stated that the alert signals should also be seen or heard by miners working inby the alerting AMS sensor because they could be endangered by increased levels of CO. Some commenters stated that it was unrealistic to expect all miners to see and hear alarms at all times. They suggested that alarm signals at underground locations should be required to be seen or heard.

The same commenter also commented that it was not necessary or reasonable to have distinguishable methane and CO alarms. MSHA believes it is important to distinguish between methane and CO alarms in order to adequately assess the situation and to respond appropriately to the hazard. For example, if a methane alarm in the immediate return is indicated on the working section which cannot be differentiated from CO alarms, section personnel might search the belt entry for a fire rather than take actions to render harmless the methane accumulation. The final rule, consistent with the proposed requirement, is more protective than the granted petition requirement that states only that the two distinguishable audible and visual signals must be provided, not that the alarm signals be distinguishable based on the hazard of CO or methane. The technology to have ''distinguishable alarms'' at working sections is available, but may require some hardware or software changes at some locations.

As in the proposed rule, final § 75.351(c)(5) requires that the AMS automatically provide visual and audible signals at other locations as specified in the mine emergency evacuation and firefighting program of instruction (§ 75.1502) when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in § 75.351(i). These signals must be seen or heard by miners working at these locations. Methane signals must be distinguishable from other signals. A commenter suggested that this section should be deleted because it is vague. MSHA disagrees with this commenter because the language is clear and there is a need to notify affected miners and, therefore, retains the section. Another commenter also suggested that the audible alarm be heard above the sound of equipment.

Existing § 75.1103–2(b) incorporates by reference NFPA 72A–1967 which requires ''Fire alarm systems * * * shall have one or more audible signaling appliances * * * so located that their operation will be heard clearly regardless of the maximum noise level obtained for machinery or other equipment under normal conditions * * *'' This final provision requires that the alarm be either heard above the sound of equipment or seen; therefore, the language of the final provision remains as proposed.

As in the proposed rule, final paragraph c(6) requires that the AMS identify the operational status of all sensors at the designated surface location. This provision is consistent with granted petition language. The intent of this provision is to assure that the AMS operator can readily determine that all of the sensors connected to the system are functioning properly. The lack of an alarm from a non-functioning sensor cannot be considered a safe condition. No comments were received on this section; it remains as proposed.

Paragraph 75.351(c)(7) has been added to the final rule, based on MSHA's analysis of the record. This provision requires that the AMS automatically provide visual and audible alarm signals at the designated surface location, at all affected working sections, and at all affected areas where mechanized mining equipment is being installed or removed when the carbon monoxide level at any two consecutive sensors alert at the same time at levels specified in § 75.351(i). These signals must be seen or heard by the AMS operator and miners working at these locations.

Many commenters suggested alert signals should automatically be transmitted to each affected working section and areas where mechanized mining equipment is being installed or removed. Other commenters suggested it is not necessary to report each alert to the sections, and that in mines where frequent nuisance and false alert and alarm signals occur, miners attach a diminished importance to the signals creating a ''cry-wolf'' syndrome, in which alert and alarm signals are discounted by miners as related to non-fire sources, such as diesel-powered equipment or welding fumes, and not to a real fire event. This new provision should reduce nuisance alert and alarm signals, thus increasing the effectiveness of the AMS as a early-warning fire detection system.

We agree that in many cases the activation of numerous alert signals may lead to complacency; however, we also agree that in some instances the early notification of working sections and setup or removal areas may be desirable. It has been reported that alert levels of CO at individual sensors are produced by diesel-powered equipment exhaust, cutting and welding operations, hot brakes on mobile equipment, and other non-fire conditions. Alert signals have also been caused by radio-frequency interference, and these occurrences are often of a limited duration. In an analysis of AMS system responses to fires, as well as large-scale fire testing by the U.S. Bureau of Mines, researchers found that fires may produce alert or higher levels of CO at consecutive sensors. When this occurs, automatic notification of affected areas is required by this final rule.

For these reasons, while alert signals at individual sensors need not be reported to affected areas, we have included this new requirement so that, in the case of consecutive sensors in alert status, automatic notification of the affected areas is required. Actions required under this section are specified in § 75.352(c). Although automatic notification of single alert signals on working sections and setup or removal areas is not required, the alert signals for individual sensors must still be investigated to determine the CO source, as required by 75.352(b).

The operation of diesel-powered equipment in the belt air course or in adjacent air courses is a concern in mines using CO-based fire detection systems. Possibly, movement of the equipment in these air courses can cause alert or alarm activations at individual sensors as the equipment passes nearby. If there are cases where engines cause numerous alert and alarm signals due to the machine exhaust containing high levels of CO, we believe that the mine operator can perform maintenance on the diesel engines which is likely to be effective in reducing these levels. Proper maintenance of diesel-powered equipment is an important aspect of controlling diesel engine emissions as required by § 75.1914—Maintenance of diesel-powered equipment. Additionally, the use of diesel discriminating sensors (DDS) has been shown to be effective in mines using diesel-powered equipment for reducing the frequency of alert signals. The DDS, as well as the hydrogen-insensitive and smoke sensor technologies, can be employed to reduce or eliminate required evacuations for alert signals.

Like the proposed rule, final paragraph (d) specifies the location and installation requirements for AMS sensors. While no comments were received on proposed paragraph (d), comments were received on the subparagraphs of paragraph (d). These are discussed below.

Like the proposed rule, paragraph (d)(1) requires that AMS sensors be in the airstream they are intended to monitor to assure that measurements are representative of the mine atmosphere. In response to comments, MSHA clarified the language of the proposed rule by adding, ''mine atmosphere in these locations'' to the final provision. No other changes were made to the proposed language.

Paragraph (d)(1) ensures the positioning of sensors to detect a hazardous condition should it develop. For example, where an electrical installation is monitored to comply with §§ 75.340(a)(1)(ii) or 75.340(a)(2)(ii), the sensor must be positioned downwind in the airstream used to ventilate that installation. This provision will provide the maximum potential for fire detection, since the products of combustion (*e.g.*, CO) will be contained in the air current. Many commenters suggested that in order to ensure the proper location for CO sensors, a smoke test be conducted prior to sensor installation to determine the best location for each sensor, especially in locations that can restrict the flow of air, such as around belt headers and drives. Commenters continued that these sensors should not be hung just over the belt, but staggered across the entry to ''catch'' the different air flows on the belt. An example was given of a belt fire at the Ohio 11 mine that was not initially detected by the nearest CO sensor to the fire because the sensor was not positioned in the air stream, but was located behind a post.

The petition governing the use of belt air at that mine neither specified the location of sensors nor required a smoke test to determine air flow patterns. Consequently, when the fire started the sensor was located in such a way that the highest concentration of CO within the entry did not pass by this sensor. MSHA has reviewed the accident report of the Ohio 11 mine fire (Accident Investigation Report (MSHA, Underground Coal Mine), Non-Injury Fire, Ohio 11, Island Creek Coal Company, Morganfield, Union County, Kentucky, May 5, 1995). The sensor did detect products of combustion from the fire. The CO sensor in question that was nearest to the fire alerted 30 seconds later than a sensor located 1,000 feet downwind. The fire was extinguished without injury to miners.

The sensor in question at the Ohio 11 mine was reportedly installed out of the air stream behind a post which delayed

transporting of products of combustion to the sensor location.

The final rule requires that sensors be installed in the air stream to assure that the products of combustion are effectively detected. This is consistent with granted petition language which does not require a smoke test prior to sensor installation, because the sensors must be installed in the airstream. Although a smoke test is not required, if a mine operator has a question about proper sensor location then a smoke test could be conducted to determine the optimum location.

Final section 75.351(d)(2) requires installation of CO or smoke sensors near the center in the upper third of the entry, in a location that would not expose personnel working on the system to unsafe conditions. The proposed rule language was very similar. The proposed rule specified that the sensor was to be installed as ''near the roof as feasible'', whereas the final provision specifies that the sensor is to be installed ''in the upper third of the entry''. This change was the result of comments that are discussed below.

This requirement is necessary to make certain that sensors are placed away from machinery, such as the belt itself, that could be a hazard to miners working on the AMS. If the sensors are installed too close to machinery, clothing and body parts could be entangled in the equipment, thus endangering miners' safety. This provision was modified following a comment that sensors should be installed in the upper third of belt entries near the center, not as near the roof as feasible, as the proposed provision stated. MSHA agrees since the final language does not reduce safety since it is consistent with the majority of recently granted petitions. We have modified the provision as stated.

As in the proposed provision, final § 75.351(d)(2) also specifies that mine operators not locate sensors in abnormally high areas or in other locations where air flow patterns do not permit products of combustion to reach the sensors. This requirement was developed based on work conducted by the U.S. Bureau of Mines and MSHA experience with existing belt air petitions. This work has shown that during both smoldering and open combustion fires, the products of combustion may stratify. The highest concentrations may be found near the mine roof. Accordingly, the U.S. Bureau of Mines recommended installing sensors near the roof of the entry to take advantage of this stratification. Our experience shows that when operators do not properly position sensors, heatings or fires can go undetected or their detection can be delayed, as was seen with the Ohio 11 mine fire. For example, sensors that are positioned behind posts or equipment will not be exposed to the products of combustion contained in the air stream.

Like the proposed rule, final § 75.351(d)(3) requires that methane sensors be installed near the center of the entry at least 12 inches from the roof, ribs, and floor, paralleling the requirement of § 75.323(a) for conducting methane tests. This final standard specifies the location for an AMS sensor installed to comply with existing § 75.323(d)(1)(ii) which requires the use of an AMS when using the return air split alternative. This final provision also requires installation of methane sensors near the center of the entry in a location that would not expose personnel working on the system to unsafe conditions. No comments were received on language in this provision; therefore, it remains unchanged from that of the proposed rule.

Like proposed paragraph (e), final paragraph (e) specifies the locations along the belt entry where the operator must install sensors to monitor for CO or smoke. Minor editorial changes where made to the proposed language. The phrase ''of this section'' was deleted and the end of the section was modified by changing ''located'' to ''at the following locations.''

A commenter stated that MSHA should require the combined use of smoke detectors, methane sensors, and CO sensors with reduced alert/alarm settings along the belt line. The commenter's rationale is that most mines that use belt air are longwall mines. He contends that more methane is released in these mines ''since the belt line is on the solid.'' He stated that this methane will be transported to the face and if the air is traveling at a high velocity, the methane is transported to working areas even faster. He gave an example that at his mine, methane levels are up to one percent higher at the face when there is a ''big proliferation'' of methane outby the belt line. While the commenter did not explain how this ''big proliferation'' of methane occurs, MSHA requires that sufficient air quantities be directed through the belt air course to control methane liberation. Currently, existing § 75.362 requires that during each production shift that a belt operates, the belt air course must be examined for hazardous conditions, including methane. Properly ventilated belt air courses can contribute to the dilution of methane and dust on working sections in many mines. Methane concentrations in belt air courses are currently limited by existing § 75.323. In addition, this final rule requires either the use of CO or smoke sensors. Smoke sensors that meet the requirements of this final rule currently are not commercially available; however, this final rule will allow their use once they become commercially available.

Some commenters stressed that the sensors need to be placed in areas that are in the air flow and are not obstructed by ''headers'' and ''belt take-up'' mechanisms. Even though MSHA is not sure what the commenter meant by ''headers'', we agree that the sensors must be properly installed as required by § 75.351(d).

Like the proposed rule, final paragraph (e)(1) requires a sensor at or near the working section tailpiece. This sensor is to monitor the belt and it is not intended to monitor the section tailpiece or feeder. The tailpiece area is visited frequently and a sensor installed over the loading point would be subject to damage. The sensor must be installed in the air stream ventilating the belt entry. In longwall mining systems using belt air to ventilate the working section, paragraph (e)(1) requires that the sensor near the tailpiece be located in the belt entry at a distance of no more than 150 feet upwind from the mixing point where intake air is mixed with belt air at or near the tailpiece. This requirement specifies that a sensor monitor the belt up to the point that intake air flows into the belt entry mixing with belt air. It is not intended to monitor the section loading point since this location is often attended by miners; therefore, miners would be in the area and aware of any sign of a fire. A commenter stated that there should be an alarm box installed on each section, because if there is only one alarm box back at the feeder while the continuous miner is moving, 30 to 40 minutes may elapse before any person returns to the feeder. Therefore, if an alarm sounds it could be over one-half hour before the miner is aware of it. Like the proposed rule, the final rule requires an alarm unit on each working section (§ 75.351(c)(4)) to notify miners of a fire or methane hazard. The final provision provides the same level of protection as existing granted petition language.

A commenter suggested that an alarm unit be placed on each end of a longwall. Due to the length of some faces, the commenter contended that it could be over one half hour before anyone would be at the transfer point to see the alarm. The commenter also suggested that an alarm box be placed by the power center as well. MSHA

disagrees with the commenter because the standard requires that the alarm signals be seen or heard. It is the responsibility of the mine operator to ensure that this requirement is met. If one alarm unit at the stage loader is not sufficient to meet this requirement, other alarm units may be necessary. Another option for the mine operator to consider could be to automatically de-energize the longwall equipment when an alarm signal is received on the section alarm unit in order for miners to see or hear the alarms. The final language in the provision remains as proposed and provides the same level of protection as a similar requirement in granted petitions.

Like the proposed rule, final paragraph (e)(2) requires that a sensor be located upwind, at a distance of no greater than 50 feet from the point where the belt air course is combined with another air course or splits into multiple air courses. This provision requires placing a CO or smoke sensor in the belt entry (*i.e.*, main belt entry) just before the air stream splits to ventilate another belt entry (*i.e.*, a panel belt). Also, if two belt air splits join, this paragraph requires a sensor in each air split immediately prior to joining. These sensors are required to promptly identify the location of a fire in either air split and would more precisely show the location or air split where the fire originated. No comments were received directly addressing this provision; therefore, the final language in the provision remains as proposed.

Like the proposed rule, final paragraph (e)(3) requires sensors to be installed at intervals not to exceed 1,000 feet along each belt entry in areas where air velocities are maintained at 50 feet per minute or higher. In areas where the air velocity in the belt entry is less than 50 fpm, the sensor spacing must be reduced to 350 feet. Some commenters supported a reduced sensor spacing when velocity levels are less than 50 fpm. Other commenters suggested a sensor spacing of 325 or 300 feet, based on NIOSH research that showed sensor spacing at approximately 344 feet in zero flow conditions is equivalent to 1,000 foot spacing with 50 fpm air velocity. MSHA has re-evaluated the spacing requirement, based on the comments. We recognize that there will be some air movement in the belt entry and zero-flow conditions will not exist. We have consulted with NIOSH on this subject and they have concurred that spacing sensors at 350 feet is appropriate.

In addition, another commenter requested the grandfathering of the 2,000-foot sensor spacing requirement from older granted belt air petitions. That is, if this is allowed, it would mean that mines with existing granted petitions that require 2,000-foot sensor spacing would not have to implement the 1,000-foot sensor spacing required in this final rule in areas of the mine developed prior to the effective date of this final rule. There are 16 mines with granted petitions that specify the 2,000-foot spacing. However, some of these mines are no longer active, while others have implemented new reduced spacing interval of 1,000-foot sensor spacing. There are another 4 active mines, working under older granted petitions, that do not even specify sensor spacing, and therefore, have implemented either a 2,000-foot spacing or a combination of 2,000- and 1,000-foot sensor spacing.

MSHA disagrees that mines with petitions that require 2,000-foot sensor spacing should be allowed to keep this spacing in portions of the mine developed prior to the effective date of this rule. Our experience indicates that the 1,000-foot spacing provides an added level of early-warning fire detection. We are not opposed to giving this limited number of mines more time to comply with this provision because the AMS may require significant modification in order to comply with not only this requirement but also § 75.351(r). Mines with the 2,000-foot spacing requirement will have a longer period to install sensors at the 1,000-foot spacing in older parts of their mines. The final provision remains as proposed except it now requires that ''All sensors must be installed at the 1,000-foot spacing, no later than August 2, 2004.''

For mines using an AMS with CO or smoke sensors for fire detection in the belt entry, as was proposed, final § 75.351(e)(3), requires a minimum velocity of 50 fpm in the belt entry unless the spacing is reduced to 350 feet between CO sensors, in which case, the velocity can be lower. Our experience with granted petitions shows that for an AMS with CO sensors to function properly as an early-warning fire detection system, the products of combustion must be transported to the sensors. This method of transport is the ventilation air current. The Advisory Committee concluded that a minimum air velocity of 50 fpm is necessary to ensure timely transport of combustion products to sensors. However, more recent research conducted by NIOSH indicates lower velocities can be used if sensor spacing is reduced. In zero-flow conditions, NIOSH has found sensor spacing of 105 meters (344 feet) to be effective for early-warning fire detection (Edwards *et al.* 1997). We recognize that mines will have some air flow within the belt entries. Therefore, we are requiring that maximum sensor spacing be reduced to 350 feet in areas where the velocity is less than 50 fpm to provide adequate fire protection capabilities. One commenter suggested reducing spacing further to 344 feet, but MSHA has determined that the proposed spacing of 350 feet is reasonable. We have consulted with NIOSH on this subject and they have concurred that spacing sensors at 350 feet is appropriate. Therefore, the language in the final provision remains as proposed.

Like the proposed rule, final paragraph (e)(4) requires a sensor be placed not more than 100 feet downwind of each belt drive unit, each tailpiece transfer point, and each belt take-up. The final rule has added the phrase, ''for a single transfer point'' based on comments and now reads, ''If the belt drive, tailpiece, and/or take-up for a single transfer point are installed together in the same air course they may be monitored with one sensor located not more than 100 feet downwind of the last component''.

Many comments were received on the language in this section, claiming it was confusing in that it may allow for the monitoring of a single belt flight, no matter what length, by a single sensor, thus replacing the proposed standard requirement of 1,000-foot sensor spacing along the belt. Commenters believed, because each belt flight has a drive unit, tailpiece, transfer point, and take-up, that a single sensor could monitor the entire belt flight. This was not our intention. We intended in the proposed rule that a belt drive and tailpiece of the subsequent belt flight on to which coal is transferred can be monitored with a single sensor rather than requiring a single sensor for each component. Section 75.351(e) includes five requirements, all of which are applicable for mines using belt air. To clarify our intention and to avoid confusion, we have amended this section by adding ''for a single transfer point'' to § 75.351(e)(4).

Like the proposed rule, final paragraph (e)(5) allows the district manager to require additional sensors as mine conditions warrant and states, ''At other locations in any entry that is part of the belt air course as required and specified in the mine ventilation plan.'' MSHA added the modifier ''mine'' to clarify that the ventilation plan is the one approved for a particular mine.

