

Proximity Detection Systems for Continuous Mining Machines in Underground Coal Mines

Summary

The Mine Safety and Health Administration's (MSHA) final rule requires underground coal mine operators to equip continuous mining machines, except full-face continuous mining machines, with proximity detection systems. Miners working near continuous mining machines face pinning, crushing, and striking hazards that result in accidents involving life-threatening injuries and death. This final rule strengthens protections for miners by reducing the potential for pinning, crushing, or striking accidents in underground coal mines.

DATES:

Effective date: The final rule is effective March 16, 2015.

Compliance dates:

- Continuous mining machines manufactured after March 16, 2015 must meet requirements no later than November 16, 2015.
- Continuous mining machines manufactured and equipped with a proximity detection system on or before March 16, 2015 must meet requirements no later than September 16, 2016.
- Continuous mining machines manufactured and not equipped with a proximity detection system on or before March 16, 2015 must meet requirements no later than March 16, 2018.

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Availability of Information

Federal Register Publications: Access rulemaking documents electronically at <http://www.msha.gov/regsinfo.htm> or <http://www.regulations.gov> [Docket No. MSHA-2010-0001]. Obtain a copy of a rulemaking document from the Office of Standards, Regulations, and Variances, MSHA, by request to 202-693-9440 (voice) or 202-693-9441 (facsimile). (These are not toll-free numbers.)

Information Collection Supporting Statement: The Information Collection Supporting Statement is available at <http://www.reginfo.gov/public/do/PRAMain>. A copy of the Statement is also available from MSHA by request to Sheila McConnell at mcconnell.sheila.a@dol.gov, by phone request to 202-693-9440, or by facsimile to 202-693-9441.

Regulatory Economic Analysis (REA): MSHA will post the REA on <http://www.regulations.gov> and on MSHA's Web site at <http://www.msha.gov/rea.htm>. A copy of the REA also can be obtained from MSHA by request to Sheila McConnell at mcconnell.sheila.a@dol.gov, by phone request to 202-693-9440, or by facsimile to 202-693-9441.

Email notification: To subscribe to receive email notification when the Agency publishes rulemaking documents in the Federal Register, go to <http://www.msha.gov/subscriptions/subscribe.aspx>.

I. Introduction

The final rule requires mine operators to install proximity detection systems on continuous mining machines, except full-face continuous mining machines, in underground coal mines according to a phase-in schedule for newly manufactured and in-service equipment. A proximity detection system consists of machine-mounted components and any miner-wearable components. For proximity detection systems with miner-wearable components, the mine operator must provide a miner-

wearable component to be worn by each miner on the working section (including producing or maintenance shifts). The final rule establishes performance and maintenance requirements for proximity detection systems and requires training for persons performing the installation and maintenance. These requirements will strengthen protections for miners by reducing the potential for pinning, crushing, or striking accidents that result in fatalities and injuries to miners who work near continuous mining machines.

A. Regulatory Authority

This final rule is issued under section 101 of the Federal Mine Safety and Health Act of 1977 (Mine Act), as amended.

B. Background

Proximity detection is a technology that uses electronic sensors to detect motion or the location of one object relative to another. Proximity detection systems can provide a warning and stop mining machines before a pinning, crushing, or striking accident occurs that could result in injury or death to a miner. Miners are exposed to hazards from working near continuous mining machines in the confined space of an underground coal mine. Conditions in underground coal mines that contribute to these hazards include limited visibility, limited space around continuous mining machines, and uneven and slippery ground conditions that may contain loose rock or other debris.

To assess the costs and benefits of the final rule, MSHA conducted a review of fatal and nonfatal pinning, crushing, and striking accidents, which occurred in underground coal mines from 1984 through 2013, to identify those that could have been prevented by using a proximity detection system. Of the 75 preventable fatalities resulting from pinning, crushing, and striking accidents, 34 were associated with continuous mining machines. During this same time period, MSHA estimates that the use of a proximity detection system could have prevented approximately 238 nonfatal injuries associated with continuous mining machines, excluding full-face continuous mining machines. From 2010 through 2013, six underground coal miners working in close proximity to continuous mining machines died from pinning, crushing, or striking accidents.

These accidents continue to occur. In February 2014, a miner was fatally crushed by a continuous mining machine. Proximity detection systems are needed because training and outreach initiatives alone, while helpful, have not prevented these accidents from continuing to occur. These accidents are preventable and the proximity detection systems can provide necessary protections for miners.

There are four proximity detection systems approved under the existing regulations for permissibility in **30 CFR part 18**. These approvals are intended to ensure that the systems will not introduce an ignition hazard when operated in potentially explosive atmospheres. MSHA's approval regulations in **30 CFR part 18** do not address how systems will perform in reducing pinning, crushing, or striking hazards.

MSHA estimates that approximately 438 of the 863 continuous mining machines in underground coal mines are not currently equipped with proximity detection systems. MSHA monitors the installation and development of proximity detection systems to maintain information on the number of proximity detection systems in use and the capabilities of the various systems. As of January

2015, 425 continuous mining machines were equipped with proximity detection systems and are being used in underground coal mines. MSHA believes the majority of these systems will meet the provisions of this final rule without much change. For example, continuous mining machines equipped with proximity detection systems may only need modification of the warning signals to meet the requirements in this final rule.

For those continuous mining machines not equipped with a proximity detection system, the phase-in schedule provides time for mine operators to schedule installation of proximity detection systems during planned rebuilds. MSHA anticipates that mine operators will equip continuous mining machines with proximity detection systems during the first planned rebuild that occurs prior to March 16, 2018.

MSHA published a Request for Information (RFI) on proximity detection systems in the Federal Register on February 1, 2010 ([75 FR 5009](#)) and a proposed rule on August 31, 2011 ([76 FR 54163](#)). The Agency held four public hearings. The comment period closed November 28, 2011. MSHA received comments from miners, mining associations, mining companies, manufacturers, and a federal government agency. Comments related to provisions of the final rule are addressed in the following section-by-section analysis.

II. Section-by-Section Analysis

A. § 75.1732(a) Machines Covered

Final § 75.1732(a) requires operators to equip continuous mining machines, except full-face continuous mining machines, with proximity detection systems according to a phase-in schedule. For proximity detection systems with miner-wearable components, the mine operator must provide a miner-wearable component to be worn by each miner on the working section. Together, the machine-mounted components and any miner-wearable components make up the overall proximity detection system.

Most commenters supported the use of proximity detection technology and stated that proximity detection systems are available for use on continuous mining machines. Some commenters, however, stated that MSHA should not require proximity detection systems until MSHA can assure that systems are safe and effective. A commenter stated that no proximity detection system has proven to be reliable and effective enough in an underground coal mine to be used as a safety device.

Proximity detection systems are available and are in use with continuous mining machines. MSHA has determined that working near continuous mining machines in underground coal mines exposes miners to dangers that have resulted in preventable injuries and fatalities. MSHA's experience with testing and demonstration of the four available systems shows that they are sufficiently developed to be used with continuous mining machines and perform effectively.