As belt drive configurations often require altering the belt entry, additional sensors may be required in this area. Also, other areas may require

additional monitoring due to unusual entry shape or air flow patterns. The location of additional sensors must be specified in the mine ventilation plan. One commenter suggested that the representative of miners be involved in the mine operator's decision to install additional sensors. Existing § 75.370(b) already allows the representative of miners to submit timely comments to the district manager, in writing, for consideration during the ventilation plan process. Therefore, since this suggestion is already part of the existing plan approval process, this provision language remains unchanged from that of the proposed rule.

Like the proposed rule, final paragraph (f) specifies the location of sensors in the primary escapeway. If used to monitor the primary escapeway under § 75.350(b)(4), CO or smoke sensors must be located in the primary escapeway within 500 feet of the working section and where mechanized mining equipment is being installed or removed. In addition, another sensor must be located within 500 feet inby the beginning of the panel. The point-feed sensor required by § 75.350(d)(1) may be used as the sensor at the beginning of the panel if it is located within 500 feet inby the beginning of the panel.'' Under this situation, only one sensor would be required to comply with both of these requirements.

Some commenters suggested that this provision is not necessary and that it is not required in any of the granted petitions. MSHA believes that the sensors provide an increased level of protection that enables the source of the fire to be quickly identified and minimizes the exposure to products of combustion, such as smoke and CO. Thus, this provision will increase protections to miners. Other commenters suggested that it would be expensive to place sensors in the primary escapeway. Under most circumstances MSHA believes that these costs would be minimal relative to the cost of the AMS, in general. Also, a commenter would like clarified that the phrase ''within 500 feet of the working section'' means tailpiece of the belt, *i.e.*, the ''loading point'' on the section and the start of the escapeway. MSHA agrees with the commenter's interpretation. However, the definition for working section in § 75.2 states that the working section is ''* * *from the loading point to and including the working faces.'' Therefore, no changes in the rule are necessary. The final language remains unchanged from what was proposed, except that the phrase ''and where mechanized mining equipment is being installed or removed'' has been added to clarify our intent. There was also an editorial change to break one sentence into two sentences for clarity (''In addition, another sensor must be located within 500 feet inby the beginning of the panel. The point-feed sensor required by § 75.350(d)(1) may be used as the sensor at the beginning of the panel if it is located within 500 feet inby the beginning of the panel.'')

Like the proposed rule, final §§ 75.351(g)(1) and 75.351(g)(2) specify the location for sensors for monitoring return air splits under the return air split alternative (§ 75.323(d)). Two commenters suggested that the methane sensors required by § 75.351(g)(1) be located on the face prior to the air starting down the longwall tailgate return entry to protect the sensors, the cables, and persons required to work on the sensors. A sensor placed at this location would not provide a methane reading between the last working place on a working section and where that split of air meets another split of air, or the location at which the split is used to ventilate seals or worked-out areas as specified in existing § 75.323(c). Therefore, the language of § 75.351(g)(1) remains unchanged from the proposed rule, except a minor editorial change removed the word ''or'' from the proposed language. It now reads ''* * *last working place, longwall, or shortwall* * *'' instead of the proposed language, ''last working place, or longwall or shortwall* * *''

Monitoring in return air courses where auxiliary fans are used is addressed by § 75.351(g)(2). This provision requires an AMS to monitor the mine atmosphere for methane concentration at two locations. Like the proposed rule, final § 75.351(g)(2)(i) states that sensors must be located in the return air course opposite the section loading point, or, if exhausting auxiliary fan(s) and tubing are used, in the return air course no closer than 300 feet downwind from the fan exhaust and at a point opposite or immediately outby the section loading point. No comments were received on this provision, and it remains unchanged from that proposed.

Like the proposed rule, final § 75.351(g)(2)(ii) requires that the mine atmosphere be monitored immediately upwind from the location where the split of air meets another split of air or immediately upwind of the location where the split of air is used to ventilate seals or worked-out areas. Placing methane sensors at these locations allows for the monitoring of the methane concentration near the beginning and the end of the immediate return. By utilizing two sensors, the mine operator will be able to determine if excessive methane levels are being produced from the sealed or worked-out areas, or if the methane is present in the return prior to ventilating these areas. The AMS must provide an alarm when either sensor reaches 1.5 percent methane. This concentration specified in § 75.351(i)(1) is the action level specified for methane levels in the existing § 75.323(d)(2). No comments were received on this provision, and it remains unchanged from the proposed rule.

Like the proposed rule, final § 75.351(h) retains the requirement of existing §§ 75.340(a)(1)(ii) and 75.340(a)(2)(ii). Under these existing requirements, when the mine operator chooses to monitor these locations in lieu of venting the air to the return air course, mine operators must install at least one CO or smoke sensor located downwind no greater than 50 feet, from the electrical installation to monitor transformer stations, battery charging stations, substations, rectifiers, and water pumps. Electrical installations include transformer stations, battery charging stations, substations, rectifiers, and water pumps.

Some commenters suggested if a CO sensor is used that it be placed no closer than 50 feet and not further than 100 feet from the battery charging stations to allow for the dilution of hydrogen. Hydrogen is produced as a by-product of the charging process, and adversely affects the CO sensors by causing a false indication of CO when hydrogen is present. A commenter suggested the use of a CO sensor to monitor electrical installations because reliable smoke sensors are not presently commercially available. Another commenter would like the sensors to be installed within 50 feet of the electrical installation.

Existing § 75.340(a)(1)(ii) already requires the sensor used to monitor battery charging stations be unaffected by hydrogen. Since the publication of the proposed rule, MSHA has evaluated a hydrogen-insensitive CO sensor which has been shown to be effective for monitoring for fires near locations where hydrogen gas may be produced, such as battery charging stations. If the sensor spacing required by this section is inappropriate for CO sensors due to the presence of hydrogen, the use of the hydrogen-insensitive sensors can resolve the problem, thus protecting miners from the hazard of fire. The final provision remains unchanged from the proposed language.

Final § 75.351(i) establishes and standardizes specific alert and alarm settings for any AMS used in accordance with §§ 75.323(d)(1)(ii),

75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f). The final rule language modifies the proposed rule language by renumbering § 75.350(c) to § 75.350(d) due to the split in the final rule of proposed § 75.350(c) into two sections (§§ 75.350(c) and (d)). The alert and alarm levels are consistent with alert and alarm levels in recently granted petitions, thus providing the same level of protection to miners.

One commenter suggested that alert and alarm levels be established on a mine-by-mine basis due to various complicating factors, such as ''volume of diesel equipment that is used in mines, placement of sensors, the velocities of air and different things of that nature that should be taken into consideration when the levels of alert and alarm are to be established.'' MSHA agrees that some factors may require reducing alert and alarm levels below 5 and 10 ppm above ambient, respectively. The 5 and 10 ppm levels above ambient are considered to be maximum levels and cannot be increased to account for the use of diesel-powered equipment. Both the final rule and the proposed rule allow for variations in the ambient CO concentrations to account for diesel equipment operation or other sources of CO such as natural liberation from the coal itself. Other methods, such as diesel-discriminating sensors, are available that have been shown to effectively deal with the effects of diesel exhaust. The alert and alarm levels can be lowered from 5 and 10 ppm above ambient, respectively, if high air quantities dilute the products of combustion. As discussed elsewhere in this preamble, the maximum velocity in the belt air course is 500 fpm without specific district manager approval. Such approval would require reduced alert and alarm levels and would be addressed in the mine's ventilation plan.

Like proposed paragraph (i)(1), the final rule requires that when an AMS is used to monitor methane concentrations in return air splits to comply with § 75.323(d)(1)(ii), the AMS alarms at 1.5 percent methane. If a methane alarm signal is received by the AMS operator, the actions specified in § 75.323(d)(2) must be taken. An alert level is not specified for methane sensors monitoring immediate return splits under § 75.323(d)(1)(ii). The return air split alternative provisions under § 75.323(d) only require action when the methane concentration is 1.5 percent or higher. Therefore, no alert level is specified. The alarm must be given at the working section so personnel can start the actions required by existing § 75.323(d)(2). No comments on this section of the proposed rule were received, so the final provision remains unchanged from the proposed rule.

Existing § 75.340(a) requires the ventilation of specified electrical installations with intake air and permits options, such as allowing ventilation with intake air coursed into a return air course or to the surface and not used to ventilate working sections; or using intake air which can be used to ventilate ''working places'' when an AMS is used to monitor in accordance with existing § 75.351. The option of using intake air which can be used to ventilate ''working places'' is provided to allow the mine operator to use this air to ventilate other areas before directing the air to the return air course and out of the mine. By monitoring the electrical installations, which are potential fire sources, the mine operator provides an additional protection by providing fire detection for these locations. For example, if an electrical installation is located such that it is vented to the return air course, it is not required to be monitored by an AMS under any regulations. Although the installation may be enclosed in a noncombustible structure or equipped with a fire suppression system, the mine operator would have difficulty detecting the fire at its early stages of development. This option under existing § 75.340(a)(1)(ii) requires that the installation be monitored for CO or smoke using the AMS. The sensor at this location provides an early warning of fire.

Some commenters suggested the rule allow for higher alert and alarm levels if there is a zero CO ambient level. This approach attempts to account for ambient CO levels when setting alert and alarm levels that would be higher than what is allowed by this final rule. Commenters also suggested that these alert and alarm levels apply only to the belt entry and not to the intake escapeway. The final rule's alert and alarm levels apply to both the belt entry and to the primary escapeway. In the absence of research on fire detection in entries other than the belt, we relied upon the best available guidance which indicates early fire detection can be accomplished using alert and alarm levels established in the final rule. Thus, we are providing protection greater than that provided by granted petition requirements.

One commenter argued that alert and alarms levels in this intake should be 25 and 50 ppm CO, respectively. These levels are much higher than those traditionally used by mine operators for early-warning fire detection. The results of years of research by NIOSH have provided sufficient documentation supporting the use of 5 and 10 ppm above ambient maximum alert and alarm levels for CO in the belt entry (RI 9380). No research on fire detection for air courses other than the belt air course was submitted to the record and the Agency is unaware of any such research.

As proposed, final paragraph (i)(2) also requires that an AMS with smoke sensors alarm at a smoke optical density of 0.022 per meter. There is no alert level for smoke sensors required since these detectors do not typically provide an analog signal which can provide multiple levels of detection. On the other hand, CO sensors provide a full range of measurement so that multiple levels of detection are available. Because some belt materials do not produce sufficient CO for detection by an AMS when the material is frictionally heated (such as belt slippage) smoke sensors can provide greater detection of this condition than CO sensors. The 0.022 per meter smoke optical density requirement is the same as in existing § 75.340(a)(1)(iii)(B) for smoke sensors monitoring noncombustible areas used to house electrical installations. However, the requirement for smoke sensors to provide an alarm at a smoke optical density of 0.022 per meter is a lower alarm threshold than the existing threshold of 0.05 per meter in former § 75.351(a)(4). We explained this difference in the preamble to the final rule on safety standards for underground coal mine ventilation (61 FR 9764, 9786–87, March 11, 1996). We reprint the text of this explanation here for the convenience of the reader.

In § 75.340 (a)(1)(iii)(B) of the proposal and the preamble discussion on page 26371 [of Volume 59 of the **Federal Register**, May 19, 1994], MSHA refers to the optical density of smoke of 0.05 per meter to characterize the sensitivity of smoke detectors. As discussed in MSHA's opening statement to the ventilation rulemaking hearings, the value used for the optical density of smoke is based on information provided from the former [U.S. Bureau of Mines]. MSHA pointed out that based on comments received from the former USBM, this number is incorrect and should be divided by 2.303 to conform to the internationally accepted term of optical density. No commenter took issue with this point. MSHA has made the correction in the final rule. One commenter suggested that optical densities be increased and based on an ambient to account for background dust. In contrast, another commenter suggested that the specified optical density should be reduced by half. MSHA has found insufficient justification to adopt either of these suggestions and believes that the specified 0.05, corrected to 0.022 based on comments from the former USBM, is the appropriate level for optical density used in

§ 75.340. Existing § 75.351 Atmospheric monitoring system (AMS), uses a level for optical density of smoke of 0.05 per meter. MSHA recognizes that the level in § 75.351 should also be corrected. MSHA intends to correct the level for optical density used in § 75.351 in a future rulemaking. In the meantime, MSHA will use an optical density of 0.022 per meter for purposes of § 75.340.

This rulemaking therefore lowers the optical density to the proper level of 0.022 per meter when fire detection relies on smoke sensors.

We have standardized the alert and alarm levels in § 75.351 from those required by some petitions to provide a more practical approach to setting alert and alarm levels. Paragraph (i)(2) requires an alert signal at 5 ppm and alarm at 10 ppm CO above the ambient level based on U.S. Bureau of Mines research, Agency experience with petitions, and the Advisory Committee recommendation. These levels will provide early-warning capability. A commenter protested the assignment of alert and alarm levels because, without a specified method for determining the ambient level at a mine, the commenter cannot be certain levels specified by any particular operator are accurate. The commenter continued by saying that the alert and alarm levels should never exceed 5 and 10 ppm, respectively. Another commenter testified that alert and alarm settings must be established on a mine-by-mine basis since mine-specific conditions that affect CO levels will vary. The method for establishing the ambient level is consistent with existing § 75.371(hh). The maximum alert and alarm levels are 5 and 10 ppm CO, respectively, and can be reduced, as warranted, depending upon mine conditions, by the district manager. Another commenter testified that the alert and alarm levels specified in granted petitions should be grandfathered, since they have proven to be effective without the occurrence of nuisance alarms.

Alert and alarm levels below 5 ppm and 10 ppm may be necessary when large air quantities dilute the CO in the air course. Some fire detection research (RI 9380) set alert and alarm levels based upon air velocity, cross-sectional area, and CO generation rates from smoldering and burning fuel sources. This research was presented as nomographs (multi-axis charts) used to set CO sensor settings for different sensor spacings using air velocity and entry area parameters. Tables were derived in an attempt to simplify the application of research data because the nomographs were difficult to use. Because of overlap in the tables, conflicting determinations for alert and alarm settings occurred. Though the tables provided a simpler method for reducing alert and alarm settings based on increased air flow quantities and cross-sectional areas, they have not always been easy to use because of variations in entry configuration and air velocity in an air course. MSHA believes the mine ventilation plan offers the best tool to handle special circumstances, such as when lower alert and alarm levels are needed due to increased air volume.

Diesel-discriminating sensors have proven to be effective in reducing the frequency of nuisance alert and alarm signals which are not the result of fire, but which are due to diesel exhaust. These sensors can allow operators to improve fire detection capabilities by lowering alert and alarm levels. Therefore, MSHA is limiting CO alert and alarm levels to 5 and 10 ppm above ambient, respectively.

The final rule does not provide for approving alert and alarm levels for CO sensors installed in accordance with § 75.350(b)(1) greater than 5 and 10 ppm above the ambient level, respectively. This flexibility is not needed because the specified alert and alarm levels are above the ambient level, and because the final rule permits the use of time delays or other techniques to reduce non-fire related alert and alarm signals. This provision maintains the early-warning fire detection capability of the AMS. Elevated alert and alarm levels reduce the detectability of the AMS. Some commenters suggested higher alert and alarm levels; however, we do not believe that they provide the protection that is necessary to protect miners by giving them early warning in the case of a fire. Higher alert and alarm levels would delay the early-warning fire detection response by appropriate personnel because higher concentrations of the products of combustion would be required to trigger alert and alarm signals. Therefore, this final provision remains as proposed.

Like the proposed rule, final paragraph (i)(3) establishes alert and alarm levels when an AMS is used to conduct the methane tests required by existing § 75.362(f). It requires the AMS to provide an alert signal at 1.0 percent methane and an alarm signal at 1.5 percent methane. If a methane alert or alarm signal is received by the AMS operator, the actions specified in § 75.323(d)(2) must be taken. This is consistent with the action levels stipulated under existing §§ 75.323(c)(1) and 75.323(c)(2) for methane in any return air split between the last working place on a working section and where that split of air meets another split of air or the location to ventilate seals or worked-out areas. Since existing § 75.323(c) requires specific actions at these methane concentrations, personnel will receive timely notification with these alert and alarm levels. The final rule does not preclude the mine operator from using alert and alarm levels that are lower than those required by this provision. No comments were received on this provision, therefore, it remains as proposed.

Like the proposed rule, final § 75.351(j)—Establishing CO ambient levels, requires that CO ambient levels and the means to determine these levels must be approved in the mine ventilation plan (§ 75.371(hh)) for sensors installed in accordance with §§ 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), and 75.350(d). In order for an AMS with CO sensors to be effective, the ambient levels must represent conditions over a broad range of mining activities. We recognize that the ambient levels in the mine may vary because of mining conditions and activities, such as the use of diesel-powered equipment and varying conditions of roadways which vary the engine loads for diesel-powered equipment. Since mining activities vary from mine to mine, we believe the mine ventilation plan is the most effective tool to set the ambient levels since this is consistent with existing § 75.371(hh). Therefore, the Agency chooses to continue the requirements contained in the granted petitions that the ambient levels, and the method for determining the ambient levels, be specified and approved in the mine ventilation plan. This provides flexibility by allowing more than one ambient level within the mine, and allowing the operator to reestablish ambient levels for some areas. Any changes in the ambient levels must be specified and approved in the mine ventilation plan. Further information concerning the setting of an ambient level can be found in the discussion for the definition of CO ambient level. A commenter, in a written submission, wanted specific language included in the final rule on how the ambient is established:

(1) A properly calibrated carbon monoxide sensor(s) shall be used for an ambient determination. Measurements from all sensors in the conveyor belt entry shall be used to determine the ambient level for each separate conveyor belt air split. Continuous readings shall be taken and recorded for a total of five (5) production shifts to establish a mine history of carbon monoxide levels. The average of the data collected for each separate conveyor air split will determine its ambient level. (2) Ambient levels shall be

representative of normal operating conditions. Diesel equipment shall not be unnecessarily idled in the air split where the ambient level is being determined. (a) The cross-sectional areas where velocity readings are taken which are used for alert and alarm level determination shall be measured at locations in the entry representative of the cross-sectional areas found throughout the entry and not at locations where the entry is abnormally high (*i.e.* belt drives) or low (*i.e.* under overcasts). For belt entries that are common with other entries, the sum of cross-sectional areas for belt entries and the common entries shall be used.

MSHA's response is that the submitted method is an adequate method to determine an ambient. However, it is not the only method available. Other methods include the use of bottle samples analyzed using a gas chromatograph to determine actual concentrations of CO in the belt entry or simply setting the ambient at zero ppm without verification due to the absence of diesel-powered equipment and naturally-occurring CO in the mine. MSHA's experience is that the ambient method is appropriately specified through the mine ventilation plan process and is consistent with existing § 75.371(hh). Therefore, the final rule retains the same language as the proposed rule.

Like the proposed rule, final paragraph (k) requires that an AMS installed in accordance with §§ 75.323(d)(1)(ii), 340(a)(1)(ii), 340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f) be installed and maintained by personnel trained in the installation and maintenance of the system. It also requires that the system be maintained in proper operating condition. The final rule language modifies the proposed rule language by renumbering § 75.350(c) to § 75.350(d) due to the split in the final rule of proposed § 75.350(c) into two sections (§§ 75.350(c) and (d)).

Agency experience is that proper functioning of an AMS is directly related to the quality of the maintenance provided. For example, in mines where sensors are not properly calibrated, these sensors will not be able to provide appropriate early-warning fire detection capability. In paragraph (k) we require trained personnel to perform the maintenance. Although we did not include a requirement for a specific training plan for maintenance personnel, as we explained earlier in this preamble, this training could be conducted under existing training programs. Some commenters testified that the Agency should include specific training and retraining requirements for AMS maintenance personnel because the requirements cannot be covered in the annual refresher training. MSHA's experience indicates that this training is already conducted by the operator as task training. Therefore, the final rule retains the same language as the proposed rule.

Like the proposed rule, paragraph (l) of § 75.351 specifies that sensors must be listed and installed in accordance with the recommendations of nationally recognized testing laboratories (NRTLs) approved by the Secretary or be of a type and installed in a manner approved by the Secretary under the procedures outlined in our ''Program Policy Manual, Volume V for §§ 75.1101–5 through 75.1103–5.'' This volume of MSHA's Program Policy Manual can be found at *http://www.msha.gov/REGS/COMPLIAN/PPM/PMVOL5J.HTM#123.* A list of NRTLs can be found at *http://www.osha.gov/dts/otpca/nrtl/index.html.* Paragraph (l) provides the requirements for CO, smoke, and methane sensors. This section is based on the existing § 75.1103–2(a) which requires components of automatic fire sensor systems in belt entries to be of a type and installed in a manner approved by the Secretary to ensure reliable fire detection. Currently, because the AMS is being used as an ''Automatic fire sensor and warning device system'' it must comply with the 1967 National Fire Code (§ 75.1103–2; Automatic fire sensors approved components; installation requirements). In the proposed rule, MSHA solicited comments on whether AMS components and the aforementioned automatic fire sensor systems should comply with appropriate sections of the 1999 National Fire Alarm Code. The National Fire Alarm Code is also an American National Standard. A commenter encouraged modification of § 75.1103–2(b) by the Agency adopting the latest edition of the National Fire Alarm Code, NFPA 72–2002 because the 1967 edition is ''obsolete.'' The current reference in that section is the 1967 edition of NFPA 72A, ''Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm and Supervisory Service.'' The commenter further said that the NFPA standards for protective signaling systems (visual and audible signal systems) have evolved substantially since 1967.

The 2002 edition includes many requirements that are substantial revisions and additions to those found in the 1967 document. The commenter noted that the requirements of NFPA 72A, as well as other related standards, have been updated many times and have been consolidated into a single National Fire Alarm Code since 1993.

As the commenter points out, the newer NFPA standard does not directly address the use of protective signaling systems in coal mines. Additionally, the commenter implied that application of the newer NFPA standard to coal mines was not specifically contemplated when the standard was developed. The 2002 NFPA standard is a voluminous document that is a compilation of several different standards, with many requirements that are not applicable to AMSs and therefore is beyond the scope of this belt air final rule.

The section to which the commenter proposed changes is § 75.1103–2(b). This section is a part of Subchapter L, ''Fire Protection,'' and gives requirements for the installation of automatic fire sensors on all belts. A revision to this section would change the requirements for all belt fire detection systems, not just those systems installed in intake air courses to ventilate working sections and setup or removal areas. A revision to this section will require additional study that is beyond the scope of this rulemaking.

AMS components are required to be of a type listed and installed in accordance with the recommendations of a nationally recognized testing laboratory (NRTL) approved by the Secretary. This provision merely expands the requirement to include methane sensors. The provision for approval by the Secretary is expected to be used for new technology, as MSHA does not have approval standards for these types of sensors because the Agency has determined that consensus standards exist. It is expected that NRTL approval of sensors will be the most prevalent vehicle for acceptance of the sensors. A review of the standards shows that ANSI/ISA92.02.01 covers CO sensors; ANSI/ISA12.13 covers combustible gas detectors, including methane sensors; and ANSI/UL 268 covers smoke sensors. It is anticipated that the sensors will be compared to these standards by the NRTLs. No other comments were received on this provision, therefore it remains as proposed.

Like the proposed rule, final paragraph (m) of the final rule permits the use of reasonable time delays when there is a demonstrated need and when the delays are approved as part of the ventilation plan. Time delays would be approved in order to prevent the triggering of alert or alarm signals when the CO being detected by the AMS is from a non-fire source, such as diesel-powered mining equipment. MSHA has approved mine ventilation plans that have included time delays of up to 3 minutes. This practice is consistent with

requirements in recently granted petitions.

We are requiring that the use and length of the time delay be approved in the mine ventilation plan submitted under existing § 75.370. Before approval in the mine ventilation plan, a demonstrated need for time delays must be documented. An example could be frequent non-fire alert and alarm signals caused by diesel exhaust emissions which exist for a short duration for any particular sensor as diesel-powered equipment is moving through air course. The total time delay for any given sensor must not exceed three minutes. Agency experience shows this time to be the maximum delay necessary to eliminate alert and alarm signals generated by diesel-powered equipment. The final provision also permits other computer or administrative techniques (such as wave-cross trending, limiting vehicular traffic, and pre-notification of actions that could produce CO to be conducted underground) for reducing the number of non-fire produced sensor signals provided they are approved in the mine ventilation plan. The use of reasonable time delays and other approaches, such as diesel-discriminating sensors, has been successful in reducing the number of alert and alarm signals from CO that are not a result of a fire or heating. The three minute time delay required by this final rule is a maximum time delay that must have a demonstrated need. This is not a blanket approval of time-delays. The district manager has the authority to disapprove their use.

We do not consider the use of time delays or other computer or administrative techniques as a replacement for the proper installation and maintenance of the AMS. For example, alert and alarm signals that are the result of short duration spikes caused by radio frequency interference could be eliminated by using shielded cable. Also, if higher levels of CO result from improperly maintained diesel-powered equipment, we expect correction of this condition in accordance with existing standards, before we would consider approving a time delay.

Comments received on this provision generally agree with MSHA's reasoning for the need to reduce the occurrence of nuisance alarms due to other sources of combustion products to reduce miner complacency, as discussed earlier in this preamble. The provision remains unchanged from that proposed, except one editorial change was made that moved the sentence referring to ''these time delays are limited to no more than three minutes'' one sentence up in the paragraph and another editorial change was made to specify ''alert and alarm'' sensor signals.

Like the proposed rule, final paragraph (n) deals with the examination, testing, and calibration of sensors used as part of an AMS. Many commenters suggested that calibration be done during non-production shifts to avoid confusion on the working sections when sensors are calibrated. Part of the calibration process involves sounding of alarms on working sections. One commenter suggested that part of the calibration process include verification that the alarm actually activate on the working sections. It is possible that some of the alarms cannot be heard in all locations above the noise of machinery; therefore, placement of the visual alarm should be given careful consideration. Other commenters focused on the need for two-way communication between the AMS operator, the maintenance technician conducting the calibration, and the miners on the working sections to make sure that everyone in the mine understands that calibration of the alarms is being conducted, thus reducing confusion. This final rule requires two-way communication between the AMS operator and maintenance personnel (§ 75.351(b)) to enhance safety by informing affected personnel that the activated alarm is due to sensor calibration and not due to a fire event (§ 75.351(n)(4)).

Final paragraph (n)(1) requires that at least once each shift when belts are operated as part of a production shift, sensors installed in accordance with §§ 75.350(b) and 75.350(d) used to detect carbon monoxide or smoke, and alarms installed in accordance with § 75.350(b) must be visually examined. The change from the proposed rule adds the reference to § 75.350(d), formerly § 75.350(c) of the proposed rule, that addresses AMS sensors at point-feed locations.

We are aware of instances where operators have placed sensors in improper locations following belt moves or sensors have been damaged by roof falls or equipment. Sometimes these conditions have gone undetected. A visual examination will enable these conditions to be discovered and repaired, thus maintaining the level of safety afforded miners. As discussed earlier, a sensor that is improperly located, may not detect the products of combustion as effectively as one that is properly installed and maintained. Since existing § 75.362(b) already requires an examination for hazardous conditions in the belt entry once each shift that the belt operates, the sensor examinations could coincide with the on-shift examination.

Final paragraph (n)(1) states the requirement that the sensors be visually examined. It is anticipated that generally this will not cause any additional time to be spent doing the on-shift belt examination. The requirement for such an examination was developed to be consistent with on-shift examination requirements in existing § 75.362(b). We believe that inoperable or inappropriately placed sensors can be found and the necessary corrective action taken in a timely manner. Many commenters on this provision agree that during the on-shift examination many hazards are found, including fires along the belt lines. Another commenter suggested that the visual examination include other areas of the mine, such as rectifiers, substations, battery charging stations, water pumps, and power centers that are ventilated to the belt line. Finding these hazards in a timely manner increases the safety afforded miners. MSHA agrees with the commenter. Existing § 75.360(b)(9) requires preshift examination of electrical installations referred to in § 75.340(a). Therefore, AMS sensors in these areas will be examined during the preshift examination of these installations.

A commenter suggested that a record be made of all visual inspections, to assure that they are being completed. The conditions identified by this commenter are addressed by existing standards. MSHA's existing § 75.363 requires that a certified person must make a record of hazardous conditions. The record will include improperly located and damaged sensors because these conditions are considered to be hazardous. This existing provision will continue to be in effect. MSHA believes that it is not necessary to record conditions that are not hazardous. Therefore, no changes have been made in the proposed provision and it remains as proposed.

Like the proposed rule, final paragraph (n)(2) requires that at least once every seven days alarms for an AMS installed in accordance with §§ 75.350(b) and 75.350(d) must be functionally tested for proper operation. The final rule language modifies the proposed rule language by renumbering § 75.350(c) to § 75.350(d) due to the split in the final rule of proposed § 75.350(c) into two sections (§§ 75.350(c) and (d)).

Testing of alarms is critical to assure that they will function properly when needed. The testing method is dependent upon the type of alarm installed but should include application of calibration gas to selected sensors.

Some commenters to this provision suggested that testing every seven days is too restrictive and were in favor of a longer testing interval of up to 10 days to cover holidays and weekends. Other commenters agreed that a 7-day period would be appropriate. Expanding to a 10-day cycle would decrease the number of examinations from 52 to 36 per year, thus adversely affecting safety by reducing the number of examinations over the course of the year and subsequently increasing the probability that a hazardous condition could go undetected for a longer period of time. This final provision requires the testing of alarms for proper operation at least once every 7 days; it remains as proposed except for the renumbering of § 75.350(c) to § 75.350(d). This is comparable to requirements in existing § 75.364 for weekly examinations for hazardous conditions, and air and methane measurements in underground coal mines.

Like the proposed rule, final paragraph (n)(3)(i) requires that, at intervals not to exceed 31 days, each carbon monoxide sensor installed in accordance with §§ 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), or 75.350(d) must be calibrated in accordance with the manufacturer's calibration specifications. The final paragraph also requires that calibration must be done with a known concentration of CO in air sufficient to activate the alarm. The final provision remains unchanged from that of the proposed rule except for the renumbering of § 75.350(c) to § 75.350(d). The final rule language modifies the proposed rule language by renumbering § 75.350(c) to § 75.350(d) due to the split in the final rule of proposed § 75.350(c) into two sections (§§ 75.350(c) and (d)).

Some commenters suggested that this calibration interval for CO sensors be increased to between 45 to 70 days and would ''not really'' create a safety hazard. MSHA disagrees with the commenters because the proper operation of the AMS sensors is central to the safe operation of the system that protects both the miners and the mine itself and is consistent with calibration schedules in granted petitions. The calibration schedule ensures that the AMS sensors are properly functioning, thus providing an efficient early-warning fire detection system. Miner safety is protected by the calibration schedule due to the fact that periodic calibration adjusts the response characteristics of these sensors to the correct settings.

Like the proposed rule, final paragraph (n)(3)(ii) requires that each smoke sensor installed in accordance with §§ 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), or 75.350(d) must be functionally tested every 31 days in accordance with the manufacturer's calibration specifications. The final rule language modifies the proposed rule language by renumbering § 75.350(c) to § 75.350(d) due to the split in the final rule of proposed § 75.350(c) into two sections (§§ 75.350(c) and (d)).

The testing method is dependent upon the type of smoke sensor installed. Functional testing may not be limited to just the appropriate response by the sensor but also could include receiving the appropriate signal at the designated surface location. As stated in the proposed rule, the nature of the functional test would be to subject the sensor to one of the following methods to assure proper sensor response: ''(1) Calibrated test method, (2) Manufacturer's calibrated sensitivity test instrument, (3) Listed control equipment arranged for the purpose, (4) Smoke detector/control unit arrangement whereby the detector causes a signal at the control unit where its sensitivity is outside its listed sensitivity range, [and] (5) Other calibrated sensitivity test methods approved by the authority having jurisdiction'' (2002 NFPA 72). This is the accepted method of calibrating smoke sensors as set forth in the consensus standard NFPA 72 (2002).

It has been our experience through granted petitions and existing standards that the calibration schedule for CO sensors in this final rule is sufficient to assure proper operation. Our experience is also consistent with manufacturers' recommendations. Miner safety is protected by the testing schedule due to the fact that periodic tests inform the AMS operator that the sensor is operating within manufacturer's specifications. This final § 75.351(n)(3)(ii) mandates a maximum time period of 31 days between sensor functional tests. However, final § 75.351(k) requires that AMSs be maintained in proper operating condition. If experience at an individual mine indicates that more frequent calibration is necessary to maintain proper operating condition pursuant to § 75.351(k), the operator must calibrate the sensor at an interval, which may be less than every 31 days, to assure that the AMS sensor is maintained in proper operating condition.

Like the proposed rule, final paragraph (n)(3)(iii) requires that each methane sensor installed in accordance with §§ 75.323(d)(1)(ii) or 75.362(f) must be calibrated in accordance with the manufacturer's calibration specifications. Calibration must be done with a known concentration of methane in air sufficient to activate the alarm. No comments were received on these sections of the proposed rule, and therefore they remain as proposed.

However, MSHA did receive many comments on the need for personnel in affected sections to be notified prior to, and upon completion of, calibration of sensors in order to avoid miners becoming unresponsive to alarms. Also, commenters suggested that it was important to make sure that the alarm actually activates on affected sections. MSHA agrees with the commenters on the issue of calibration notification and has added a new paragraph, § 75.351(n)(3)(iv), to this section. It requires that if the alert or alarm signal will be activated during calibration of sensors, the AMS operator must be notified prior to, and upon completion of, calibration. The AMS operator must then notify miners on affected working sections, areas where mechanized mining equipment is being installed or removed, or other areas designated in the approved emergency evacuation and firefighting program of instruction (§ 75.1502) when calibration will activate alarm signals, and when calibration is completed.

Like the proposed rule, final paragraph (n)(4) requires certification of the accuracy of calibration gases as directly traceable to National Institute of Standards and Technology (NIST) standards. When these referenced standards are not available for a specific gas the final paragraph (n)(4) requires calibration gases be traceable to an analytical standard which is prepared using a method traceable to NIST. This provision provides for the use of new technology for fire detection. This paragraph is necessary since the accuracy of the calibration gas has a direct bearing on the accuracy and functional performance of the sensor, and therefore increases confidence that the AMS sensor readings are accurate. The traceability of the calibration gas directly affects the effectiveness of the AMS system, thereby, affecting the safety of miners working underground. Without the sensors being properly calibrated, there is no assurance that the AMS system is functioning properly. According to NIST, traceability is ''* * * the property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties.'' In other words, if traceability is maintained, the user can be confident that the concentration of the calibration gas is as

stated on the container. The NIST standard is a physical standard: ''Only measurement results and values of standards are traceable. To support a claim (of traceability), the provider of a measurement result or value of a standard must document the measurement process or system used to establish the claim and provide a description of the chain of comparisons that were used to establish a connection to a particular stated reference.'' All of the information regarding traceability to NIST is available on-line at *http://www.nist.gov/traceability.* No comments were received on this section of the proposed rule. The final provision remains as proposed.

Like the proposed rule, final paragraph (o)(1) requires that when an AMS is used to comply with §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), individuals designated by the operator must make the required records by the end of the shift in which the specified event(s) occur. The final rule language modifies the proposed rule language by renumbering § 75.350(c) to § 75.350(d) due to the split in the final rule of proposed § 75.350(c) into two sections (§§ 75.350(c) and (d)).

These records will provide a history of system performance and mine operator response. They are considered essential to the operation of an effective system and can be invaluable in determining sources of recurring alert and alarm signals and system malfunctions. This will enhance safety because it will reduce the number of non-fire alerts and alarms, thereby reducing the occurrence of the ''cry-wolf syndrome'' (ignoring alerts and alarms because of numerous non-fire alerts and alarms in the past) underground. One commenter wrote that these requirements are far more extensive than any requirements under any of our existing petitions for modification and they contend that they are not necessary. After a review of granted petitions, MSHA disagrees with the comment, because many of the petitions contain similar paperwork requirements to document that these actions have been taken. Therefore, the language of the final provision remains as was proposed, except for the renumbering of § 75.350(c) to § 75.350(d).

Final § 75.351(o)(1) requires that individuals designated by the operator record events related to the AMS as described in § 75.351(o)(1)(i)–(iii) by the end of the shift in which the event(s) occur(s). Proposed § 75.351(o)(1) is almost identical to the final rule language except that it uses the term ''responsible persons designated by the operator'' to make the records identified in this section. A comment on this section requested clarification on the term ''responsible persons.'' The commenter wanted to know whether this is the same ''responsible person'' identified in 30 CFR 75.1501 or does MSHA have other criteria for these responsible persons? The commenter continued that it would be helpful to know what occupations MSHA considers to be included in this phrase. MSHA agrees that the responsible person may be the same person as designated in § 75.1501 or could be someone else. Therefore, in order to avoid confusion the term ''responsible person'' was replaced with ''individuals'' in the final rule. Each mining operation knows what the different job categories at its mine are. We will not specify any in this final rule.