Final § 75.1732(a), like the proposal, requires proximity detection systems to be installed on continuous mining machines, which include both on-board operated and remote-controlled continuous mining machines, except for full-face continuous mining machines.

A full-face continuous mining machine includes integral roof bolting equipment and develops the full width of the mine entry in a single cut, generally without having to change its location.

Some commenters stated that persons working around full-face continuous mining machines should be required to use a proximity detection system for tramming because tramming a full-face continuous mining machine can put miners at risk. One commenter stated that proximity detection systems are not needed on full-face continuous mining machines because they are much larger and slower than place-changing continuous mining machines and there are few, if any, crushing injuries caused by normal movement. Other commenters stated that the final rule should also require the use of proximity detection systems on shuttle cars, loading machines, scoops, bolters, and other equipment.

After considering comments, the final rule, like the proposal, does not require mine operators to equip full-face continuous mining machines with proximity detection systems. The Agency has not found any history of accidents involving full-face continuous mining machines and there is limited experience with proximity detection systems on these machines.

The final rule does not require that operators equip other mobile machines with proximity detection systems. MSHA is addressing the use of proximity detection systems on other mobile machines in a separate rulemaking (RIN [1219-AB78](#)).

Final § 75.1732(a), unlike the proposal, requires that, for proximity detection systems with miner-wearable components, the mine operator must provide a miner-wearable component to be worn by each miner on the working section.

In the proposal, MSHA solicited comments on which miners working around continuous mining machines should be required to have a miner-wearable component. In the preamble to the proposal, MSHA noted that the cost estimates for the miner-wearable components included in the Preliminary Regulatory Economic Analysis (PREA) were based on miners on the working section being equipped with these components. MSHA estimated that, on average, there are seven miners on the working section and they would be provided with miner-wearable components.

Several commenters stated that any miner on the working section should be required to wear a miner-wearable component. One commenter stated that only miners who interact closely with the continuous mining machine on a daily basis should wear a miner-wearable component. This commenter noted that only the continuous mining machine operator, helper/cable handler, and maintenance personnel working on an energized continuous mining machine were fatally injured in the pinning, crushing, and striking accidents involving continuous mining machines.

Each of the four proximity detection systems approved for underground coal mines in the United States uses a miner-wearable component to determine distance between the machine and a miner. These systems cannot detect a miner who is not wearing the component and, therefore, could not stop the machine before contacting such miners.

After considering the comments, MSHA determined that all miners on a working section where the continuous mining machine is equipped with a proximity detection system must wear a miner-wearable component. Under the final rule, the mine operator must provide a miner-wearable

component to be worn by each miner on the working section (including production and maintenance shifts).

In MSHA's experience, most operators who move continuous mining machines outby the working section generally use miners from the working section who would be protected by the proximity detection system. MSHA anticipates that this industry practice would continue after the final rule goes into effect.

A commenter stated that some proximity detection systems have limited ability to function properly with more than two miner-wearable components. MSHA has observed two proximity detection systems functioning properly with multiple miner-wearable components in use on the working section, demonstrating that proximity detection systems can function properly with more than two miner-wearable components. MSHA is aware that, in the past, a system has experienced some adverse effects when two or more miner-wearable components were near the machine. The adverse effects were unintended expansion of the warning and stop distances, but these effects would not prevent the system from meeting the requirements of the final rule (*e.g.*, to stop before contacting a miner). MSHA has found that advances in the technology now allow proximity detection systems to function properly with more than two miners on the working section without any adverse effects.

MSHA proposed a phase-in schedule of 3 months for continuous mining machines (except full-face continuous mining machines) manufactured after the publication date of a final rule and 18 months for machines (except full-face continuous mining machines) manufactured on or before the publication date of a final rule. Although not separately discussed under the proposal, machines equipped with a proximity detection system prior to the publication date of a final rule would have been subject to the 18-month phase-in schedule for continuous mining machines manufactured before the publication date.

Final § 75.1732(a)(1) requires continuous mining machines manufactured after March 16, 2015 to meet the requirements in this section no later than November 16, 2015. These machines must meet the requirements in this section when placed in service with a proximity detection system.

Final § 75.1732(a)(2) requires continuous mining machines manufactured and equipped with a proximity detection system on or before March 16, 2015 to meet the requirements in this section no later than September 16, 2016.

Final § 75.1732(a)(3) requires continuous mining machines manufactured and not equipped with a proximity detection system on or before March 16, 2015 to meet the requirements in this section no later than March 16, 2018. These machines must meet the requirements in this section when placed in service with a proximity detection system. A continuous mining machine is placed in service when it is equipped with a proximity detection system and placed in the underground coal mine.

MSHA solicited comments on the proposed phase-in schedule of 3 months for new machines and 18 months for in-service machines.

One commenter supported the proposed phase-in schedule of 3 months for new machines. Several commenters stated additional time is needed for new machines and suggested 6 months. A commenter stated that additional time was needed to develop manuals, train miners, and validate

installations. Some commenters also stated that the proposed schedule was not sufficient to allow for the required MSHA approvals.

One commenter supported the proposed phase-in schedule of 18 months for machines manufactured before the effective date of the rule. Many commenters stated that the proposed phase-in schedule was insufficient to provide for installation of proximity detection systems on continuous mining machines. These commenters stated that additional time is necessary to allow mine operators to equip continuous mining machines manufactured before the effective date of the rule with proximity detection systems during scheduled rebuilds. Most commenters stated that retrofitting these machines on the surface is necessary to assure the quality of the installations. One commenter, however, has experience installing proximity detection systems underground and on the surface and provided estimated timeframes for installation underground, on the surface of a mine, and at the manufacturer or rebuild facility. Commenters generally recommended a 36-month timeframe before requiring installation for in-service machines. Some commenters suggested 24 months, while others suggested 48 months. MSHA agrees that it will take more time than proposed for proximity detection system manufacturers, machine manufacturers, and mine operators to obtain approval under **30 CFR part 18**, and for manufacturers to produce and mine operators to install proximity detection systems.

MSHA has determined that the longer phase-in schedules in the final rule provide an appropriate amount of time for operators to engage in the necessary actions to comply with the final rule. This is based on the availability of four MSHA-approved proximity detection systems for continuous mining machines, the estimated number of continuous mining machines that would be replaced by newly manufactured machines during the phase-in period, manufacturers' capacity to produce and install proximity detection systems on machines in use, and comments received in response to the proposed rule. The compliance dates provide time for manufacturers to produce and install proximity detection systems, for mine operators to modify their existing proximity detection systems, and for mine operators to train their workforce.

MSHA considers the date of manufacture as the date identified on the machine or otherwise provided by the manufacturer. MSHA considers a continuous mining machine to be equipped with a proximity detection system when the machine-mounted components are installed on the machine and miners are provided with the miner-wearable components.

Mine operators that obtain continuous mining machines manufactured after March 16, 2015 must comply no later than November 16, 2015. MSHA believes that these machines can be equipped with proximity detection systems during the manufacturing process. This compliance date provides time for manufacturers and mine operators to modify any MSHA approvals, if necessary; provide miners with miner-wearable components; and provide training to meet the requirements of this final rule. Continuous mining machines manufactured and equipped with the machine-mounted components of a proximity detection system after March 16, 2015 must meet the requirements of the final rule when placed in service. MSHA believes it is important for continuous mining machines equipped with a proximity detection system to meet the final rule's requirements when placed in service to assure that miners are protected from pinning, crushing, and striking hazards.

As stated earlier, under the proposal, continuous mining machines in use in underground coal mines and equipped with proximity detection systems prior to the publication date of a final rule would

have been subject to the proposed 18-month phase-in schedule for continuous mining machines manufactured before the publication date. A phase-in schedule for this group of machines was not discussed separately in the proposal, as there were a limited number of continuous mining machines equipped with proximity detection systems in service in the United States when the proposal was published. However, as of January 2015, MSHA estimates that 425 continuous mining machines in use in underground coal mines were equipped with proximity detection systems.

This final rule provides 18 months after March 16, 2015 for mine operators to make modifications to the existing proximity detection systems on these machines. MSHA has determined that 18 months provides operators with enough time to obtain any MSHA approvals, to modify continuous mining machines that are equipped with a proximity detection system to meet the requirements, and to provide training. MSHA believes the majority of these machines will comply with the provisions of this final rule without much change to the systems. For example, continuous mining machines equipped with proximity detection systems may only need modification of the warning signals to meet the requirements of this final rule. MSHA expects that the systems can be modified during maintenance shifts while the machine is underground.

Most continuous mining machines equipped with proximity detection systems are operating with one miner-wearable component. This component is for the machine operator. To meet the requirements of the final rule, mine operators will need to provide miner-wearable components to additional miners on the working section.

MSHA proposed an 18-month phase-in schedule for machines manufactured before the publication date of the final rule. MSHA has determined that allowing up to 36 months after March 16, 2015 provides both operators and manufacturers with enough time to retrofit the continuous mining machines manufactured on or before March 16, 2015. MSHA recognizes that machines that are in use when the final rule goes into effect will need to be taken out of use for a period of time. The longer phase-in schedule under the final rule provides mine operators time to complete the installation during planned rebuilds or scheduled maintenance and provides time to train the workforce on proximity detection systems. MSHA anticipates that mine operators will equip continuous mining machines with proximity detection systems during the first planned rebuild that occurs prior to March 16, 2018.

Once these continuous mining machines are retrofitted with a proximity detection system, mine operators must meet the requirements of the final rule when these machines are placed in service to assure that miners are protected from pinning, crushing, and striking hazards.

MSHA acknowledges that it will take some time for operators and manufacturers to obtain MSHA approvals to equip continuous mining machines with proximity detection systems. MSHA must approve miner-wearable components and continuous mining machines with machine-mounted components of a proximity detection system as permissible equipment under existing regulations in **30 CFR part 18**. The three methods to obtain MSHA approval to add the machine-mounted components of a proximity detection system to a continuous mining machine are: (1) A continuous mining machine manufacturer can apply for a Revised Approval Modification Program (RAMP) approval; (2) a mine operator can apply to the Approval and Certification Center (A&CC) for a field modification; or (3) a mine operator can notify the MSHA district manager through a district field change application.

MSHA offers an optional Proximity Detection Acceptance (PDA) program which allows a proximity detection system manufacturer to obtain MSHA acceptance for the machine-mounted components of a proximity detection system (PDA Acceptance Number). This acceptance states that the machine-mounted components of the proximity detection system have been evaluated under **30 CFR part 18** and are suitable for installation on an MSHA-approved machine. It permits the manufacturer or owner of a machine to add the machine-mounted components of a proximity detection system to a machine by requesting MSHA approval to add the acceptance number to the machine approval. MSHA believes the phase-in schedule in the final rule provides the time needed to obtain MSHA approval or acceptance.

The phase-in schedule under the final rule also allows time for the mine operators to train miners on how to use proximity detection systems. Mine operators, under existing **30 CFR part 48**, must provide miners with new task training. MSHA intends that mine operators will address safety issues, such as some machines being equipped with proximity detection systems while others are not, that might arise during the phase-in period.

Some commenters stated that the final rule should not include additional or redundant training requirements. One commenter stated that initial training (new task training) and retraining should be separate from **30 CFR part 48** annual retraining requirements. This commenter also stated that retraining on proximity detection systems should be performed at least quarterly.

Commenters stated that training should include a combination of classroom and hands-on training and that MSHA should consider a cold-start period (*i.e.*, using a proximity detection system without an active stop function) to allow miners to become familiar with how proximity detection systems function. A commenter stated that, during a cold-start period, the stopping function is not yet active, which facilitates employee interpretation and exploration of the system and identification of possible variations to normal safe operating procedures. Commenters stated that training should be provided to all miners who may come in contact with a continuous mining machine.

Miners working near continuous mining machines equipped with proximity detection systems will engage in different and unfamiliar machine operating procedures resulting from new work positions, machine movements, and new visual and audible signals. Training on proximity detection systems, other than for installing and maintaining systems, is required under existing **30 CFR part 48**. Existing § 48.7(a) requires that miners assigned to new work tasks as mobile equipment operators not perform new work tasks until training has been completed. In addition, § 48.7(c) requires that miners assigned a new task not covered in § 48.7(a) be instructed in the safety and health aspects and safe work procedures of the task prior to performing the task. Miners working near continuous mining machines equipped with proximity detection systems will receive new task training on the operation of the newly equipped machine and the miner-wearable components. New task training could include: General proximity detection system operation during tramming, cutting, and loading; warning and stop zone size and shape; response to warning signals; response to system malfunction; and re-charging miner-wearable components.

New task training is separate from new miner training under existing § 48.5 and annual refresher training under existing § 48.8. New task training helps assure that miners have the necessary skills to perform new tasks prior to assuming responsibility for these tasks. Mine operators should assure that training on proximity detection systems includes hands-on training during supervised non-

production activities. The hands-on training allows miners to experience how the systems work and to determine the appropriate work locations. Based on Agency experience, hands-on training is most effective when provided in miners' work locations. As required by existing § 48.7(a)(3), machine operators must be instructed in safe operating procedures applicable to new or modified machines to be installed or put into operation in the mine, which require new or different operating procedures.

New task training cannot include cold-start training underground after the relevant compliance date because the system must meet the requirements of the final rule at that time (*e.g.*, stop the machine before contacting a miner, provide audible and visual warning signals).

B. § 75.1732(b) Requirements for a Proximity Detection System

Final § 75.1732(b) establishes requirements for proximity detection systems. A proximity detection system includes machine-mounted components and miner-wearable components.

Final § 75.1732(b)(1) requires that a proximity detection system cause a machine, which is tramming from place-to-place or repositioning, to stop before contacting a miner except for a miner who is in the on-board operator's compartment. This provision is changed from proposed § 75.1732(b)(1) that would have required that a proximity detection system cause a machine to stop no closer than 3 feet from a miner.