The final rule language also modifies the proposed rule language by renumbering § 75.350(c) to § 75.350(d) due to the split in the final rule of proposed § 75.350(c) into two sections (§§ 75.350(c) and (d)). Other than these clarifications, the final provision remains as proposed.

Like the proposed rule, final paragraph (o)(1)(i) requires that a record be kept of all alert and alarm signal activations. The required record will include the date, time, location and type of sensor, and the cause of the activation. Like the proposed rule, final paragraph (o)(1)(ii) requires a record to be made of all AMS malfunctions. This record will contain the date, extent, and cause of the malfunction. It will also include the corrective action taken to return the system to proper operation. As specified by this section, the records required by paragraphs (o)(1)(i) and (ii) will be made by individuals designated by the operator. No comments were specifically received on these two sections and they remain as proposed.

Like the proposed rule, final paragraph (o)(1)(iii) requires that a record also be maintained of the seven-day test of alert and alarm signals, calibrations, and maintenance of the AMS. Unlike the records required by §§ 75.351(o)(1)(i) and 75.351(o)(1)(ii), the records required by paragraph (o)(1)(iii) must be made by the person(s) doing the test, calibration, or maintenance. No comments were specifically received regarding § 75.351(o)(1)(i) through § 75.351(o)(1)(iii). However, a general comment focused on the belief that the mine operator should be the person responsible to certify the records, not the persons doing the tests, calibrations, or maintenance. MSHA requires certification by the individuals having firsthand knowledge of how the sensors performed during their calibration and testing and any maintenance required. This requirement is similar to recordkeeping requirements for methane monitor calibration tests found under existing § 75.342(a)(4)(ii). Only editorial changes were made in this provision. Instead of reading as proposed, ''A record of the seven-day test of alert and alarm signals, calibrations, and maintenance performed on the system must be made by the person(s) performing the test, calibration or maintenance''; the final provision reads, ''A record of the: seven-day tests of alert and alarm signals; calibrations; and maintenance of the AMS must be made by the person(s) performing these actions.'' No comments were received regarding this section. The final rule language remains the same as was proposed, except for the editorial change as stated above.

Final paragraph (o)(2) requires the person entering the record to include their name, date, and signature. These records are necessary because they will document the test, calibration, and maintenance history of the AMS and will provide the operator with an overall perspective of how the AMS is operating. Some commenters testified that they did not think it was necessary to include the title of the person in the log entry. MSHA agrees that it is not necessary to include a person's title in the log entry since titles are not consistent across the industry and the inclusion of this information does not further enhance the safety of miners. Therefore, the word ''title'' was deleted from the language of the final provision. No other changes were made to the language of the final provision.

Consistent with other requirements of this subpart, final paragraph (o)(3) requires that all records required by this section be maintained either in a secure book that is not susceptible to alteration, or electronically in a computer system that is secure and not susceptible to alteration. This section requires that these records be maintained separately from any other record and be easily identifiable by a title, such as the ''AMS log.'' This requirement is important because these records verify that the actions required to be taken to maintain the AMS were actually taken. The records help to assure the safety of miners. Proposed paragraph (o)(3) had similar language to the final rule language but failed to include the term ''either'' when giving the mine operator the option of maintaining the records in this section either in a secure book that is not susceptible to alteration, or

electronically in a computer system that is secure and not susceptible to alteration. A commenter suggested that if MSHA requires that a hard copy with a signature be maintained, that this should preclude a requirement that any electronic records being kept. The final provision is modified to eliminate any confusion by adding the word ''either.'' The provision now states: ''The records required by this section must be kept either in a secure book that is not susceptible to alteration or electronically in a computer system that is secure and not susceptible to alteration.'' In addition, an editorial change was made to remove a duplicative phrase ''must be kept'' from the provision following the phrase ''* * * secure book that is not susceptible to alteration or * * *'' No other changes were made in this provision. Accordingly, the final rule language remains unchanged.

Like the proposed rule, final paragraph (p) requires that all records must be retained for at least one year at a surface location at the mine and made available for inspection by miners and authorized representatives of the Secretary. No comments on this provision were received. The final provision remains as proposed.

Final paragraphs (o) and (p) are consistent with existing standards and recently granted petition requirements. These sections are intended to assure that these records are retained and made available, and that the appropriate level of mine management is made aware of AMS conditions or problems requiring attention. The safety purpose of these provisions is to analyze the performance of the AMS to ensure continued reliable operation of the AMS. The final rule also will help to assure the integrity of records and enable mine management to review the quality of the examinations. Consistent with existing standards in this part, we intend the term ''secure and not susceptible to alteration'' when applied to electronic storage to mean that the stored record cannot be modified. One example of acceptable electronic storage would be a ''write once, read many'' file.

Like the proposed rule, final paragraph (q) requires that all AMS operators be trained annually in the proper operation of the AMS. In addition, the final paragraph requires that the mine operator retain a record of the content of training, the person conducting the training, and the date the training was conducted at the mine for at least one year.

MSHA believes that the training program for an AMS operator should address at least two topics: the AMS system operation and legal requirements. The AMS system operation includes hardware and software issues.

The hardware training should at least include the following subjects:

1. A complete AMS overview, including orientation with the central computer system and its components, the data highway, outstations, and sensors.

2. Common system problems and diagnostic tools, as well as any special features of the system.

The AMS system operation would also include software training. As noted in the proposed rule, such training should include at least the following subjects as they relate to the AMS:

1. The basic computer operating systems used, such as MS–DOS or Windows.

2. CMOS setup, board(s), jumper and address settings, directory and file allocation, program start-up, logging in/out of system, system shutdown and other AMS software functions.

3. Printing, editing sensor points, setting communication parameters, creating reports, and device controls.

4. Special features of the system, such as networking, graphics editing, and database management.

Legal requirements include provisions and requirements of the ventilation plan, emergency evacuation and fire fighting program of instruction, and the requirements of this final rule.

Finally, AMS operators would need to be trained on the following issues:

1. The provisions and requirements of the mine ventilation plan, emergency evacuation and fire fighting program of instruction, and

2. The requirements of this rule.

All of this training will assure that the AMS operator maintains proficiency in the operation of the AMS and the understanding of his/her responsibility under this final rule. Such training is necessary because, in the event of a mine fire or other emergency, the AMS operator will be one of the first individuals to detect a serious problem underground based on AMS signals which may require the evacuation of the mine.

Numerous comments were received on this section. Some commenters thought that the recommended training for the AMS operator, as outlined in the previous paragraphs, was not applicable to many AMS operators. It is MSHA's intent that the AMS operator be specifically trained to conduct the task of monitoring the AMS and trained to respond appropriately to its different signals. It is imperative that the ''AMS operator,'' as defined in this final rule, receive annual training on conducting the tasks as required. If a mine operator wishes to limit the understanding of the AMS operator on ''how'' the system actually operates, then it is imperative that this operator have personnel on call to handle computer programming and failure issues and the AMS operator must be trained to contact such individuals immediately to fix problems. In cases where hardware and software issues affect the safety of the miners underground, manual monitoring of the belt entry, as specified under § 75.352(e), would need to be conducted.

Other commenters wanted the AMS operator to be better trained in all aspects of mine operation. This training would include mine layout, location of all workers underground, and a working knowledge of the mine's fire and evacuation plan. In addition, a commenter suggested that the training provided to the AMS operator be system specific as well as be consistent with all aspects of part 48 training.

MSHA agrees that the AMS operator should have specialized training. As indicated earlier, if a mine operator wishes to expand the training of the AMS operator beyond what is required by this final rule, then it is up to the mine operator to provide that individual with the necessary information. MSHA experience with granted petitions and fire investigations indicate the final rule's provision is sufficient to protect safety. For example, during the initial phase of the fire at Mine 84, the AMS operator appropriately responded to alert signals that, upon investigation, resulted in the discovery of a fire. The AMS operator in this instance utilized his knowledge of the AMS to help rapidly investigate and evacuate the miners. These actions helped to avoid miner injury and death. For these reasons, MSHA believes that the provision, as proposed, is sufficient. The final provision language remains unchanged from that in the proposed rule.

MSHA expects that many operators will be able to fulfill these training and recordkeeping requirements in the course of meeting their responsibilities under 30 CFR Part 48. MSHA agrees with the commenter requesting that AMS operator training be system specific as well as consistent with Part 48 training. Mine operators with granted belt air petitions that address this training requirement fulfill this provision for AMS operator training and recordkeeping requirements under a modified 30 CFR Part 48 training plan. While this provision is not intended to require a separate, stand-alone training

program and recordkeeping system, operators could opt to administer the AMS operator training this way.

Proposed paragraph (r) would have required that when an AMS is used to comply with § 75.350(b), a two-way voice communication system, as required by § 75.351(b)(1), would have been installed in a different entry from the AMS. Commenters to this section that already use belt air disagreed with the need to separate the cables in the belt entry. They argued that operators with existing belt air petitions be grandfathered on this requirement for all areas of the mine where the two systems are installed in the same entry prior to the effective date of the rule. MSHA does not believe that grandfathering existing developed areas of mines that currently have both the voice communication line and the AMS cable in the belt entry would achieve the level of safety required by this final rule. Therefore, grandfathering of existing communication lines will not be allowed. However, MSHA recognizes that additional time may be required for some mines to comply with this provision. Therefore, this final rule has been changed from that proposed to allow for additional time for the implementation of this provision; the phrase, ''no later than August 2, 2004.''

One commenter argued that ''Under the proposed standard, the primary escapeway will need to be monitored at the mouth of a section and near the loading point. If the AMS system lines are in the belt entry and the communication lines are in the intake (primary escapeway), compliance cannot be achieved.'' MSHA agrees with the commenter and has modified the provision language to read, ''However, the two-way voice communication system may be installed in the entry where the intake sensors required by §§ 75.350(b)(4) or 75.350(d)(1) are installed.''

Another commenter argued, ''Normally, an operator would want the AMS line in the belt entry and the additional communication line in the intake entry. Normally, the operator would also have phones at belt drives and transfers. This requirement would appear to require two separate systems unless the AMS sensors in the non-belt entries can be fed off the belt entry system and the phones in the belt entry can be fed off the communication line in the intake entry or vice versa, and that is not clear from the proposed rules.'' The commenter suggested that this requirement be deleted.

In response to these comments, the provision clearly requires that the trunk lines for the AMS and communication systems be installed in separate entries. MSHA agrees with the commenter, however, that branch cables from these trunk lines can extend into the entry in which the other communication line is installed. However, with this clarification MSHA believes that deleting the provision would negatively affect miner safety.

Another commenter wrote that installing communication lines in separate entries is not practical because trunk and branch lines of both the AMS and communication systems must be placed in both entries and therefore, this requirement is not reasonable for three-entry sections with the belt in one entry and the primary escapeway in the next entry. A commenter stated that this requirement is not included in existing petitions. One other commenter said, our ''mine has miles of communication lines in the same entry as the AMS system lines. There has never been an incident or indication that this may be a problem. Requiring the two lines be separated will only move one of the lines into an entry where the likelihood of being damaged is greater. Therefore we feel the proposed standard will complicate and endanger a system that is working well.''

MSHA disagrees with the commenters that the branch lines for both the AMS and voice communication system should not be installed in separate entries. MSHA does not believe that placing both the voice communication line and the AMS cable in the same entry would achieve the level of safety required by this final rule, since voice communication problems have occurred due to damage to the phone line in the belt entry, as discussed in this section of the preamble. Therefore, installation of the branch lines for the AMS cables and the voice communication line must be in separate entries.

Other commenters repeatedly stated that two forms of communication independent of the regular mine phone system are necessary on sections, longwalls, belts, and outby areas of the mine that do not include the AMS. Examples of independent forms of communication include a leaky feeder radio system or a personal evacuation device (PED) emergency communication system. They also suggested that phone directories listing each mine phone be posted at each phone, and the location of each underground phone should be mapped on the surface to inform surface personnel of their locations. In addition, the commenter stated that ''* * * the proposed rules do not address the fact that current mine communication systems do not reach all of the miners all of the time, as assumed in the proposed belt air standards. Thus there will always be miners who may not be contacted in case of an emergency created by the use of belt air to ventilate an active working mine.'' The commenters also argued that a communication device be located every 1,000 feet, not every 2,000 feet, as proposed because a fire could grow to be out-of-control while the miner walks the extra 1,000 feet to a phone. In addition, one commenter asked if this proposed requirement was different than the requirements of existing § 75.1600 which requires that whenever miners are underground, two-way communication must be made available to the miners.

MSHA agrees that the ability to communicate is essential during emergency situations, such as a fire. Therefore, it is critical that at least one line of communication remain intact. This provision is consistent with existing petition requirements. Nearly all of the granted petitions approved since 1978 required two-way communications. In response to the commenter about requiring two independent forms of voice communication other than that required by § 75.1600, the mine operator is responsible to provide equipment that is necessary for the safe operation of the mine. MSHA recognizes that it is not reasonable to expect that every underground miner has immediate access to a voice communication line. However, MSHA believes that the requirement to have voice communication available every 2,000 feet in the belt entry if the AMS system fails is sufficient to maintain miner safety. In response to the commenter's suggestion that a phone directory and map be provided at each phone underground, MSHA is requiring that the AMS operator have the ability to contact various individuals on the surface and underground in order to fulfill the responsibilities of the AMS operator. Part of this responsibility is the requirement to have two-way voice communication from the surface to affected areas to notify personnel. Also, a directory would not apply if the mine has a paging system.

In the event of a roof fall, fire, or other event in one entry that could damage either the AMS or the two-way voice communication, it is more likely that one of these systems will remain functional when installed in an alternate entry, thus providing an additional measure of protection. Therefore, the language of this provision has been changed to read, ''When an AMS is used to comply with § 75.350(b), a two-way voice communication system

required by § 75.1600 must be installed in an entry that is separate from the entry in which the AMS is installed * * * However, the two-way voice communication system may be installed in the entry where the intake sensors required by §§ 75.350(b)(4) or 75.350(d)(1) are installed.''

Section 75.352 Actions in Response to AMS Malfunction, Alert, or Alarm Signals

Final § 75.352(a) requires that when the AMS operator receives either a malfunction, alert, or alarm signal at the designated surface location, the sensor(s) that are activated must be identified and the AMS operator must notify the appropriate personnel to take action. The AMS operator can be designated as one of the appropriate personnel who is responsible to carry out actions required by this section. This provision was modified from the proposed rule that stated, ''The designated AMS operator or other designated responsible person must promptly initiate * * * actions:'' This change was made to clarify our intent that the AMS operator must notify appropriate personnel when either a malfunction, alert, or alarm signal is received at the designated surface location.

Some commenters asked for clarification on the actions of the responsible person under § 75.1502 and the AMS operator under this section. AMS operators may be designated by the mine operator as ''appropriate personnel'' (see § 75.301 definition). Since appropriate personnel includes the ''responsible person'' for emergency mine evacuations under §§ 75.1501 and 75.1502, the AMS operator can be the responsible person for emergency evacuations. However, the AMS operator must meet the criteria described in § 75.1501 in order to be the responsible person. The mine operator is free to select any miner meeting the § 75.1501 criteria to be the responsible person. The final provision was modified from that proposed.

Proposed paragraph (a)(1) of § 75.352 stated, ''When a malfunction or alert signal is given, notify appropriate personnel, immediately begin an examination to determine the cause, and take required action to address it, and''. Final paragraph (b), that parallels proposed paragraph (a)(1) has been modified to clarify MSHA's intent to read, ''Upon notification of a malfunction, alert, or alarm signal, appropriate personnel must promptly initiate an investigation to determine the cause of the signal and take required actions set forth in §§ 75.352(c), (d), or (e) below.'' These actions are required unless the cause of the malfunction, alert, or alarm signal is known not to be a hazard to the miners. If the cause of the malfunction, alert, or alarm signal is known not to represent a hazard, such as sensor calibration, or cutting and welding near a sensor, the final rule does not require notification of affected workers under § 75.352(c).

However, we still require a record of these events under § 75.351(o).

Proposed § 75.352(a)(2) stated that, ''When an alarm is given, notify appropriate personnel, including miners in affected working sections, in areas where mechanized mining equipment is being installed or removed, and in other locations specified in the approved program of instruction as set forth in § 75.1502.'' This proposed section has been renumbered and restated in final §§ 75.352(c), 75.352(c)(1), and 75.352(c)(2) to clarify MSHA's intent that certain actions must be taken when the alarm signal is received at the designated surface location.

Many commenters suggested alert signals should also be automatically transmitted to each affected working section and areas where mechanized mining equipment is being installed or removed. Other commenters suggested it is not necessary to report each alert to the sections, and that in mines where frequent nuisance and false alert and alarm signals occur, miners attach a diminished importance to the signals creating a ''cry-wolf'' syndrome, in which alert and alarm signals are discounted by miners as related to non-fire sources, such as diesel-powered equipment or welding fumes, and not to a real fire event. This new provision should reduce unnecessary notification of miners, thus increasing the over-all effectiveness of the AMS as an early-warning fire detection system.

We agree that in many cases the activation of numerous alert signals may lead to complacency; however, we also agree that in some instances the early notification of working sections and setup or removal areas may be desirable. It has been reported that alert levels of CO at individual sensors are produced by diesel-powered equipment exhaust, cutting and welding operations, hot brakes on mobile equipment, and other non-fire conditions. Alert signals have also been caused by radio-frequency interference, and these occurrences are often of a limited duration. In an analysis of AMS system responses to fires, as well as large-scale fire testing by the U.S. Bureau of Mines, researchers found that fires may produce alert or higher levels of CO at consecutive sensors. When this occurs, automatic notification of affected areas is required by this final rule.

For these reasons, while alert signals at individual sensors need not be reported to affected areas, we have included this new requirement so that, in the case of consecutive sensors in alert status, automatic notification of the affected areas is required. Actions required under this section are specified in § 75.352(c). Although automatic notification of single alert signals on working sections and setup or removal areas is not required, the alert signals for individual sensors must still be investigated to determine the CO source, as required by 75.352(b).

The operation of diesel-powered equipment in the belt air course or in adjacent air courses is a concern in mines using CO-based fire detection systems. Possibly, movement of the equipment in these air courses can cause alert or alarm activations at individual sensors as the equipment passes nearby. If there are cases where engines cause numerous alert and alarm signals due to the machine exhaust containing high levels of CO, we believe that the mine operator can perform maintenance on the diesel engines which is likely to be effective in reducing these levels. Proper maintenance of diesel-powered equipment is an important aspect of controlling diesel engine emissions as required by § 75.1914—Maintenance of diesel-powered equipment.

Additionally, the use of diesel discriminating sensors (DDS) has been shown to be effective in mines using diesel-powered equipment for reducing the frequency of alert signals.

Final § 75.352(c) requires that upon notification of an alarm signal or when alert signals at two consecutive sensors are indicated at the same time, the appropriate personnel must take various actions specified in §§ 75.352(c)(1) and 75.352(c)(2). Under final § 75.352(c)(1) the appropriate personnel must notify miners in affected working sections, in affected areas where mechanized mining equipment is being installed or removed, and at other locations specified in the approved mine emergency evacuation and firefighting program of instruction (§ 75.1502). Under final § 75.352(c)(2), all personnel in the affected areas, unless assigned other duties under § 75.1502 must be withdrawn promptly to a safe location identified in the mine emergency evacuation and firefighting program of instruction. This section has been reworded and renumbered from that proposed to clarify MSHA's intent that appropriate personnel have responsibilities to not only notify

affected workers upon the receipt of an alarm signal but also to notify affected workers upon receipt of alert signals at two consecutive sensors. This inclusion is based upon MSHA's analysis of the record and corresponds to the new requirement under § 75.351(c)(7) that requires the AMS to automatically provide visual and audible alarm signals at the designated surface location, at all affected working sections, and at all affected areas where mechanized mining equipment is being installed or removed when the carbon monoxide level at any two consecutive sensors reaches and remains at the alert level specified in § 75.351(i).

Another commenter said that communication errors were reported by the AMS in JWR No. 5 Mine in September 2001 subsequent to the initial explosion. ''However, the Control Room operator simply did not deem these errors as significant and did not plan further action. Yet computer printouts from the AMS showed that the errors were acknowledged or silenced by the CO supervisor.'' This final rule requires that communication failure must be investigated, not ignored by the AMS operator. Section 75.352(a) requires that when the alert level is reached or a malfunction occurs, the sensor involved is identified, and appropriate personnel are notified immediately. Section 75.352(b) requires that appropriate personnel promptly initiate an investigation to determine the cause of the alert, malfunction or alarm signal. Some commenters also suggested that an alert response should include communication and coordination of maintenance personnel with the AMS operator to limit the number of people who enter the mine until the incident is verified. In addition, commenters wanted the miners in affected sections to be withdrawn outby the alerting sensor. Other commenters opposed the sounding of alerts on working sections because it ''would propagate indifference to its sounding.'' MSHA agrees that communication errors should be investigated as malfunctions, as required by this section. However, MSHA disagrees with the comment that miners on working sections should be withdrawn outby a single alerting sensor unless an investigation confirms a problem or a problem is confirmed by other means such as a second sensor alert. We believe that automatic activation of signals on the working section at alert levels could potentially inhibit the system's effectiveness if a ''cry wolf'' syndrome develops. A miner receiving an alert signal from an AMS that later is determined not to represent a hazard may lose confidence in the system and become desensitized to these signals. Such a situation reduces a miner's confidence in the AMS and may reduce the importance of an alarm to the worker. We believe that the procedures outlined in §§ 75.352(a) and (b) provide the early warning intended under an alert, malfunction, or alarm condition. Therefore, the requirement to withdraw workers to a safe location upon receipt of a single alert signal was not included in this final rule. This action is consistent with recently granted belt air petition requirements. In addition, MSHA has included a requirement under 75.351(c)(7) that mandates miners be withdrawn to a safe area if two consecutive sensors indicate an alert level as specified in § 75.351(i) at the same time. This provides protection to miners without causing unnecessary withdrawals caused by malfunctions or other non-fire related alerts.

When it is necessary to withdraw personnel under § 75.352(c)(2), the personnel must be withdrawn promptly to a safe location identified in the mine emergency evacuation and firefighting program of instruction. Based on the results of the investigation, a determination will be made by the § 75.1501 responsible person on whether or not to initiate an emergency evacuation. Some commenters repeatedly suggested that an action that should be taken by the responsible person under this section is to limit the number of people entering the mine, as mandated by § 75.1502, until the investigation is completed. MSHA has already stated that the investigation prompted by the alarm will determine the extent of the hazard to miners, and therefore, the necessary response under either §§ 75.352 or 75.1502.

A commenter suggested that miners working in the affected section be withdrawn outby the alerting sensor. MSHA has previously stated that we disagree with this suggestion because constantly notifying and withdrawing miners following every single alert signal, increases the occurrence of the ''cry-wolf'' syndrome. Investigation of the alert by the appropriate personnel is required and should reduce the occurrence of non-fire related signals that unnecessarily cause miner withdrawal. Therefore this provision should improve safety. The proposed language has been modified as discussed above.

By not requiring the withdrawal of miners outby to a safe location we are reducing the occurrence of the ''cry-wolf'' syndrome. By requiring the withdrawal of miners outby to a safe location when alert signals are indicated at two consecutive sensors at the same time we are improving miner safety because if two sensors are in the alert mode, this is a more likely indication that a fire hazard exists. It is more likely that the AMS operator would receive alert signals on two consecutive sensors when a fire condition exists. This position is supported by an analysis of AMS system responses to fires, as well as large-scale fire testing by the U.S. Bureau of Mines, that indicates that fires may produce alert levels or higher of CO at consecutive sensors. Under this condition, automatic notification of affected areas is prudent.

Many commenters noted that many of the granted petitions require notification of alarms and withdrawal of personnel outby the alarming sensor. MSHA agrees that this action is prudent. The language in the final provision has been modified to reflect withdrawal of affected miners to a safe location. Withdrawal of miners outby the alarming sensor may not always place the miners in a safe location and actually could move miners into smoke. Therefore, the last requirement of this provision has been modified, based on comments, from that proposed, eliminating the phrase ''outby the next functioning sensor upwind of the alarming sensor'' and replacing it with ''must be withdrawn promptly to a safe location identified in the mine emergency evacuation and firefighting program of instruction.'' MSHA agrees with the commenters that miners need to be evacuated to a safe place, as required by § 75.352(c)(2), and not just outby the next functioning sensor upwind of the alarming sensor, since this location may not be as safe as some other withdrawal sites depending on the location of the fire. MSHA disagrees with a commenter who contended that for each alarm that the miners must be brought to the surface. Miners will be withdrawn to a safe location if either two consecutive alert signals or an alarm signal is received by the AMS operator. They will remain in the safe location until the investigation required by § 75.352(b) is conducted and either results in an ''all clear'' to return to the affected areas of the mine or the miners are evacuated according to the requirements of § 75.1502.

Some commenters recommended the review of each mining operation's approved emergency evacuation and firefighting program of instruction to ascertain if they have been updated to include the new provisions of § 75.1502—Mine emergency evacuation and firefighting program of instruction. In addition, these commenters are

uncomfortable with including new belt air requirements in these plans, until the Agency ascertains that these emergency plans have been updated to incorporate the new § 75.1501 standard. The commenters are convinced that this action is necessary, since many of the existing plans are ''antiquated'' and unable to meet the additional requirements imposed upon them.

The Emergency Temporary Standard (ETS) on emergency evacuations was published on December 12, 2002. Mine operators were required by the ETS to submit for approval their emergency plans by January 13, 2003. MSHA published the final emergency evacuation rule on September 9, 2003. This rule was effective immediately. In light of this, MSHA believes that these mine emergency plans are not ''antiquated.'' The final emergency evacuations rule amended annual refresher training to allow MSHA to approve the mine operator's annual course of instruction regarding their emergency evacuation and fire fighting program of instruction (§ 48.8 as amended). If MSHA deems that this course is not consistent with current conditions found at the mine, then MSHA will require that modifications be made to the course, and consequently to the emergency evacuation plan, to reflect these conditions. Such changes might also include revisions to the training to include relevant final belt air provisions, such as the withdrawal of miners required by § 75.352(c)(2).

Proposed § 75.352(c) stated, ''If an alert or alarm signal from a methane sensor in a return air split is activated, the sensor producing the alert or alarm signal must be identified, an examination must be made to determine the cause of the activation, and the actions required under [existing] § 75.323 must be taken.'' This proposed section has been renumbered and editorially revised to be final § 75.352(d). This provision addresses the actions required in case an alarm from a methane sensor in a return air split is activated. These actions apply also to methane sensors installed in accordance with §§ 75.323(d)(1)(ii) and 75.362(f) that alarm. The specific actions required by the final rule include identification of the sensor that is causing the alarm, an investigation into the cause of the alarm, and actions required by existing §§ 75.323(c) and § 75.323(d). The final provision reads, ''If there is an alert or alarm signal from a methane sensor installed in accordance with §§ 75.323(d)(1)(ii) and 75.362(f), an investigation must be initiated to determine the cause of the signal, and the actions required under § 75.323 must be taken.'' No specific comments were received on this paragraph; therefore, except for the renumbering and editorial changes, it remains as proposed.

Like the proposed § 75.352(d), final paragraph (e) of § 75.352 addresses the actions required if any fire detection component of the AMS malfunctions or is inoperative. The final rule requires the operator to take immediate action to return the system to proper operation. MSHA will allow continued operation of the belt only when certain safety precautions described in § 75.352(e) are taken to assure miners' safety. This standard is consistent with recently granted petitions that permit the use of belt air to ventilate working places. This provision will maintain the safety in mines that currently have a granted belt air petition with such a requirement and will increase safety for miners that currently do not work under such a granted petition requirement if the mine operator chooses to use belt air.

Some commenters testified that, if the AMS is inoperative for more than eight (8) hours, the mine operator must notify the district manager. MSHA does not believe that notification of the district manager is necessary since this final rule specifies equivalent actions that must be taken to protect miners. Hand-monitoring of the belt air course as required by this final rule is an equivalent method to AMS monitoring of the belt air course. Therefore, the paragraph remains unchanged from that of the proposed rule.

Like the proposed § 75.352(d)(1), final paragraph (e)(1) covers those instances when one sensor becomes inoperative. Under this condition, we require the operator to station a person trained in the use of hand-held devices to continually monitor for CO or smoke near the inoperative sensor. This action is consistent with current requirements in granted petitions and gives the mine operator needed information on the atmosphere at the location of the inoperative sensor. This action will maintain safety because hand-monitoring of the belt air course, as specified in this final rule, is an equivalent method to AMS monitoring of the belt air course. No comments were received on this paragraph. The final language remains as proposed, except that the proposed phrase ''During that time that'' has been replaced with the word ''While'' to make the provision read better.

Like proposed § 75.352(d)(2), final paragraph (e)(2) specifies the monitoring required if two or more adjacent AMS sensors become inoperative. Under the final rule, a sufficient number of trained persons would be required to patrol and continuously monitor the area affected so that the area is traveled each hour. As an alternative under (e)(2), the operator could station a trained person near each inoperative sensor to continuously monitor for the presence of CO or smoke. These actions are consistent with current requirements in granted petitions and give the mine operator needed information on the atmosphere at the locations of the inoperative sensors. This action will maintain safety because hand-monitoring of the belt air course, as required by this final rule, is an equivalent method to AMS monitoring of the belt air course. No comments were received on this provision. The final language remains as proposed except for the section being renumbered.

Like proposed § 75.352(d)(3), final paragraph (e)(3) specifies actions required if the complete AMS becomes inoperative. When determining what is complete system failure, we do not necessarily mean that every component of the system does not function. It is intended that this paragraph of the final rule would apply when part of the system is inoperative to render the system incapable of performing its intended function. For example, if a break in the data transmission line occurs that does not permit sensors to communicate with the central processing unit (CPU) on the surface or if the CPU itself becomes inoperative although all underground components continue to operate, then the entire system should be considered inoperative. When the entire system becomes inoperative, paragraph (e)(3) requires the mine operator to take immediate action to have trained persons patrol and continuously monitor for CO or smoke so that the affected areas will be traveled each hour in their entirety. This action will maintain safety because hand-monitoring of the belt air course, as required by this final rule, is an equivalent method to AMS monitoring of the belt air course. No specific comments were received on this provision. However, MSHA is clarifying language in the final provision to change ''belt entry(ies)'' to ''affected areas'' to include monitoring at sensors located in entries outside of the belt entry, such as at the sensors located in the primary escapeway under § 75.351(f). This action will maintain safety by reducing the possibility that hand monitoring will not be conducted at these other sensors. Other than this change and the renumbering, the final language remains as proposed.

When monitoring is conducted during times of system or sensor malfunction, the person doing the monitoring must be trained to make these tests. As in proposed § 75.352(d)(4), final paragraph (e)(4) requires the person monitoring under this section must have voice communication available with the designated surface location. Communication capabilities must be available to trained persons patrolling at intervals not to exceed 2,000 feet. This could be a mine phone, telephone, trolley phone, or radio location. Easily accessible communication is necessary to ensure quick notification to the designated surface location when an alert or alarm level is reached. Some commenters suggested that the mine phones be positioned at a shorter distance than every 2,000 feet, such as every 1,000 feet, or that MSHA require the use of a leaky feeder system (*i.e.,* walkie talkies with feeder antennas) in the track entries. The 2,000-foot spacing is consistent with granted petition requirements and will maintain the level of safety afforded miners.

In addition, proposed (d)(5) stated that ''The trained persons monitoring under this section must report the AMS sensor(s) at intervals not to exceed one hour.'' This requirement has been included in final paragraph (e)(4), but modified to require that the trained person ''report contaminant levels to the AMS operator at intervals not to exceed 60 minutes.'' This requires that, even if alert or alarm levels are not exceeded, the trained persons must report to the AMS operator at intervals not to exceed one hour. This will verify to the AMS operator that there are no elevated levels of contaminants at the monitoring locations in the belt entry. These actions give the mine operator needed information on the atmosphere at the locations of the affected sensors and assure that appropriate action is taken as needed.

Some commenters suggested that the trained person monitoring the AMS by hand should report to the AMS operator at least every 15 to 20 minutes, not once per hour, as required by the provision. MSHA believes that it is not necessary for the trained person to report normal conditions more often than once per hour to the AMS operator. Miner safety is not affected by reporting normal conditions every 60 minutes instead of every 20 minutes. This ensures that the hand-held monitoring is occurring as required. It is important to note, that the AMS is not required to report levels of CO, smoke, and methane below established alert and alarm levels. As previously discussed, MSHA moved the requirement in the proposed rule (proposed paragraph (d)(5)) for trained persons to report to the AMS operator at intervals not to exceed one hour to final paragraph (e)(4). Therefore, the final provision (e)(4) is modified, as discussed above, from that proposed in (d)(4).

Like proposed § 75.352(d)(5), final paragraph (e)(5) requires the trained person to immediately report to the AMS operator any concentration of the contaminant that reaches either the alert or alarm level specified in § 75.351(i), or the alternate alert and alarm level specified in paragraph (e)(7) of this section, unless the source of the contaminant is known not to represent a hazard. This provision was modified from the proposed requirement to emphasize the importance that the trained person immediately report any concentrations at or above the alert or alarm levels specified in § 75.351(i), unless the source of the contaminant is known not to create a hazard to miners. The proposed provision stated, in part, ''* * * the trained person must report as soon as possible to the AMS operator any concentration of the contaminant that reaches either the alert or alarm level specified in § 75.351(i), or the alternate alert and alarm level specified in paragraph (f)(8) of this section, unless the source of the contaminant is known not to represent a hazard.'' Whereas, the final provision states, ''The trained person(s) monitoring under this section must report immediately to the AMS operator any concentration of the contaminant that reaches either the alert or alarm level specified in § 75.351(i), or the alternate alert and alarm levels specified in paragraph (e)(7) of this section, unless the source of the contaminant is known not to present a hazard.'' MSHA believes the modified language clarifies our intent that the trained person monitoring for fires immediately report any contaminant levels at or above the mine's alert or alarm level to the AMS operator.

Like proposed § 75.352(d)(6), final paragraph (e)(6) requires that detectors used to comply with this paragraph have a level of detectability comparable to those required for AMS sensors by § 75.351(l). That is, the hand-held detectors and the AMS sensors have the same resolution and detection range to detect CO at both the alert and alarm levels. The proposed rule used the term ''instruments.'' MSHA has changed this to ''detectors'' to clarify our intent because the term ''detector'' is more specific for portable gas-detection equipment used in underground mines. No comments were received on this section, therefore, other than this one word change and the renumbering of the provision, it remains as proposed.

Hand-held methane and CO detectors are commercially available. Some AMS sensors do not have commercially available hand-held counterparts, such as smoke, so that an alternate instrument would be needed as required in both proposed § 75.352(d)(7) and final paragraph 75.352(e)(7) of this paragraph, which reads, ''For those AMSs using sensors other than carbon monoxide sensors, an alternate detector and the alert and alarm levels associated with that detector must be specified and approved in the mine ventilation plan.'' For example, smoke sensors which malfunction will require monitoring with an alternate detector, perhaps a hand-held CO detector that can detect CO at the established alert and alarm levels as required by § 75.351(i)(2). No comments were received on this paragraph. The final language remains as proposed, except for the renumbering of the provision.

Like proposed § 75.352(e), final § 75.352(f) requires that if the 50-fpm minimum air velocity is not maintained in the belt entry as required in § 75.351(e)(3), immediate action must be taken to return the ventilation system to proper operation. It also requires that while the 50-fpm air velocity is not maintained, trained persons must patrol and continuously monitor for CO or smoke as set forth in §§ 75.352(e)(3) through 75.352(e)(7) so that the affected belt entry(ies) is traveled each hour in its entirety. As discussed previously, contaminants must reach the sensors in order to be detected. Less than a 50-fpm velocity with 1,000-foot sensor spacing is considered a system failure because air currents will not carry a sufficient amount of contaminants to the sensors for detection. This is considered a system failure since the system would not be able to provide adequate warning. A commenter requested clarification, ''Does this section only apply to the requirement of a 50-foot per minute minimum or does it also apply to velocities below 50-foot per minute where sensors spacing has been reduced. Each scenario should be allowed as long as they comply with the requirements of hand monitoring.'' If the spacing of sensors is 1,000 feet and the velocity is less than 50 fpm, hand monitoring is required. If the spacing of sensors is 350 feet, hand monitoring is only required in the case of system or component failure. MSHA considers these provisions to be equivalent. Two minor editorial changes were made to the final language of the provision. The proposed rule stated ''Trained persons,'' while the final provisions states, ''A

trained person(s).'' The proposed rule included the phrase ''of this section'' which has been deleted from the final language. Other than these editorial changes and renumbering of the section, the language of the final paragraph remains unchanged from that proposed.