MSHA solicited comments on the proposed 3-foot stopping distance and on alternatives such as other specific stopping distances or a performance-based requirement. Performance-based requirements focus on attaining objectives, such as stopping a machine before contacting a miner, rather than being prescriptive in how the result is achieved, such as stopping within a certain distance. Some commenters stated that the Agency's proposal to require the machine to stop no closer than 3 feet from a miner would not provide flexibility to allow for mine- and machine-specific conditions. They stated that there were too many variables to be able to assure that the machine will stop consistently before getting to 3 feet from a miner. According to these commenters, these variables include the imprecision of electromagnetic technology, mine conditions, and machine relay activation time. Commenters stated that MSHA should consider a performance-based approach. One commenter, however, agreed that a proximity detection system should cause a machine to stop no closer than 3 feet from a miner.

The National Institute for Occupational Safety and Health (NIOSH) recommended that MSHA use a performance-based approach because the requirement to stop the machine no closer than 3 feet from a miner would limit future technological innovations that could improve miner safety. NIOSH stated that future "intelligent" systems, those that monitor workers' positions and disable only unsafe movement, may not require the entire machine to stop; rather they could restrict certain motions of the machine. NIOSH stated that there are several advantages to restricting certain motions of the machine including decreased nuisance shut-downs; flexibility in operator position when close proximity to the machine is needed; flexibility in operator position to avoid other hazards; and increased safety and productivity.

MSHA's experience with testing and observing proximity detection systems indicates that causing a machine to stop before contacting a miner provides the required performance and appropriate protection. A performance-based approach allows mine operators and manufacturers to address

mine- and machine-specific conditions when determining the appropriate settings for the proximity detection system. Specific conditions include steep or slippery roadways, tramming speed of machinery, location of the miner-wearable component, and the accuracy of the proximity detection system. Mine operators are responsible for programming a proximity detection system to initiate the stop movement function at an appropriate distance from a miner to assure that the machine stops before it can contact a miner.

The final rule requires that a proximity detection system cause a continuous mining machine to stop before contacting a miner. Stopping a continuous mining machine consists of stopping the tramming and conveyor swing movements that could cause the machine to contact a miner. The machine must remain stopped while any miner is within the programmed stop zone.

Commenters stated that a proximity detection system should only stop the tram and conveyor boom swing movements and not de-energize the entire continuous mining machine.

Unexpected tramming and conveyor boom swing movements can be hazardous. Many pinning, crushing, and striking accidents occur as a result of continuous mining machine tram or conveyor boom swing functions. MSHA has determined that it is unnecessary to shut down the machine to stop all machine movement because miners are protected by stopping the tramming and conveyor swing movements. Shutting down the machine causes stress on machine components. The requirement to stop tram and conveyor boom swing movements that could contact a miner does not prohibit the use of proximity detection systems that can pinpoint a miner's location and prevent machine movements accordingly.

Final § 75.1732(b)(1) requires that the proximity detection system cause a machine, which is tramming from place-to-place or repositioning, to stop before contacting a miner except for a miner who is in the on-board operator's compartment. The final rule, like proposed § 75.1732(b)(1)(i), allows machines equipped with a proximity detection system to move if the only miner in proximity occupies the operator's compartment. MSHA did not receive comments on proposed § 75.1732(b)(1)(i).

Final § 75.1732(b)(1) does not include proposed § 75.1732(b)(1)(ii), which would have provided an exception for a miner who is remotely operating a continuous mining machine while cutting coal or rock. The proposal would have required the machine to stop before contacting the machine operator. Commenters stated that the proposed requirement would force miners to stand in a location with a significantly higher risk of being struck by a shuttle car while cutting or loading or turning a crosscut. Other commenters stated that the proximity detection system should allow a continuous mining machine operator to be located behind the rear bumper and adjacent to the conveyor boom when cutting or loading. One commenter has experience deactivating the proximity detection system when cutting or loading. Another commenter stated that there is no history of accidents during cutting or loading. Another commenter stated that a zone must be provided to prevent forcing the continuous mining machine operator out of a safe area and into the hazardous area around another piece of equipment particularly, shuttle cars, ram cars, loading machines, and scoops.

NIOSH recommended eliminating § 75.1732(b)(1)(ii) as proposed. NIOSH and other commenters stated there is no means currently available in the MSHA-approved proximity detection systems for determining whether the continuous mining machine is cutting coal/rock or only running the cutter

drum. NIOSH and other commenters also stated that other activities may require an operator or miner to be closer than 3 feet to the continuous mining machine, such as positioning the conveyor boom over the shuttle car or activating certain machine functions during maintenance.

MSHA reviewed an internal study conducted in 2002 in which MSHA studied the location of the remote-controlled continuous mining machine operator relative to the machine during production and while tramming. This internal study was included in the record for public review and comment. MSHA found that using a proximity detection system during cutting would be impractical due to where the continuous mining machine operator has to stand to safely operate the machine. The use of the proximity detection system on the continuous mining machine during cutting of coal may place the operator in the path of other equipment. The study concluded that the proximity detection system should be activated while tramming but not be activated while cutting.

MSHA agrees with commenters who identified situations during cutting when the proposed requirement, in some circumstances, may cause miners to stand in a location with a higher risk of being struck by a coal hauling machine. The continuous mining machine was tramming from place-to-place or repositioning in all 34 fatal accidents (those occurring in 1984 through 2013) that could have been prevented by the use of proximity detection systems. MSHA recognizes that there are certain mining operations where continuous mining machine operators must get close to the machine to properly perform the required tasks (*e.g.*, turning crosscuts).

Under the final rule, mine operators must use proximity detection systems that will cause a continuous mining machine, which is tramming from place-to-place or repositioning, to stop before contacting a miner (except for a miner who is in an on-board operator's compartment). Tramming from place-to-place includes moving the machine from one working face to another (*i.e.*, place-changing). Repositioning includes moving from one side of a cut to the other (commonly called setting over) and also includes cleaning up loose coal or rock when not cutting.

The final rule does not require that a proximity detection system provide a warning or stop the continuous mining machine when it is cutting coal or rock. This includes when the cutter head is used to clean up coal or rock, such as after a roof fall. MSHA intends that the proximity detection system be operational and function properly at all times when the continuous mining machine is in use. However, it is not required to provide a warning or stop machine movement when the continuous mining machine is cutting coal or rock.

In MSHA's experience, when a continuous mining machine is cutting coal or rock, the machine moves slower, reducing the hazard. This reduced hazard is reflected by the absence of fatal accidents when continuous mining machines are cutting. MSHA recognizes that if the continuous mining machine operator is forced away from the machine, the operator may be exposed to other hazards. The final rule is changed from the proposal to allow miners to work in close proximity to the continuous mining machine when it is cutting coal or rock to avoid hazards related to other mobile machines.

Based on NIOSH recommendations, comments received, and MSHA experience, MSHA is requiring proximity detection systems to cause a machine, when tramming from place-to-place or repositioning, to stop before contacting a miner. An exception is provided when relocating a

continuous mining machine from an unsafe location for repair when a machine-mounted component of a proximity detection system is not functioning properly.

Final § 75.1732(b)(2) is changed from the proposal and requires that a proximity detection system provide an audible and a visual warning signal on the miner-wearable component and a visual warning signal on the machine that alert miners before the system causes a machine to stop. These warning signals must be distinguishable from other signals. The proposal would have required either an audible or visual warning signal, distinguishable from other signals, when the machine is 5 feet and closer to a miner.