Section 75.371 Mine Ventilation Plan, Contents

Section 75.371 sets forth the information that the mine operator must include in the mine ventilation plan. The mine ventilation plan is mine specific and is designed to permit safe and healthful operation of the mine by ensuring that ventilation is sufficient to dilute and render harmless hazardous components of mine air such as respirable dust and methane, and provide necessary levels of oxygen to the mine working environment.

We are adding eight (8) requirements to the mine ventilation plan. These new paragraphs, §§ 75.371(ii) through (pp), require certain information to be specified and approved. Under this final rule, the existing paragraphs (ii) through (nn) would be redesignated as (qq) through (xx).

Existing § 75.371(hh) requires that the mine ventilation plan specify the ambient level in parts per million of CO, and the method for determining the ambient level. Section 75.351(j) does not change this requirement.

Like the proposed rule, final paragraph (ii), in accordance with § 75.350(b)(3), requires the locations (designated areas) where dust measurements would be made in the belt entry when belt air is used to ventilate working sections and setup or removal areas. As discussed under § 75.350(b)(3), the Advisory Committee determined that multiple designated areas should be established for mines using belt air to ventilate working places. The mine operator is required to establish the DA in order to monitor the intake air for dust levels and to keep these levels within existing standards. This monitoring and control of dust levels ensures that miners' health is protected by keeping the dust levels within existing standards (§ 70.100). No comments were received on this provision. The final language remains as proposed, except the phrase ''in accordance with'' as been editorially added to refer to § 75.350(b)(3).

Final paragraph (jj), in accordance with § 75.350(a)(2), requires that the locations where velocities exceed 500 feet per minute in the belt entry, and the maximum approved velocity for each location, be included in the mine ventilation plan. This is a new provision under § 75.371 that corresponds to the inclusion of new § 75.350(a)(2). This requirement was added based on the comments received that are discussed in this preamble under the section-by-section discussion of § 75.350(a)(2). This information is necessary for MSHA to evaluate the capability of fire detection system to ensure that the fire detection components are compatible with the air velocity and the mining conditions.

Final paragraph (kk), in accordance with § 75.350(b)(6), requires the location where air quantities are measured. This provision corresponds to the new provision of § 75.350(b)(6). This requirement was added based on the comments received that are discussed in this preamble under the section-by-section discussion of § 75.350(b)(6).

Final paragraph (ll), formerly (jj) of the proposed rule, requires that the locations and use of all point feeds be approved in the mine ventilation plan. The term ''use'' was added and the term ''regulators'' was deleted to clarify MSHA's intent to clearly specify point feeding requirements in this final rule, as stated under §§ 75.350(c) and (d).

One commenter asked for clarification: ''[m]ust the point feed locations be site specific and be identified and changed for every section or can a general statement be made as to their location and then be shown on the mine map? A general statement can be made and a sketch shown for the approximate location * * * Requiring individual site specific locations will cause additional paper work and time for approval that is not necessary.'' This provision requires that a specific location be identified in the ventilation plan. However, if the mine operator consistently point feeds at the same location and in the same manner in each panel then a general statement may be acceptable for approval of multiple locations. For example, a mine operator may point feed consistently in each panel at a specified crosscut inby the mouth of each panel in a specific manner. In other instances, where point feeding is used infrequently then specific locations may need to be identified in the ventilation plan. Regardless, these locations must be approved by the district manager. The provision remains unchanged from that proposed, except for the inclusion of the word, ''use'' and the phrase ''in accordance with'' has been editorially added to refer to § 75.350(d)(5).

Final paragraph (mm), formerly proposed paragraph (kk), in accordance with § 75.351(e)(5), requires the location of any additional CO or smoke sensor required by the district manager to be identified in the mine ventilation plan. Final §§ 75.351(e)(1) through (e)(4) specify the required locations where sensors monitor CO or smoke along belts. We recognize instances may occur when additional sensors are necessary to provide early-warning fire protection. In those cases, § 75.351(e)(5) requires that these locations be specified and approved in the mine ventilation plan. A commenter was not in favor of this requirement to have additional sensors approved in the mine ventilation plan. MSHA believes that it is important to identify the sensors required by § 75.351(e)(5) in order to adequately evaluate the effectiveness of the early-warning fire detection system. However, we do not intend that additional sensors installed by the mine operator that are not required by the district manager in § 75.351(e)(5), need to be identified in the mine ventilation plan. Only in those cases when additional sensors are necessary would the mine ventilation plan contain this information. The language of the final provision remains unchanged from that proposed except the phrase ''in accordance with'' has been editorially added to refer to § 75.350(e)(5).

Final paragraph (nn), formerly proposed paragraph (ll), in accordance with § 75.351(m), requires the length of time delays or other methods used to reduce the number of non-fire related alert and alarm signals from the AMS be stated in the ventilation plan. Other methods may include a sophisticated algorithm similar to that employed by the diesel-discriminating sensor, human intervention, controlling or limiting diesel-powered equipment operation. Section 75.351(m) requires that the length of the delays be specified and approved in the mine ventilation plan.

Documentation must be submitted to the Agency in support of the need for a time delay. This documentation should include the frequency of alert and alarm signals, contaminant levels reached, the duration of signals, and the expected benefit of using the time delay. This section also requires that computer techniques or administrative controls used to reduce the number of non-fire alert and alarm signals be approved in the mine ventilation plan. As discussed under § 75.351(m) the use of reasonable time delays and other computer techniques has reportedly been successful in reducing the number of non-fire alert and alarm signals. However, because these techniques should be used only when necessary (when non-fire alert and alarm signals are excessive) and should delay the activation of alert and alarm signals for the shortest time possible, they should be specified and approved in the mine ventilation plan. Time delays, when

used appropriately, increase safety by reducing the occurrence of alert and alarm signals caused by non-fire related events. This increases miner confidence in the AMS. No comments were received on this provision. The final language remains as proposed, except the phrase ''in accordance with'' has been editorially added to refer to § 75.351(m).

Final paragraph (oo), formerly proposed paragraph (mm), in accordance with § 75.351(i)(2), requires that when reduced alert and alarm settings for CO sensors are required by the district manager, they be specified in the mine ventilation plan. The only change from the proposed language was the replacement of the word ''lower'' with ''reduced'' to make our intention clear. These reduced alert and alarm levels that are incorporated into the mine ventilation plan allow for evaluation of the mine operator's proposed alert and alarm levels, thus maintaining miner safety. No comments were received on the specific language of this provision; it otherwise remains unchanged from that proposed, except the phrase ''in accordance with'' has been editorially added to refer to § 75.351(i)(2).

Final paragraph (pp), formerly proposed paragraph (nn), in accordance with § 75.352(e)(7), requires that alternate detectors be approved in the mine ventilation plan if they can be used to monitor the belt entry in the case of an inoperative or malfunctioning AMS. For example, this provision would permit the use of a CO detector to monitor a belt entry equipped with smoke sensors. Such a CO detector could be used if it meets the levels of detectability that would be expected if it were used in place of an AMS with CO sensors. Incorporating alternate detectors into the mine ventilation plan allows for evaluation of the mine operator's proposed use of such detectors, thus maintaining miner safety. No comments were received on the specific language of this provision. It remains unchanged from that proposed, except the phrase ''in accordance with'' has been editorially added to refer to § 75.352(e)(7).

Section 75.372 Mine Ventilation Map

Existing § 75.372(b)(16) requires that the location of all required AMS sensors be shown on the mine ventilation map. Like the proposed rule, final paragraph § 75.372(b)(16) requires that the type of sensor also be shown on the mine ventilation map. With the anticipated increased usage of sensors other than CO sensors, it is important that persons who may be called upon to respond to malfunction, alert, and alarm signals have information available that tells them both the type and location of these sensors. No comments were received on this provision. The final language remains as proposed, except we added ''subpart D'' to clarify which subpart of part 75 is affected by this change.

Section 75.380(g) Escapeway; Bituminous and Lignite Mines

Like the proposed rule, final paragraph (g) of § 75.380 requires that except where separation of belt and trolley haulage entries from designated escapeways did not exist before November 15, 1992, and except as provided in § 75.350(c) of this final rule, the primary escapeway must be separated from belt and trolley haulage entries for its entire length, to and including the first connecting crosscut out by each loading point except when a greater or lesser distance for this separation is specified and approved in the mine ventilation plan and does not pose a hazard to miners. This modification to existing § 75.380(g) allows point-feed regulators to be installed and monitored when additional intake air is needed in the belt air course as permitted by § 75.350(c) of this final rule. Exceptions to this provision include where separation of belt and trolley haulage entries from designated escapeways did not exist before November 15, 1992, and as provided in § 75.350(c) of this final rule. No comments were received on this provision. The final language remains as proposed.

In the proposed rule, MSHA did not require the use of lifelines but solicited information from the public concerning the use and maintainability of lifelines. In general, a lifeline is generally a rope extending from a working section through an escapeway to the surface that miners could grasp and use as a guide to help escape the mine during low-visibility emergency conditions. The Advisory Committee recommended the installation and maintenance of lifelines in all underground coal mines, regardless of the use of belt air. The recommendation specified that lifelines had to clearly designate the route of escape. Discussion in the Advisory Committee's report suggested the use of directional cones that indicate the direction of travel to the surface to increase the effectiveness of lifelines.

Numerous commenters suggested that lifelines should be required if belt air is used to ventilate working sections. Other commenters thought that lifelines should not be located in the primary escapeway because they would be subject to frequent damage from mobile equipment. Another commenter thought that this issue was best addressed through a different rulemaking.

NIOSH submitted to the record a study that ranked factors that affected survival during coal mine fires. A combination of factors, including installing lifelines, moderately decreasing air leakage, and decreasing the fire growth rate significantly decreased the amount of time required to escape a fire. A conclusion of the NIOSH research is that lifelines with directional cones can improve escape through smoke.

The Commonwealth of Kentucky's State Statute at Ky.Rev.Stat.Ann.§ 352.135 requires that ''lifeline cords, with attached reflective material at not to exceed twenty-five (25) foot intervals, from the last open crosscut to the surface; provided, that in case of a shaft mine, such lifeline cords shall extend from the last open crosscut to the bottom of the designated escape shaft. Such lifeline cord shall be of durable construction sufficient to allow miners to see and to use effectively to guide themselves out of the mine in the event of an emergency.''

West Virginia's State Statute at W.Va. Code § 22A–2–60(b) requires that ''* * * lifeline cords, with reflective material at twenty-five foot intervals, * * * '' be installed '' * * * from the last open crosscut to the surface along a designated escapeway ventilated by return air: Provided, that in the case of a shaft mine such lifeline cords shall extend from the last open crosscut to the bottom of the designated escape shaft. Such lifeline cord shall be of durable construction sufficient to allow miners to see and to use effectively to guide themselves out of the mine in the event of an emergency.''

The Agency decided that on balance, directional lifelines could be practical as a safety enhancement in return entries when used as alternate escapeways. Based on the rulemaking record, granted petition requirements, an Advisory Committee recommendation, and the requirements of these state laws, MSHA developed provisions for the use of directional lifelines. The new provisions under § 75.380(n) require the use of directional lifelines in return entries when used as alternate escapeways when belt air is used to ventilate working sections or setup or removal areas, in accordance with § 75.350(b). The term ''directional lifelines'' refers to lifelines that contain directional cones or similar devices that face in the direction of escape to the surface.

The first provision, § 75.380(n)(1), requires that lifelines be installed in

alternate escapeways ventilated with return air from the working sections or areas where mechanized mining equipment is being installed or removed: continuous to the surface escape drift opening; or continuous to the escape shaft or slope facilities to the surface; or continuous to where this escapeway enters into intake air. This provision is based on language that describes escapeways in existing § 75.380(b)(1). However, the lifelines do not need to extend into an intake air course when the alternate escapeway passes into intake air from return air because the lifelines are required only in return entries designated as an alternate escapeway.

The second provision, § 75.380(n)(2) requires that lifelines be made of a durable material so that they are resistant to mechanical damage. This parallels the states' requirements as well as being consistent with testimony in the rulemaking record. Lifelines must be constructed of durable materials in order for them to survive normal mining conditions (*e.g.*, atmospheric conditions such as humidity) so that they are available in case miners need to use them to evacuate the mine.

The third provision, § 75.380(n)(3), is that the lifelines must be marked with a reflective material every 25 feet, so that miners can locate the lifeline in low-visibility conditions using their cap lamps. This requirement is also consistent with states' laws and with testimony in the rulemaking record.

The fourth provision, § 75.380(n)(4), is that lifelines be positioned in such a manner so that miners can use them effectively to escape. For example, the proper positioning of the lifeline as determined by the mining conditions increases the ability of miners to effectively use lifelines during emergency situations. This provision is also consistent with states' laws.

The fifth provision, § 75.380(n)(5), is that lifelines contain directional indicators, signifying the route of escape, placed at intervals not to exceed 100 feet. Existing § 75.380(d)(2) requires that ''each escapeway shall be clearly marked to show the route and direction of travel to the surface.'' During escape when visibility is low, the directional indicators, such as cones, will enhance the ability of miners to escape by quickly indicating the proper direction of travel. Therefore, we are requiring these directional indicators. Currently, some mines place prefabricated directional lifelines in escapeways, using cones to show the direction of escape. NIOSH publications discuss the design of a particular lifeline construction (75-foot cone spacing) and NIOSH recommends installation of double-cones at obstructions to alert miners of personnel doors, overcasts, belt crossings, etc. However, NIOSH did not recommend an interval for directional cone spacing. MSHA experience in training miners at the Mine Simulation Laboratory in Beaver, West Virginia, indicates that the directional cone spacing interval needs to be variable, due to variation in conditions found in return entries, including overcasts and undercasts and turns. MSHA's intent is that the interval spacing will never exceed 100 feet, but may be shorter depending upon entry conditions, as determined by the mine operator as mine conditions warrant.

III. Paperwork Reduction Act

This final rule contains information collection requirements in various provisions. These paperwork requirements are under OMB Control Number 1219–0138. Our paperwork submission summarized below is explained in detail in the Regulatory Economic Analysis (REA) that accompanies the rule. The REA includes the estimated costs and assumptions for the paperwork requirements related to this final rule. A copy of the REA is available on our Web site at *http://www.msha.gov/regsinfo.htm* and can also be obtained in hardcopy from MSHA. These paperwork requirements have been submitted to the Office of Management and Budget for review under 44 U.S.C. § 3504(h) of the Paperwork Reduction Act of 1995, as amended. Respondents are not required to respond to any collection of information unless it displays a current valid OMB control number. This control number, 1219–0138, combines paperwork requirements from the following OMB control number packages: 1219–0065, 1219–0067, 1219–0073, and 1219–0088.

MSHA estimates that the final rule would create 22,042 burden hours for the first year, 22,100 burden hours for the second year, and 22,522 burden hours for the third year, for a total of 66,665 burden hours for Years 1 through 3 combined. This is equivalent to an annualized value of 22,465 hours per year and related annualized costs of $1,215,996 per year. These costs are more than offset by the $1.847 million in gross cost savings from this final rule.

On a per-mine basis, MSHA estimates the same paperwork burdens for both new and existing mines that use belt air. However, MSHA estimates that as time goes by a greater proportion of new coal mines using three or more entries will choose to use belt air. This means that the number of mines using belt air will increase over time. This greater number of mines using belt air will increase the total burden hours and paperwork cost over time. Hence, second year hours and costs are greater than first year hours and costs, and third year hours and costs are greater than second year hours and costs. MSHA also estimates paperwork costs for all mines that point feed. These estimates include the burden hours and costs for mines that point feed, but do not use belt air at the working places. The burden hours and cost for point-feeding-only mines are less than 0.1% of the total burden hours and costs. They are separately calculated because they affect a different set of mines.

The paperwork burden is summarized by total annualized burden hours by provision (Table 1) and by total annualized burden costs by provision (Table 2).

Numerous provisions require action to modify the mine ventilation plan. Paragraph 75.351(j) requires modification of the mine ventilation plan to include ambient CO levels and the means used to determine them. Paragraph 75.351(m) requires that the mine ventilation plan be modified to show the use and length of time-delays of any non-fire related CO sensor signals. Paragraphs 75.371(mm), 75.371(nn), and 75.371(oo) require modification of the mine ventilation plan to show the length of the time delay or any other method used for reducing the number of non-fire related alert and alarm signals from CO sensors, the lower alert and alarm setting for CO sensors, and the alternate instrument and the alert and alarm levels associated with the instrument, respectively. This final rule will also have an impact on existing paperwork requirements in 75.371(hh) on the ambient level in parts per million of CO, and the method for determining the ambient level, in all areas where CO sensors are installed.

Paragraph 75.351(n)(1) requires sensors used to detect CO or smoke be visually examined at least once each shift, when belts are operated as part of a production shift. If hazardous conditions are found during the visual exam, then a log of such conditions must be filed under existing § 75.363(b)—Hazardous conditions; posting, correcting and recording. Paragraphs 75.351(n)(2) and 75.351(n)(3) require that a log be kept of every seven-day alarm test and every 31-day CO, smoke, or methane sensor calibration, respectively.

Paragraph 75.351(o)(1)(i) requires that a record be made if the AMS emits an alert or alarm signal. The record must include the date, time, location and type

of sensor, and the reason for its activation. Paragraph (o)(1)(ii) requires that, if a malfunction in the system occurs, a record be made of the malfunction and the corrective action to return the system to proper operating condition. We (MSHA) believe that such records are useful to the miner, the mine operator, and the Agency in determining areas of recurring problems. This aids in ensuring proper operation of AMS.

Paragraph (o)(1)(iii) requires that the persons doing the weekly test of alert and alarm signals, the monthly calibration, and maintenance of the system make a record of these tests, calibrations, and maintenance. Paragraph 75.351(o)(3) requires that all records concerning the AMS be kept in a book or electronically in a computer system, that is secure and not susceptible to alteration. Paragraph 75.351(p) requires the mine operator keep these records for at least one year at a surface location and to make them available for inspection by miners and authorized representatives of the Secretary.

Paragraph 75.351(q) requires that AMS operators receive training annually and that a record of this training be kept. The record of training includes the content of training, the name of the person conducting the training, and the date the training was conducted. The record needs to be maintained at the mine site by the mine operator for at least one year.

Paragraphs 75.352(a), 75.352(b), and 75.352(c) require the designated AMS operator or other designated responsible person to take actions promptly when malfunction, alert, or alarm signals are received. These requirements are parallel to those of § 75.351(o).