One commenter stated that both an audible and visual warning is necessary when the continuous mining machine is 5 feet and closer to the miner.

After considering comments, MSHA determined that a proximity detection system must provide both an audible and visual warning signal to any miner who may be in proximity to the continuous mining machine. This provides an added margin of safety because audible signals may not always be heard and visual signals may not always be seen.

The audible and visual warnings provided by miner-wearable components allow the miner wearing the component to move away from the machine before the proximity detection system causes the machine to stop. The visual warning provided on the machine alerts the machine operator as well as all miners near the machine.

Several commenters recommended a performance-based warning signal requirement. One commenter stated that warning signals are critical to the implementation of a proximity detection system, but that a 5-foot warning is not practical for all mining conditions. This commenter stated that the existing proximity detection technology cannot guarantee a set distance from a person where the proximity detection system would provide a warning due to electromagnetic variability and environmental conditions. Several commenters stated that a warning signal is unnecessary and may be a nuisance.

MSHA agrees with commenters who stated that a warning signal requirement should be performance-based rather than the 5-foot distance in the proposal. A performance-based approach allows mine operators and manufacturers to address mine- and machine-specific conditions, tramming speed of machinery, location of the miner-wearable component, and accuracy of the proximity detection system when determining the appropriate settings for triggering warnings. MSHA anticipates that mine operators and manufacturers will program a proximity detection system to provide warnings at a distance that will allow the miner to move away before the proximity detection system causes the machine to stop.

Final § 75.1732(b)(2) does not include proposed paragraphs (i), the exception to provide a warning signal for a miner who is in an on-board operator's compartment, and (ii), the exception to provide a warning signal for a miner who is remotely operating a continuous mining machine while cutting coal or rock. The proposed paragraphs are not needed because final § 75.1732(b)(1) requires a proximity detection system to cause a machine, which is tramming from place-to-place or repositioning, to stop before contacting a miner. For the reasons noted above, this final rule does not require the proximity detection system to cause a machine to stop before contacting a miner when

cutting coal or rock as proposed. The exceptions are not needed. Final § 75.1732(b)(2) is performance-based and requires audible and visual warning signals before causing a machine to stop.

Final § 75.1732(b)(3), like the proposal, requires that a proximity detection system provide a visual signal on the machine that indicates the machine-mounted components are functioning properly.

A commenter stated that this provision should be removed because the signal could give miners a false sense of security. Another commenter stated that a proximity detection system should include a diagnostic function that provides a visual signal that the system is working properly. This commenter stated that a visual signal will allow miners to readily determine that the system is functioning properly and recommended that the signal be located where a miner can observe it from all work locations.

MSHA agrees that the required visual signal allows miners to readily determine that the machine-mounted components of a proximity detection system are functioning properly. A light-emitting diode (LED) would be an acceptable visual signal. The signal indicates that the machine-mounted components are working properly.

A commenter stated that MSHA should clarify the term functioning properly. MSHA considers the proximity detection system to be functioning properly when the system is working as designed and will: Cause the machine to stop before contacting a miner; provide audible and visual warning signals, distinguishable from other signals, that alert miners before causing the machine to stop; provide the required visual signals on the machine; and prevent movement of the machine if any machine-mounted component is not working as intended. If a miner-wearable component malfunctions during the shift, a replacement must be provided for the miner.

Final § 75.1732(b)(4), similar to the proposal, requires that a proximity detection system prevent movement of the continuous mining machine if any machine-mounted component of the system is not functioning properly. However, a system with any machine-mounted component that is not functioning properly may allow machine movement if it provides an audible or visual warning signal, distinguishable from other signals, during movement. Such movement is permitted only for purposes of relocating the machine from an unsafe location for repair.

A commenter stated that a distinct audible or visual alarm will make miners aware that the proximity detection system is not operating normally. Several commenters recommended allowing a machine with a malfunctioning proximity detection system to operate until the next maintenance shift or up to 24 hours using alternative protective measures. One commenter recommended that the rule permit a machine with a malfunctioning proximity detection system to operate until finishing the cut that is in progress. This commenter stated that completing the cut should be permitted since there is no history of accidents during cutting or loading. Another commenter supported the proposal but stated that a machine with a malfunctioning proximity detection system should only be moved under the direction of a qualified mechanic or certified electrician. A commenter stated that MSHA should allow the machine to continue moving with an audible or visual warning signal only for the time necessary to move the machine to a safe location for repair before the end of the current production shift.

The final rule is changed from the proposal to clarify that a proximity detection system must prevent movement of the continuous mining machine if any machine-mounted component of the system is not functioning properly. MSHA intends for the proximity detection system to prevent all machine movement. This includes the tramming and conveyor swing movements that could cause the machine to contact a miner, as well as other machine movements associated with cutting coal or rock. Cutting cannot continue because the tramming function, which is needed to keep the cutter head in contact with coal or rock, would be disabled when machine-mounted components malfunction. A continuous mining machine equipped with a malfunctioning machine-mounted component could expose miners to pinning, crushing, and striking hazards. When any machine-mounted component of the system is not functioning properly, preventing all machine movement helps to assure that miners are protected.

Final § 75.1732(b)(4) provides for an exception to allow a machine to be moved for repair if the system is not functioning properly; the machine is in an unsafe location; and the system provides an audible or visual warning signal, distinguishable from other signals, during movement. Overriding the proximity detection system should only occur for the time necessary to move the machine to a safe location—for example, the time needed to move a continuous mining machine from under unsupported roof to an appropriate repair location. MSHA intends that machine movement be restricted to tramming and the hydraulic functions necessary to move the continuous mining machine to a safe location. Under the final rule, this movement is allowed only to relocate the machine so repairs can be made safely.

The final rule does not require a mechanic or qualified electrician to direct the relocation of a machine with a malfunctioning proximity detection system. Mine operators must train machine operators, under existing new task training requirements, to relocate a machine to a safe location for repair.

This provision is changed from the proposal to clarify that the warning signal must be provided by the proximity detection system. Either an audible or visual signal is sufficient warning when the machine is moving while any machine-mounted component of the proximity detection system is not functioning properly. In MSHA's experience, both types of warning signals are not necessary because miners are generally aware if the machine is not functioning properly and the machine will only be moved a limited distance in a supervised environment.

Final § 75.1732(b)(5), changed from the proposal, requires that proximity detection systems be installed to prevent interference that adversely affects performance of any electrical system. The proposed rule would have required mine operators to prevent interference with or from other electrical systems. The final rule clarifies that mine operators must prevent interference that adversely affects performance of any electrical system.

A commenter stated that if there are interference issues with a proximity detection system, the problems need to be identified, resolved, and shared with the rest of the industry. Commenters stated there are several electrical devices at risk for interference and this interference may occur when kneeling in close proximity to loops of cables, such as in low seam mines where experience with proximity detection systems is limited. A commenter stated that a final rule should require installation such that electrical interference from other devices does not affect proper functioning.

Electrical systems used in the mine, including proximity detection systems, can adversely affect the function of other electrical systems through the generation of electromagnetic interference which includes radio frequency interference. There have been instances of adverse performance of a remote-controlled system, an atmospheric monitoring system, and a machine-mounted methane monitoring system when a hand-held radio was in use near the affected systems. Electromagnetic output of approved proximity detection systems is substantially lower and uses different frequencies than other mine electrical systems, such as communication and atmospheric monitoring systems; therefore, the likelihood of encountering interference issues is less, even in low seam mines. Additionally, MSHA has not experienced issues with adverse interference, with or from other electrical systems, associated with the 425 systems in use on continuous mining machines in underground coal mines.

The final rule requires the mine operator to evaluate the proximity detection system and other electrical systems, including blasting circuits, in the mine and take adequate steps to prevent adverse interference. Steps could include design considerations, such as the addition of filters or providing adequate separation between electrical systems.

Final § 75.1732(b)(6), changed from the proposal, requires that a proximity detection system be installed and maintained in proper operating condition by a person trained in the installation and maintenance of the system.

One commenter stated that continuous mining machine operators, mechanics, and electricians should receive training at the mine from the manufacturer covering the operation, installation, and maintenance of the system. Another commenter stated that MSHA should not mandate training because either the persons can perform the work or they cannot. Another commenter stated that all miners affected by a proximity detection system should be trained as required by **30 CFR part 48** task training and, to prevent redundancy, there should not be additional training requirements.

Based on MSHA's experience with testing of proximity detection systems, the Agency has determined that proper functioning of a proximity detection system is directly related to the quality of the installation and maintenance of the systems. The training requirement in the final rule for installing and maintaining a proximity detection system is in addition to training required under existing part 48. The new training requirement helps assure that the person performing the installation and maintenance of a proximity detection system understands the system and can perform the work necessary to assure that the system operates properly. Appropriate training could include adjusting detection zones, trouble-shooting electrical connections, and replacing and adjusting machine-mounted and miner-wearable components.

MSHA anticipates that operators will assign miners to perform most maintenance activities, but representatives of the manufacturer may perform some maintenance. Based on Agency experience, operators will generally arrange for proximity detection system manufacturers to provide appropriate training to miners for installation and maintenance. Miners receiving training from manufacturers' representatives will, in most cases, provide training for other miners who may undertake installation and maintenance duties at the mine. In MSHA's experience, many mines use the train-the-trainer model for installation and maintenance activities.

The final rule is changed from the proposal to clarify that the proximity detection system must be installed and maintained in proper operating condition. A system must operate properly to protect miners near the machine. This includes the machine-mounted components and the miner-wearable components. Mine operators will be expected to demonstrate that a continuous mining machine equipped with a proximity detection system in use at their mine is installed and maintained in proper operating condition.

One method a mine operator could use to demonstrate that a proximity detection system is operating properly to cause the machine to stop before contacting a miner is to suspend a miner-wearable component from the mine roof, move the machine towards the suspended component, and after the proximity detection system causes the machine to stop movement, determine whether the machine would have contacted a miner. When making this determination, the position of the miner-wearable component on the miner and the distance from the closest surface of the continuous mining machine to the miner-wearable component should be considered. Mine- and machine-specific conditions, including steep or slippery roadways, tramming speed of machinery, location of the miner-wearable component, and the accuracy of the proximity detection system, should also be considered.

C. § 75.1732(c) Proximity Detection System Checks

Final § 75.1732(c), like the proposal, establishes requirements for checking proximity detection systems.

Final § 75.1732(c)(1) requires that operators designate a person to perform a check of machine-mounted components of the proximity detection system to verify that components are intact, that the system is functioning properly, and take action to correct defects: (i) At the beginning of each shift when the machine is to be used; or (ii) immediately prior to the time the machine is to be operated if not in use at the beginning of a shift; or (iii) within one hour of a shift change if the shift change occurs without an interruption in production. Final § 75.1732(c)(1), unlike the proposal, does not include the word “visual” because the check requires verification of both the audible and visual warning signals under final § 75.1732(b)(2).

A commenter stated that MSHA should require a mine operator to use MSHA-approved written examination procedures for this check. This commenter also recommended requiring a visual check by the machine operator and a certified electrician or qualified mechanic. Another commenter, however, stated that a requirement for a check was unnecessary. A commenter also stated that MSHA should allow the operator to determine how often and when the proximity detection system is checked for proper operation. Other commenters stated that the machine hardware should be checked before each shift.

After reviewing the comments, MSHA determined that a check of the machine-mounted components of a proximity detection system should be performed before the continuous mining machine is operated each shift. MSHA anticipates that the check will be performed at the same time as the existing on-shift dust control parameter check. A check of machine-mounted components of the proximity detection system is needed to verify that components are intact and that the system is functioning properly before the machine is operated. For example, some machine-mounted components may be mounted on the outer surface of a continuous mining machine and could be damaged when the machine contacts a rib or heavy material falls against the machine. The person

designated to perform the check will walk around the machine to verify that machine-mounted components are intact and the system is functioning properly. The check will also include observation of appropriate audible and visual warning signals. Operators can check that the system is functioning properly by approaching the machine with a miner-wearable component and observing changes in the system's warning signals as the miner-wearable component enters the warning and stop zones.

MSHA believes that it is unnecessary to require written procedures for the check because existing training regulations require that the person designated to perform the check be trained to check the system. The check supplements the design requirement in final § 75.1732(b)(4) that prevents movement of the machine if any machine-mounted component is not functioning properly. The system may not be able to detect all types of damage, such as detached field generators, which could affect proper function. The check helps assure that machine-mounted components are positioned correctly and mounted properly on the machine and the system will warn miners and stop movement appropriately. Under existing § 48.7, miners who perform the required check must receive training in the safety and health aspects and safe work procedures of the task.

In most cases, MSHA anticipates that the trained person designated to make the on-shift dust control parameter check, required under existing § 75.362(a)(2), will also make the check of the proximity detection system. MSHA also anticipates that both checks would be performed at the same time. Unlike the examinations and tests required under existing § 75.512 for permissible equipment, it is not essential to require a person qualified to perform electrical work to conduct this check.

Final § 75.1732(c)(2), like the proposal, requires that operators check for proper operation of miner-wearable components at the beginning of each shift that the components are to be used and correct defects before the components are used.

Commenters recommended checking the miner-wearable component at the beginning of each shift for damage. One commenter recommended checking for sufficient power to work for the duration of the shift. A commenter stated that defective miner-wearable components should be replaced before that person goes underground. A commenter stated that it should be up to the mine operator to determine how often and when the miner-wearable component is checked for proper operation. Another commenter stated that the final rule should allow an operator to designate a person to check the miner-wearable component.

After considering comments, MSHA determined that the miner-wearable components must be checked for proper operation at the beginning of each shift that the component is to be used. This requirement helps assure that the miner is protected before getting near a machine. MSHA anticipates that each miner equipped with a miner-wearable component will check the component to see that it is not damaged and has sufficient power. The proximity detection systems that use these components can only function properly if the miner-wearable components have sufficient power.