TABLE 1.—TOTAL BURDEN HOURS OF FINAL RULE

[Summary of all burden hours, by mine size and by provision]

Provision	Annualized burden hours [1]				
	Mines with 1–19 employees	Mines with 20–99 employees	Mines with 100–500 employees	Mines with over 500 employees	Total annual burden hours
§ 75.350(b), implied impact on existing §§ 44.9, 44.10 and 44.11	(8.48)	(131.73)	(144.96)	(12.26)	(297.43)
§ 75.351(j)	2.87	37.00	35.64	3.14	78.65
§ 75.351(j), implied impact on existing § 75.371(hh)	0.09	1.16	1.11	0.10	2.46
§ 75.351(m)	0.07	4.65	16.71	1.47	22.90
§ 75.351(n)(1), implied impact on existing § 75.363(b)	0.47	4.03	10.80	2.25	17.55
§ 75.351(n)(2)	46.04	784.94	2,105.58	293.00	3,229.57
§ 75.351(n)(3)	56.66	1,932.16	10,365.95	1,803.11	14,157.88
§§ 75.351(o)(1)(i) & (ii)	1.34	67.45	778.89	121.94	969.61
§ 75.351(o)(1)(iii)	6.35	174.70	824.96	139.59	1,145.60
§ 75.351(q)	32.76	400.02	931.32	119.74	1,483.83
§§ 75.352(a),(b) & (c)	13.63	271.21	1,158.29	159.31	1,602.44
§ 75.371(kk)	0.77	7.34	11.23	1.14	20.47
§ 75.371(ll)	2.44	13.88	12.52	1.23	30.08
§ 75.371(nn)	0.00	0.15	0.52	0.05	0.72
§ 75.371(oo)	0.01	0.12	0.11	0.01	0.25
§ 75.371(pp)	0.02	0.23	0.22	0.02	0.49
Total	155.04	3,567.30	16,108.88	2,633.83	22,465.06

[1] Source: Chapter VII of the Regulatory Economic Analysis.

TABLE 2.—TOTAL BURDEN COSTS OF FINAL RULE

[Summary of all burden costs, by mine size and by provision]

Provision	Annualized burden costs [1]				
	Mines with 1–19 employees	Mines with 20–99 employees	Mines with 100–500 employees	Mines with over 500 employees	Total annual burden hours
§ 75.350(b), implied impact on existing §§ 44.9, 44.10, and 44.11	($500)	($7,767)	($8,547)	($723)	($17,537)
§ 75.351(j)	$169	$2,181	$2,101	$185	$4,637
§ 75.351(j), implied impact on existing § 75.371(hh)	5	68	66	6	145
§ 75.351(m)	4	274	985	87	1,350
§ 75.351(n)(1), implied impact on existing § 75.363(b)	14	115	309	65	503
§ 75.351(n)(2)	2,714	46,281	124,148	17,276	190,420
§ 75.351(n)(3)	3,341	113,923	611,190	106,313	834,767
§§ 75.351(o)(1)(i) & (ii)	38	1,933	22,324	3,495	27,791
§ 75.351(o)(1)(iii)	374	10,301	48,641	8,230	67,546
§ 75.351(q)	1,502	16,268	35,281	4,328	57,379
§§ 75.352(a), (b) & (c)	391	7,773	33,198	4,566	45,928
§ 75.371(kk)	45	433	662	67	1,207
§ 75.371(ll)	144	818	738	73	1,774
§ 75.371(nn)	0	9	31	3	42
§ 75.371(oo)	1	7	7	1	14

TABLE 2.—TOTAL BURDEN COSTS OF FINAL RULE—Continued

[Summary of all burden costs, by mine size and by provision]

Provision	Annualized burden costs [1]				
	Mines with 1–19 employees	Mines with 20–99 employees	Mines with 100–500 employees	Mines with over 500 employees	Total annual burden hours
§ 75.371(pp)	1	14	13	1	29
Total	8,244	192,631	871,148	143,973	1,215,996

[1] Source: Chapter VII of the Regulatory Economic Analysis.

IV. Executive Order 12866 (Regulatory Planning and Review) and Regulatory Flexibility Act

Executive Order (E.O.) 12866 (58 FR 51735) as amended by E.O. 13258 (67 FR 9385) requires that regulatory agencies assess both the costs and benefits of regulations. MSHA has determined that this final rule will not have an annual effect of $100 million or more on the economy and that, therefore, it is not an economically ''significant regulatory action'' pursuant to § 3(f) of E.O. 12866. However, this final rule has been determined to be significant under § 3(f) of E.O. 12866, which defines a significant regulatory action as one that may ''* * * raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.'' MSHA completed a Regulatory Economic Analysis (REA) in which the economic impact of the rule is estimated. The REA is available from MSHA at *http://www.msha.gov/REGSINFO.HTM* and is summarized as follows.

A. Population-at-Risk

MSHA estimates that this rulemaking will initially affect approximately 14,117 miners at 88 underground coal mines which choose to use belt air at the working places during the first year of the final rule. MSHA also estimates that this rulemaking will additionally affect approximately 5,535 miners at 71 underground coal mines which choose to point feed the belt air, but do not use belt air at the working places, during the first year of the final rule. Accordingly, MSHA estimates that this rulemaking will affect a total of approximately 19,652 miners at 159 underground coal mines during the first year of the final rule.

B. Benefits

MSHA has qualitatively determined that the final rule, to permit use of belt air at the working places, yields net health and safety benefits relative to the existing rule, which does not permit use of belt air at the working places. The final rule will not create any health or safety hazards relative to current petition practice, which also permits use of belt air at the working places.

The main requirement of the final rule is that the mine operator who chooses to use belt air must install an atmospheric monitoring system (AMS) in the belt entry for fire detection. The AMS, composed of CO, smoke, or methane sensors, provides early warning fire detection that is superior to that provided by point-type heat sensors. This added level of protection is beneficial to both workers and the mine owner.

The AMS is beneficial to the mine operator because early warning of a mine fire provides maximal opportunity for extinguishing the fire. An uncontrolled mine fire can damage or destroy a coal mine and can delay or prevent future mining of coal in the affected mine. The AMS is beneficial to workers, because the early warning of fire from an AMS permits more time for miners to escape. Early warning from the AMS also gives the firefighting crew more time to fight or extinguish a fire before it creates a serious mine fire accident or disaster.

The final rule utilizes the common interests of both workers and mine owners to avoid mine fires, and particularly to avoid fires that may result in a serious mine fire accident. By reducing regulatory hurdles to the use of belt air at the working places, the proposed rule would provide additional encouragement for mine operators to install an AMS. The installation of AMSs in additional mines will reduce the risk of mine fire accidents that may injure or kill miners or severely damage mine property.

In addition, MSHA's experience with belt air petitions indicates that, with proper precautions, allowing belt air to ventilate working places can achieve net health and safety benefits. Belt air usage can result in an increase in the quantity of air in the belt entry and other common entries (belt air course). This provides increased protection to miners against hazards created by elevated levels of methane, other harmful gases, and respirable dust.

Prevention of mine fires can also benefit local communities. In the event a mine fire is uncontrolled, persons living in the area of the mine may need to be evacuated for several days due to the smoke and toxic gases escaping to the surface from a mine fire. In addition, there can be long-term adverse economic impacts on a community when a mine fire shuts down a coal mine.

C. Compliance Costs

The final rule revises various sections of part 75, which regulates underground coal mines. These revised sections include § 75.301 Definitions, § 75.350 Air courses and belt haulage entries (title revised to Belt air course ventilation), § 75.351—Atmospheric monitoring systems, § 75.352—Return air courses (title revised to Actions in response to AMS alert and alarm signals or malfunctions), § 75.371 Mine ventilation plan, § 75.372 Mine ventilation map, and § 75.380 Escapeway; bituminous and lignite mines.

The main substantive changes of the final rule are for three-or-more-entry mines that voluntarily choose to use belt air as intake air to ventilate the working places of the coal mine. Three-or-more-entry mines that choose to ventilate the working places with belt air are required to use an atmospheric monitoring system (AMS) to assure worker safety. A secondary substantive change applies to three-or-more entry mines that voluntarily choose to point feed the belt air course.

There are no substantive changes in the final rule that apply to any mine that chooses not to use belt air at the working places, and that chooses not to point feed the belt air. Two-entry mines are also not impacted by the final rule.

The final rule will provide a net yearly cost savings of $707,804 to underground coal mine operators. Included are yearly gross cost savings of

$1,847,181 and yearly gross compliance costs of $1,139,377 for mines affected by the final rule. The yearly gross costs are composed of $1,138,642 for mines using belt air and $735 for mines that point feed the belt air without using the belt air at the working places.

D. Safety Benefits and Other Economic Impacts

The final rule will enhance safety in belt air mines while utilizing the common incentive of both workers and mine owners to avoid mine fires, and particularly to avoid fires that may result in a serious mine fire accident.

MSHA believes that the estimated cost savings of this final rule are conservative because contested petition costs were not included in the preliminary economic analysis. If a petition is contested, the costs to the petitioner could increase by as much as $100,000.

The final rule provides additional encouragement for mine operators to install an AMS by reducing regulatory hurdles to the use of belt air at the working places. The installation of AMSs in additional mines will reduce the risk of mine fire accidents that may injure or kill miners or severely damage mine property. Mine operators are inherently interested in avoiding these catastrophic incidents that could result in the lost of the mine. This final rule would mandate the proper installation and maintenance of AMSs that would serve to further protect mine property from these catastrophic incidents.

MSHA has concluded that the final rule will have only a small (but favorable) effect on coal output, price, and profitability.

E. Feasibility

MSHA has concluded that the requirements of the final rule are both technologically and economically feasible.

This final rule is not a technology-forcing standard and does not involve activities on the frontiers of scientific knowledge. The technology to monitor the mine atmosphere and to alert miners of hazards involve available, off-the-shelf technologies that are currently being used in many mines. Also, standard procedures used to safeguard the safety of miners are approved by the Agency through the mine's Emergency Evacuation and Firefighting Program of Instruction (§ 75.1502). Other provisions of the final rule will reduce petition requirements.

The final rule is clearly economically feasible insofar as it will reduce costs for the mining industry while increasing the use of AMSs to monitor the mine atmosphere. In total, the cost savings from the final rule are $708,000 per year.

The final rule provides for a safe mining environment and facilitates the use of technologically advanced fire-detection systems. In addition, there will no longer be a time delay for approval due to the petition process. Mine operators could use belt air to ventilate working sections as soon as they are in compliance with the rule.

F. Regulatory Flexibility Act (RFA) and Small Business Regulatory Enforcement Fairness Act (SBREFA)

The RFA, as amended by SBREFA, requires regulatory agencies to consider a rule's impact on small entities. For the purposes of the RFA and this final determination, MSHA has analyzed the impact of the final rule and determined that it will not have a significant economic impact on a substantial number of small entities that are affected by this rulemaking.

MSHA will mail a copy of the final rule, including the preamble and regulatory flexibility certification statement, to all underground coal mine operators and miners' representatives. The final rule will also be placed on MSHA's Internet Homepage at *http://www.msha.gov,* under Statutory and Regulatory Information.

The RFA, as amended, at 5 U.S.C. 605(b) also requires MSHA to include in the final rule a factual basis for this determination. This information must be published in the **Federal Register.**

1. Factual Basis for Certification

The Agency compared the gross costs of the rule for small mines in each sector to the revenue for that sector for both size categories analyzed (MSHA and Small Business Administration ''small entity'' definitions). Given that the gross compliance costs for small mines is substantially less than 1 percent of revenue and that net costs are negative, MSHA concludes that there is no significant cost impact of the rule on small entities. For both definitions of a small mine, the net cost of the proposed rule is negative. Since the final rule results in net cost savings, there will not be any burden placed on small mine operators. Accordingly, MSHA certifies that there is no significant impact on a substantial number of small coal mining entities that are affected by this rule.

V. Other Regulatory Analyses

A. Unfunded Mandates Reform Act of 1995 and Executive Order 12875 (Enhancing the Intergovernmental Partnership)

For purposes of the Unfunded Mandates Reform Act of 1995, as well as E.O. 12875 (58 FR 58093), this final rule does not include any Federal mandate that may result in increased expenditures by State, local, and tribal governments, or increased expenditures by the private sector of more than $100 million. MSHA is not aware of any State, local, or tribal government that either owns or operates underground coal mines.

B. Executive Order 13132 (Federalism)

MSHA has reviewed this final rule in accordance with Executive Order 13132 (64 FR 43255) regarding federalism, and has determined that it does not have ''federalism implications.'' The final rule will not ''have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.'' There are no underground coal mines owned or operated by any State governments.

C. Executive Order 13045 (Health and Safety Effect on Children)

In accordance with Executive Order 13045, 62 FR 19885, MSHA has evaluated the environmental health and safety effect of the final rule on children. The Agency has determined that the final rule will have no adverse effect on children.

D. Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments)

In accordance with Executive Order 13175 (63 FR 27655), MSHA certifies that the final rule does not impose substantial direct compliance costs on Indian tribal governments. MSHA is not aware of any Indian tribal governments which either own or operate underground coal mines.

E. Executive Order 12630 (Governmental Actions and Interference with Constitutionally Protected Property Rights)

This final rule is not subject to Executive Order 12630, 53 FR 8859, because it does not involve implementation of a policy with takings implications.

F. Executive Order 12988 (Civil Justice Reform)

The Agency has reviewed Executive Order 12988 (61 FR 4729) and determined that this final rule will not unduly burden the Federal court system. The final rule is written so as to provide a clear legal standard for affected conduct, and has been reviewed carefully to eliminate drafting errors and ambiguities.

G. Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use)

In accordance with Executive Order 13211, 66 FR 28355, MSHA has reviewed this final rule for its energy impacts. MSHA has determined that this final rule will not have any adverse effects on energy supply, distribution, or use.

H. Executive Order 13272 (Proper Consideration of Small Entities in Agency Rulemaking)

In accordance with Executive Order 13272, MSHA has thoroughly reviewed the final rule to assess and take appropriate account of its potential impact on small businesses, small governmental jurisdictions, and small organizations. As discussed in Chapter V of the REA, MSHA has determined that the final rule will not have a significant economic impact on a substantial number of small entities.

VI. Petitions for Modification

On the effective date of the final rule, all existing granted petitions for modification for belt air used to ventilate working places and/or areas where mining equipment is being installed or removed under § 75.350 and former § 75.326 in mines with sections developed using three or more entries will be superseded. Mine operators will thereafter be required to comply with the provisions of the final rule. All existing granted petitions for modification for two-entry mines will remain in effect and will not be superseded by this rule. Future two-entry mines must continue to file petitions to use belt air, since § 75.350(a) prohibits placing the conveyor belt in the return air course.

List of Subjects in 30 CFR Part 75

Mandatory safety standards, Mine safety and health, Underground coal mines, Ventilation.

Dated: March 22, 2004.

Dave D. Lauriski,

Assistant Secretary of Labor for Mine Safety and Health.

■ Chapter I of title 30, part 75 of the Code of Federal Regulations is amended as follows:

PART 75—MANDATORY SAFETY STANDARDS—UNDERGROUND COAL MINES

■ 1. The authority citation for part 75 continues to read as follows:

Authority: 30 U.S.C 811.

■ 2. Amend § 75.301 by adding the following definitions:

§ 75.301 Definitions.

* * * * *

AMS operator. The person(s), designated by the mine operator, who is located on the surface of the mine and monitors the malfunction, alert, and alarm signals of the AMS and notifies appropriate personnel of these signals.

Appropriate personnel. The person or persons designated by the operator to perform specific tasks in response to AMS signals. Appropriate personnel include the responsible person(s) required by § 75.1501 when an emergency evacuation is necessary.

Atmospheric Monitoring System (AMS). A network consisting of hardware and software meeting the requirements of §§ 75.351 and 75.1103–2 and capable of: measuring atmospheric parameters; transmitting the measurements to a designated surface location; providing alert and alarm signals; processing and cataloging atmospheric data; and, providing reports. Early-warning fire detection systems using newer technology that provides equal or greater protection, as determined by the Secretary, will be considered atmospheric monitoring systems for the purposes of this subpart.

Belt air course. The entry in which a belt is located and any adjacent entry(ies) not separated from the belt entry by permanent ventilation controls, including any entries in series with the belt entry, terminating at a return regulator, a section loading point, or the surface.

Carbon monoxide ambient level. The average concentration in parts per million (ppm) of carbon monoxide detected in an air course containing carbon monoxide sensors. This average concentration is representative of the composition of the mine atmosphere over a period of mining activity during non-fire conditions. Separate ambient levels may be established for different areas of the mine.

* * * * *

Point feeding. The process of providing additional intake air to the belt air course from another intake air course through a regulator.

* * * * *

■ 3. Revise § 75.350 to read as follows:

§ 75.350 Belt air course ventilation.

(a) The belt air course must not be used as a return air course; and except as provided in paragraph (b) of this section, the belt air course must not be used to provide air to working sections or to areas where mechanized mining equipment is being installed or removed.

(1) The belt air course must be separated with permanent ventilation controls from return air courses and from other intake air courses except as provided in paragraph (c) of this section.

(2) The maximum air velocity in the belt entry must be no greater than 500 feet per minute, unless otherwise approved in the mine ventilation plan.

(3) Air velocities must be compatible with all fire detection systems and fire suppression systems used in the belt entry.

(b) Air from a belt air course may be used to ventilate a working section or an area where mechanized mining equipment is being installed or removed, provided the following additional requirements are met:

(1) The belt entry must be equipped with an AMS that is installed, operated, examined, and maintained as specified in § 75.351.

(2) All miners must be trained annually in the basic operating principles of the AMS, including the actions required in the event of activation of any AMS alert or alarm signal. This training must be conducted prior to working underground in a mine that uses belt air to ventilate working sections or areas where mechanized mining equipment is installed or removed. It must be conducted as part of a miner's 30 CFR part 48 new miner training (§ 48.5), experienced miner training (§ 48.6), or annual refresher training (§ 48.8).

(3) The average concentration of respirable dust in the belt air course, an intake air course, must be maintained at or below 1.0 mg/m^3. A permanent designated area (DA) for dust measurements must be established at a point no greater than 50 feet upwind from the section loading point in the belt entry when the belt air flows over the loading point or no greater than 50

feet upwind from the point where belt air is mixed with air from another intake air course near the loading point. The DA must be specified and approved in the ventilation plan.

(4) The primary escapeway must be monitored for carbon monoxide or smoke as specified in § 75.351(f).

(5) The area of the mine with a belt air course must be developed with three or more entries.