MSHA intends that this check can be similar to the check that a miner performs on a cap lamp prior to the beginning of a shift. A mine operator, however, could also designate a person to check miner-wearable components before they are used. Mine operators must provide new task training, under **30 CFR part 48**, for miners who will be checking the miner-wearable components. If any defect is found, the final rule requires that it be corrected before the component is used. This helps assure that

the miner-wearable component functions properly and reduces the risk of injuries and fatalities from miners' exposure to pinning, crushing, and striking hazards.

The final rule does not include proposed § 75.1732(c)(3). This proposed provision would have required the operator to designate a person under MSHA's existing standard for qualified electricians to examine proximity detection systems for conformance with the performance requirements of this section at least every seven days and that defects in the proximity detection system be corrected before the machine is returned to service.

A commenter stated that a trained, qualified maintenance person should examine the basic functions of proximity detection systems every seven days by checking zone sizes, system communication, and warning signals; examine at regular maintenance intervals and for each modification to the machine or environment; and perform the examination while the machine is not in service. This commenter stated that the maintenance person should fully understand how the system works. Other commenters stated that the electrical examination should take place on a weekly basis at the same time as the other electrical examinations required under § 75.512. A commenter also stated that requiring an examination each week is not needed.

After considering comments, MSHA concluded that the examinations of proximity detection systems will take place with other electrical examinations required under existing § 75.512. MSHA determined that the proposed requirement to designate a qualified person under existing § 75.153 to examine proximity detection systems at least every seven days and correct defects is not necessary because the machine-mounted components are electric equipment and must be examined, tested, and properly maintained under existing § 75.512. The miner-wearable components are MSHA-approved intrinsically safe equipment and do not need to be examined in accordance with existing § 75.512.

Existing § 75.512 requires electric equipment to be frequently examined, tested, and properly maintained by a qualified person to assure safe operating conditions. The examinations and tests required under existing § 75.512 must be made at least weekly under existing § 75.512-2, and the qualified person performing the examinations and tests must meet the requirements to perform electrical work under existing § 75.153. Under existing § 75.512, when a potentially dangerous condition is found on electric equipment, such equipment must be removed from service until such condition is corrected. The on-shift check required in final § 75.1732(c)(1) helps assure that proximity detection systems function properly between the weekly examinations required under existing § 75.512.

D. § 75.1732(d) Certifications and Records

Final § 75.1732(d), like the proposal, establishes requirements for certifications and records for proximity detection systems.

Final § 75.1732(d)(1), like the proposal, requires that at the completion of the check required under paragraph (c)(1) of this section, a certified person under existing § 75.100 certify by initials, date, and time that the check was conducted. Defects found as a result of the check under paragraph (c)(1) of this section, including corrective actions and dates of corrective actions, must be recorded.

A commenter supported the proposed requirement that the mine operator record any defect and corrective action. Another commenter recommended that the record of any defect or corrective action be made at the end of the shift and kept in a book on the surface. Another commenter, however, supported the requirement to certify the check required in paragraph (c)(1), but stated there was no safety benefit to requiring a record of defects or corrective actions. Other commenters indicated that there is no need to require records specifically for proximity detection systems and that these records would be a burden.

The certification in final paragraph (d)(1) helps assure compliance and provides miners on the section a means to confirm that the required check was made. MSHA anticipates that, in most cases, the person making the certification of the on-shift examination under existing § 75.362(g)(2) will also make the certification of this check at the same time.

The record of defects and corrective actions as a result of the check required under final paragraph (c)(1) of this section must be made by the completion of the shift, which is consistent with the requirements for records of hazardous conditions in existing § 75.363(b). If no defect is found, no record is needed. The requirement in final paragraph (d)(1) of this section requires a record of defects and corrective actions. This record can be used to show a history of machine-mounted component defects that can alert miners, representatives of miners, mine management, manufacturers, and MSHA of recurring problems.

Final § 75.1732(d)(2), like the proposal, requires the operator to record defects found as a result of the check of miner-wearable components under final paragraph (c)(2) of this section, including corrective actions and dates of corrective actions.

A commenter supported the proposed requirement that the mine operator record any defect and corrective action, but also stated that the check of the miner-wearable component must be recorded. Another commenter stated that the record of any defect or corrective action be made at the end of the shift and kept in a book on the surface. A commenter also stated there was no safety benefit to requiring a record of defects or corrective actions. Other commenters indicated that there is no need to require records specifically for proximity detection systems and that these records would be a burden.

The requirement in final § 75.1732(d)(2) provides for a record of defects and corrective actions. This record can be used to show a history of miner-wearable component defects that can alert miners, representatives of miners, mine management, manufacturers, and MSHA of recurring problems. For miner-wearable components, no record is needed unless a defect is found. A certification of the check for proper operation of miner-wearable components that is required under final § 75.1732(c)(2) is not necessary because miners can readily check to confirm that the component is working.

The final rule does not include the provisions in proposed § 75.1732(d)(3). The proposal would have required that: (1) The operator make and retain records at the completion of the weekly examination under proposed § 75.1732(c)(3); (2) the qualified person conducting the examination record and certify by signature and date that the examination was conducted; and (3) defects, including corrective actions and dates of corrective actions, be recorded.

A commenter supported the proposed requirement but also stated that a maintenance supervisor should be required to countersign the record. Another commenter indicated that the electrical examination of proximity detection systems should be recorded consistent with the recordkeeping requirement under existing § 75.512 and that it would be unnecessary and burdensome for this record to include a record of defects found and corrective actions. Another commenter stated that maintaining separate records for weekly inspections of proximity detection systems is redundant to records already being maintained. Another commenter stated this requirement would increase the paperwork burden on a mine operator.

After considering the comments, MSHA determined that a separate examination under proposed paragraph (c)(3) and existing requirements under § 75.512 are redundant. Accordingly, the corresponding record requirement under proposed paragraph (d)(3) is not required by the final rule. As required under existing § 75.512, electric equipment must be frequently examined, tested, and properly maintained by a qualified person to assure safe operating conditions; and a record of this examination must be kept and made available to an authorized representative of the Secretary and to the miners. Consistent with MSHA policy, if dangerous conditions and corrective actions are not recorded, the records of weekly examinations of electric equipment are incomplete.

Final § 75.1732(d)(3), like proposed § 75.1732(d)(4), requires that the operator make and retain records of the persons trained in the installation and maintenance of proximity detection systems.

One commenter stated that a record is necessary to assure that the person assigned to install and perform maintenance on proximity detection systems has been trained. Other commenters stated that this requirement would be redundant. One of these commenters stated that it would be redundant with existing § 75.159, which requires a list of all qualified persons designated to perform duties under part 75. This commenter stated that MSHA Form 5000-23 (Certificate of Training) includes this information and that, due to this redundancy, the requirement in proposed paragraph (d)(4) of this section should not be included in the final rule. Other commenters indicated that this requirement would be impractical when the installation or maintenance is performed by a third party. Another commenter indicated this requirement would increase the paperwork burden for a mine operator.