(6) In areas of the mine developed after the effective date of this rule, unless approved by the district manager, no more than 50% of the total intake air, delivered to the working section or to areas where mechanized mining equipment is being installed or removed, can be supplied from the belt air course. The locations for measuring these air quantities must be approved in the mine ventilation plan.

(7) Lifelines that meet the requirements of § 75.380(n) must be provided if return entries are used as alternate escapeways.

(c) Notwithstanding the provisions of § 75.380(g), additional intake air may be added to the belt air course through a point-feed regulator. The location and use of point feeds must be approved in the mine ventilation plan.

(d) If the air through the point-feed regulator enters a belt air course which is used to ventilate a working section or an area where mechanized mining equipment is being installed or removed, the following conditions must be met:

(1) The air current that will pass through the point-feed regulator must be monitored for carbon monoxide or smoke at a point within 50 feet upwind of the point-feed regulator;

(2) The air in the belt air course must be monitored for carbon monoxide or smoke upwind of the point-feed regulator. This sensor must be in the belt air course within 50 feet of the mixing point where air flowing through the point-feed regulator mixes with the belt air;

(3) The point-feed regulator must be provided with a means to close the regulator from the intake air course without requiring a person to enter the crosscut where the point-feed regulator is located. The point-feed regulator must also be provided with a means to close the regulator from a location in the belt air course immediately upwind of the crosscut containing the point-feed regulator;

(4) A minimum air velocity of 300 feet per minute must be maintained through the point-feed regulator;

(5) The location(s) and use of a point-feed regulator(s) must be approved in the mine ventilation plan and shown on the mine ventilation map; and

(6) An AMS must be installed, operated, examined, and maintained as specified in § 75.351.

■ 4. Revise § 75.351 to read as follows:

§ 75.351 Atmospheric monitoring systems.

(a) *AMS operation.* Whenever personnel are underground and an AMS is used to fulfill the requirements of §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), the AMS must be operating and a designated AMS operator must be on duty at a location on the surface of the mine where audible and visual signals from the AMS must be seen or heard and the AMS operator can promptly respond to these signals.

(b) *Designated surface location and AMS operator.* When an AMS is used to comply with §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), the following requirements apply:

(1) The mine operator must designate a surface location at the mine where signals from the AMS will be received and two-way voice communication is maintained with each working section, with areas where mechanized mining equipment is being installed or removed, and with other areas designated in the approved emergency evacuation and firefighting program of instruction (§ 75.1502).

(2) The mine operator must designate an AMS operator to monitor and promptly respond to all AMS signals.

(3) A map or schematic must be provided at the designated surface location that shows the locations and type of AMS sensor at each location, and the intended air flow direction at these locations. This map or schematic must be updated within 24 hours of any change in this information.

(4) The names of the designated AMS operators and other appropriate personnel, including the designated person responsible for initiating an emergency mine evacuation under § 75.1501, and the method to contact these persons, must be provided at the designated surface location.

(c) *Minimum operating requirements.* AMSs used to comply with §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f) must:

(1) Automatically provide visual and audible signals at the designated surface location for any interruption of circuit continuity and any electrical malfunction of the system. These signals must be of sufficient magnitude to be seen or heard by the AMS operator.

(2) Automatically provide visual and audible signals at the designated surface location when the carbon monoxide concentration or methane concentration at any sensor reaches the alert level as specified in § 75.351(i). These signals must be of sufficient magnitude to be seen or heard by the AMS operator.

(3) Automatically provide visual and audible signals at the designated surface location distinguishable from alert signals when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in § 75.351(i). These signals must be of sufficient magnitude to be seen or heard by the AMS operator.

(4) Automatically provide visual and audible signals at all affected working sections and at all affected areas where mechanized mining equipment is being installed or removed when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in § 75.351(i). These signals must be of sufficient magnitude to be seen or heard by miners working at these locations. Methane signals must be distinguishable from other signals.

(5) Automatically provide visual and audible signals at other locations as specified in Mine Emergency Evacuation and Firefighting Program of Instruction (§ 75.1502) when the carbon monoxide, smoke, or methane concentration at any sensor reaches the alarm level as specified in § 75.351(i). These signals must be seen or heard by miners working at these locations. Methane alarms must be distinguishable from other signals.

(6) Identify at the designated surface location the operational status of all sensors.

(7) Automatically provide visual and audible alarm signals at the designated surface location, at all affected working sections, and at all affected areas where mechanized mining equipment is being installed or removed when the carbon monoxide level at any two consecutive sensors alert at the same time. These signals must be seen or heard by the AMS operator and miners working at these locations.

(d) *Location and installation of AMS sensors.* (1) All AMS sensors, as specified in §§ 75.351(e) through 75.351(h), must be located such that measurements are representative of the mine atmosphere in these locations.

(2) Carbon monoxide or smoke sensors must be installed near the center in the upper third of the entry, in a location that does not expose personnel working on the system to unsafe conditions. Sensors must not be located in abnormally high areas or in other

locations where air flow patterns do not permit products of combustion to be carried to the sensors.

(3) Methane sensors must be installed near the center of the entry, at least 12 inches from the roof, ribs, and floor, in a location that would not expose personnel working on the system to unsafe conditions.

(e) *Location of sensors—belt air course.* In addition to the requirements of paragraph (d) of this section, any AMS used to monitor belt air courses under § 75.350(b) must have sensors to monitor for carbon monoxide or smoke at the following locations:

(1) At or near the working section belt tailpiece in the air stream ventilating the belt entry. In longwall mining systems the sensor must be located upwind in the belt entry at a distance no greater than 150 feet from the mixing point where intake air is mixed with the belt air at or near the tailpiece;

(2) Upwind, a distance no greater than 50 feet from the point where the belt air course is combined with another air course or splits into multiple air courses;

(3) At intervals not to exceed 1,000 feet along each belt entry in areas where air velocities are maintained at 50 feet per minute or higher. In areas along each belt entry where air velocities are less than 50 feet per minute, the sensor spacing must not exceed 350 feet. All sensors must be installed at the 1,000-foot spacing no later than August 2, 2004.

(4) Not more than 100 feet downwind of each belt drive unit, each tailpiece transfer point, and each belt take-up. If the belt drive, tailpiece, and/or take-up for a single transfer point are installed together in the same air course they may be monitored with one sensor located not more than 100 feet downwind of the last component; and

(5) At other locations in any entry that is part of the belt air course as required and specified in the mine ventilation plan.

(f) *Locations of sensors—the primary escapeway.* When used to monitor the primary escapeway under § 75.350(b)(4), carbon monoxide or smoke sensors must be located in the primary escapeway within 500 feet of the working section and areas where mechanized mining equipment is being installed or removed. In addition, another sensor must be located within 500 feet inby the beginning of the panel. The point-feed sensor required by § 75.350(d)(1) may be used as the sensor at the beginning of the panel if it is located within 500 feet inby the beginning of the panel.

(g) *Location of sensors—return air splits.* (1) If used to monitor return air splits under § 75.362(f), a methane sensor must be installed in the return air split between the last working place, longwall or shortwall face ventilated by that air split, and the junction of the return air split with another air split, seal, or worked out area.

(2) If used to monitor a return air split under § 75.323(d)(1)(ii), the methane sensors must be installed at the following locations:

(i) In the return air course opposite the section loading point, or, if exhausting auxiliary fan(s) are used, in the return air course no closer than 300 feet downwind from the fan exhaust and at a point opposite or immediately outby the section loading point; and

(ii) Immediately upwind from the location where the return air split meets another air split or immediately upwind of the location where an air split is used to ventilate seals or worked-out areas.

(h) *Location of sensors—electrical installations.* When monitoring the intake air ventilating underground transformer stations, battery charging stations, substations, rectifiers, or water pumps under § 75.340(a)(1)(ii) or § 75.340(a)(2)(ii), at least one sensor must be installed to monitor the mine atmosphere for carbon monoxide or smoke, located downwind and not greater than 50 feet from the electrical installation being monitored.

(i) *Establishing alert and alarm levels.* An AMS installed in accordance with the following paragraphs must initiate alert and alarm signals at the specified levels, as indicated:

(1) For § 75.323(d)(1)(ii) alarm at 1.5% methane.

(2) For §§ 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), and 75.350(d), alert at 5 ppm carbon monoxide above the ambient level and alarm at 10 ppm carbon monoxide above the ambient level when carbon monoxide sensors are used; and alarm at a smoke optical density of 0.022 per meter when smoke sensors are used. Reduced alert and alarm settings approved by the district manager may be required for carbon monoxide sensors identified in the mine ventilation plan, § 75.371(nn).

(3) For § 75.362(f), alert at 1.0% methane and alarm at 1.5% methane.

(j) *Establishing carbon monoxide ambient levels.* Carbon monoxide ambient levels and the means to determine these levels must be approved in the mine ventilation plan (§ 75.371(hh)) for monitors installed in accordance with §§ 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), and 75.350(d).

(k) *Installation and maintenance.* An AMS installed in accordance with §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f) must be installed and maintained by personnel trained in the installation and maintenance of the system. The system must be maintained in proper operating condition.

(l) *Sensors.* Sensors used to monitor for carbon monoxide, methane, and smoke must be either of a type listed and installed in accordance with the recommendations of a nationally recognized testing laboratory approved by the Secretary; or these sensors must be of a type, and installed in a manner, approved by the Secretary.

(m) *Time delays.* When a demonstrated need exists, time delays may be incorporated into the AMS. These time delays must only be used to account for non-fire related carbon monoxide alert and alarm sensor signals. These time delays are limited to no more than three minutes. The use and length of any time delays, or other techniques or methods which eliminate or reduce the need for time delays, must be specified and approved in the mine ventilation plan.

(n) *Examination, testing, and calibration.* (1) At least once each shift when belts are operated as part of a production shift, sensors used to detect carbon monoxide or smoke in accordance with §§ 75.350(b), and 75.350(d), and alarms installed in accordance with § 75.350(b) must be visually examined.

(2) At least once every seven days, alarms for AMS installed in accordance with §§ 75.350(b), and 75.350(d) must be functionally tested for proper operation.

(3) At intervals not to exceed 31 days—

(i) Each carbon monoxide sensor installed in accordance with §§ 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), or 75.350(d) must be calibrated in accordance with the manufacturer's calibration specifications. Calibration must be done with a known concentration of carbon monoxide in air sufficient to activate the alarm;

(ii) Each smoke sensor installed in accordance with §§ 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), or 75.350(d) must be functionally tested in accordance with the manufacturer's calibration specifications;

(iii) Each methane sensor installed in accordance with §§ 75.323(d)(1)(ii) or 75.362(f) must be calibrated in accordance with the manufacturer's calibration specifications. Calibration must be done with a known concentration of methane in air sufficient to activate an alarm.

(iv) If the alert or alarm signals will be activated during calibration of sensors, the AMS operator must be notified prior to and upon completion of calibration. The AMS operator must notify miners on affected working sections, areas where mechanized mining equipment is being installed or removed, or other areas designated in the approved emergency evacuation and firefighting program of instruction (§ 75.1502) when calibration will activate alarms and when calibration is completed.

(4) Gases used for the testing and calibration of AMS sensors must be traceable to the National Institute of Standards and Technology reference standard for the specific gas. When these reference standards are not available for a specific gas, calibration gases must be traceable to an analytical standard which is prepared using a method traceable to the National Institute of Standards and Technology. Calibration gases must be within ±2.0 percent of the indicated gas concentration.

(o) *Recordkeeping.* (1) When an AMS is used to comply with §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), individuals designated by the operator must make the following records by the end of the shift in which the following event(s) occur:

(i) If an alert or alarm signal occurs, a record of the date, time, location and type of sensor, and the cause for the activation.

(ii) If an AMS malfunctions, a record of the date, the extent and cause of the malfunction, and the corrective action taken to return the system to proper operation.

(iii) A record of the seven-day tests of alert and alarm signals; calibrations; and maintenance of the AMS must be made by the person(s) performing these actions.

(2) The person entering the record must include their name, date, and signature in the record.

(3) The records required by this section must be kept either in a secure book that is not susceptible to alteration, or electronically in a computer system that is secure and not susceptible to alteration. These records must be maintained separately from other records and identifiable by a title, such as the 'AMS log.'

(p) *Retention period.* Records must be retained for at least one year at a surface location at the mine and made available for inspection by miners and authorized representatives of the Secretary.

(q) *Training.* All AMS operators must be trained annually in the proper operation of the AMS. A record of the content of training, the person conducting the training, and the date the training was conducted, must be maintained at the mine for at least one year by the mine operator.

(r) *Communications.* When an AMS is used to comply with § 75.350(b), a two-way voice communication system required by § 75.1600 must be installed in an entry that is separate from the entry in which the AMS is installed no later than August 2, 2004. The two-way voice communication system may be installed in the entry where the intake sensors required by §§ 75.350(b)(4) or 75.350(d)(1) are installed.

■ 5. Revise § 75.352 to read as follows:

§ 75.352 Actions in response to AMS malfunction, alert, or alarm signals.

(a) When a malfunction, alert, or alarm signal is received at the designated surface location, the sensor(s) that are activated must be identified and the AMS operator must promptly notify appropriate personnel.

(b) Upon notification of a malfunction, alert, or alarm signal, appropriate personnel must promptly initiate an investigation to determine the cause of the signal and take the required actions set forth in paragraphs (c), (d), or (e) of this section.

(c) If any sensor installed in accordance with §§ 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), or 75.350(d) indicates an alarm or if any two consecutive sensors indicate alert at the same time, the following procedures must be followed unless the cause of the signal(s) is known not to be a hazard to miners:

(1) Appropriate personnel must notify miners in affected working sections, in affected areas where mechanized mining equipment is being installed or removed, and at other locations specified in the § 75.1502 approved mine emergency evacuation and firefighting program of instruction; and

(2) All personnel in the affected areas, unless assigned other duties under § 75.1502, must be withdrawn promptly to a safe location identified in the mine emergency evacuation and firefighting program of instruction.

(d) If there is an alert or alarm signal from a methane sensor installed in accordance with §§ 75.323(d)(1)(ii) and 75.362(f), an investigation must be initiated to determine the cause of the signal, and the actions required under § 75.323 must be taken.

(e) If any fire detection components of the AMS malfunction or are inoperative, immediate action must be taken to return the system to proper operation. While the AMS component repairs are being made, operation of the belt may continue if the following conditions are met:

(1) If one AMS sensor malfunctions or becomes inoperative, a trained person must continuously monitor for carbon monoxide or smoke at the inoperative sensor.

(2) If two or more adjacent AMS sensors malfunction or become inoperative, a trained person(s) must patrol and continuously monitor for carbon monoxide or smoke so that the affected areas will be traveled each hour in their entirety, or a trained person must be stationed to monitor at each inoperative sensor.

(3) If the complete AMS malfunctions or becomes inoperative, trained persons must patrol and continuously monitor for carbon monoxide or smoke so that the affected areas will be traveled each hour in their entirety.

(4) The trained person(s) monitoring under this section must, at a minimum, have two-way voice communication capabilities with the AMS operator at intervals not to exceed 2,000 feet and report contaminant levels to the AMS operator at intervals not to exceed 60 minutes.

(5) The trained person(s) monitoring under this section must report immediately to the AMS operator any concentration of the contaminant that reaches either the alert or alarm level specified in § 75.351(i), or the alternate alert and alarm levels specified in paragraph (e)(7) of this section, unless the source of the contaminant is known not to present a hazard.

(6) Detectors used to monitor under this section must have a level of detectability equal to that required of the sensors in § 75.351(l).

(7) For those AMSs using sensors other than carbon monoxide sensors, an alternate detector and the alert and alarm levels associated with that detector must be specified in the approved mine ventilation plan.

(f) If the 50-foot per minute minimum air velocity is not maintained when required under § 75.351(e)(3), immediate action must be taken to return the ventilation system to proper operation. While the ventilation system is being corrected, operation of the belt may continue only while a trained person(s) patrols and continuously monitors for carbon monoxide or smoke as set forth in §§ 75.352(e)(3) through (7), so that the affected areas will be traveled each hour in their entirety.

■ 6. Redesignate § 75.371 paragraphs (ii) through (pp) to be paragraphs (qq) through (xx) and add new paragraphs (ii) through (pp) to read as follows:

§ 75.371 Mine ventilation plan; contents.

* * * * *

(ii) The locations (designated areas) where dust measurements would be made in the belt entry when belt air is used to ventilate working sections or areas where mechanized mining equipment is being installed or removed, in accordance with § 75.350(b)(3).

(jj) The locations where velocities in the belt entry exceed limits set forth in § 75.350(a)(2), and the maximum approved velocity for each location.

(kk) The locations where air quantities are measured as set forth in § 75.350(b)(6).

(ll) The locations and use of point-feed regulators, in accordance with §§ 75.350(c) and 75.350(d)(5).

(mm) The location of any additional carbon monoxide or smoke sensor installed in the belt air course, in accordance with § 75.351(e)(5).

(nn) The length of the time delay or any other method used to reduce the number of non-fire related alert and alarm signals from carbon monoxide sensors, in accordance with § 75.351(m).

(oo) The reduced alert and alarm settings for carbon monoxide sensors, in accordance with § 75.351(i)(2).

(pp) The alternate detector and the alert and alarm levels associated with the detector, in accordance with § 75.352(e)(7).

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■ 7. Amend § 75.372 by revising paragraph (b)(16) to read as follows:

§ 75.372 Mine ventilation map.

* * * * *

(b) * * *

(16) The locations and type of all AMS sensors required by subpart D of this part.

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■ 8. Amend § 75.380, by revising paragraph (g) and adding paragraph (n) to read as follows:

§ 75.380 Escapeway; bituminous and lignite mines.

* * * * *

(g) Except where separation of belt and trolley haulage entries from designated escapeways did not exist before November 15, 1992, and except as provided in § 75.350(c), the primary escapeway must be separated from belt and trolley haulage entries for its entire length, to and including the first connecting crosscut outby each loading point except when a greater or lesser distance for this separation is specified and approved in the mine ventilation plan and does not pose a hazard to miners.

* * * * *

(n) Alternate escapeways that are ventilated with return air from working sections or areas where mechanized mining equipment is being installed or removed that are ventilated with belt air in accordance with § 75.350(b) must be provided with a directional lifeline that must be:

(1) Installed from the working sections or areas where mechanized mining equipment is being installed or removed continuous to the surface escape drift opening or continuous to the escape shaft or slope facilities to the surface or to where this escapeway enters into intake air.

(2) Made of durable material.

(3) Marked with a reflective material every 25 feet.

(4) Located in such a manner for miners to use effectively to escape.

(5) Have directional indicators, signifying the route of escape, placed at intervals not exceeding 100 feet.

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