Final § 75.1732(d)(3) requires the mine operator to make a record of persons trained to install and perform maintenance on proximity detection systems. MSHA anticipates that many mine operators will train qualified persons, as defined by existing § 75.153, to install and perform maintenance on proximity detection systems; but, the mine operator may train another miner who is not included on the list required under existing § 75.159. A mine operator may make the record of the persons trained under final paragraph (d)(3) of this section using existing MSHA Form 5000-23. Consistent with existing practice, mine operators do not need to make and retain records of training for proximity detection system manufacturers' employees who install or perform maintenance on their systems.

Final § 75.1732(d)(4), like proposed § 75.1732(d)(5), requires the operator to maintain records in a secure book or electronically in a secure computer system not susceptible to alteration.

One commenter supported the proposal. Another commenter stated that this requirement should be removed because the underlying recordkeeping requirements in proposed paragraph (d) of this

section are redundant. Another commenter stated that this requirement would create another record book for mine operators to maintain and that this would increase their paperwork burden.

The records required under final §§ 75.1732(d)(1), (d)(2), and (d)(3), if recorded in a book, must be in a book designed to prevent the insertion of additional pages or the alteration of previously entered information in the record. Based on MSHA's experience with other safety and health records, the Agency believes that records should be maintained so that they cannot be altered. In addition, electronic storage of information and access through computers is increasingly a common business practice in the mining industry. This provision permits the use of electronically stored records provided they are secure, not susceptible to alteration, and able to capture the information and signatures required. Care must be taken in the use of electronic records to assure that the secure computer system will not allow information to be overwritten after being entered. MSHA believes that electronic records meeting these criteria are practical and as reliable as paper records. MSHA also believes that once records are properly completed and reviewed, mine management can use them to evaluate whether the same conditions or problems, if any, are recurring, and whether corrective measures are effective.

The final rule provides mine operators flexibility to maintain the records in a secure book or electronically in a secure computer system that they already use to satisfy existing recordkeeping requirements.

Final § 75.1732(d)(5), like proposed § 75.1732(d)(6), requires that the operator retain records for at least one year and make them available for inspection by authorized representatives of the Secretary and representatives of miners.

A commenter supported the proposal but stated that hard copies of this information must be made available if the lack of computer skills would prohibit a miner from viewing this information. Another commenter stated that this requirement should be removed because the underlying recordkeeping requirements in paragraph (d) of this section are redundant with existing requirements. This commenter stated that this requirement would increase a mine operator's paperwork burden.

This provision applies to the records required under final §§ 75.1732(d)(1), (d)(2), and (d)(3). These records must be made available for inspection to representatives of miners and MSHA. The operator may provide access electronically or by providing paper copies of records. MSHA believes that keeping records for one year provides a history of the conditions at the mine to alert miners, representatives of miners, mine management, manufacturers, and MSHA of recurring problems.

E. New Technology

The final rule does not include proposed § 75.1732(e) that would have addressed technologically advanced proximity detection systems because the final rule allows for flexibility in system design. The final rule is performance-based and does not require specific distances for stopping the machine or for warning miners. Proposed § 75.1732(e) would have provided that mine operators or manufacturers could apply to MSHA for acceptance of a proximity detection system that incorporates new technology.

A commenter stated that it was unclear whether proposed § 75.1732(e) refers to approval of a petition for modification or a way for MSHA's Approval and Certification Center (A&CC) to approve a proximity detection system. A commenter was uncertain as to how this provision would apply to manufacturers. Another commenter stated that MSHA should clarify the scope of this provision and provide testing requirements to assure proximity detection systems are safe and effective for their intended use. Commenters stated that MSHA must accept new technology if (1) it meets current permissibility requirements, (2) performs the same function as already accepted systems, or (3) is as safe as the proposed requirements.

Proposed § 75.1732(e) would have addressed technologically advanced proximity detection systems that did not meet the prescriptive requirements for causing a machine to stop no closer than 3 feet from a miner and for providing an audible or visual warning signal when the machine is 5 feet and closer to a miner. Many comments to proposed §§ 75.1732(b)(1) and (b)(2) stated the Agency should change requirements to a performance-based approach. The performance-based requirements in this final rule allow for flexibility in system design, eliminating the need for the proposed new technology provision.

III. Regulatory Economic Analysis

A. Executive Orders 12866 and 13563: Regulatory Planning and Review

Executive Orders 12866 and 13563 direct agencies to assess all costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). **Executive Order 13563** emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. To comply with these Executive Orders, MSHA has prepared a Regulatory Economic Analysis (REA) for the final rule. The REA contains supporting data and explanation for the summary information presented in this preamble, including the covered mining industry, costs and benefits, feasibility, small business impacts, and Paperwork Reduction Act requirements.

On April 23, 2014, the State of West Virginia issued a rule governing proximity detection systems, effective July 1, 2014. The rule requires, among other things, that proximity detection systems be installed on place-change continuous mining machines in underground sections of coal mines according to a 34-month phase-in schedule. The regulatory economic analysis addresses cost and benefit changes to this rule due to the West Virginia Rule in Chapter 5, Summary of Adjustments for West Virginia Rule.

The Commonwealth of Virginia issued a memorandum to coal mine operators (DM-14-03, August 18, 2014) stating that, effective October 1, 2014, all remote-control operated continuous mining machines be equipped with proximity detection systems or use a designated spotter during equipment moves.

MSHA anticipates that mine operators in the Commonwealth of Virginia would opt to use a designated spotter instead of incurring the expense of installing proximity detection systems on continuous mining machines. The Agency estimates that the cost of diverting resources to assure that there is a designated spotter for those continuous mining machines during equipment moves

would be de minimis. MSHA does not address Virginia's memorandum in the regulatory economic analysis (REA) because it does not affect the impact of the final rule.

MSHA received comments on the preliminary regulatory economic analysis and those comments are addressed in the REA. The REA can be accessed electronically at <http://www.msha.gov/REGSINF5.HTM> or <http://www.regulations.gov>. A copy of the REA can be obtained from MSHA's Office of Standards, Regulations and Variances at the address in the Availability of Information section of this preamble.

Under E.O. 12866, a significant regulatory action meets at least one of the following conditions: Having an annual effect on the economy of \$100 million or more, creating a serious inconsistency or interfering with an action of another agency, materially altering the budgetary impact of entitlements or the rights of entitlement recipients, or raising novel legal or policy issues. The Office of Management and Budget (OMB) has determined that this final rule would be a significant regulatory action because it raises novel legal or policy issues.

B. Population at Risk

The final rule applies to all underground coal mines in the United States. In 2013, there were approximately 326 active underground coal mines using continuous mining machines employing approximately 42,314 miners (excluding office workers).

C. Net Benefits

Under the Mine Act, MSHA is not required to use estimated net benefits as the basis for its decision. At a 7 percent discount rate over 10 years, the estimated annualized values for net benefits of this rule after adjusting for West Virginia are \$1.3 million; benefits are \$6.0 million and costs are \$4.7 million. At a 3 percent discount rate over 10 years, the estimated annualized values for net benefits of this rule after adjusting for West Virginia are \$1.8 million; benefits are \$6.5 million and annualized costs are \$4.7 million.

MSHA anticipates several benefits from the final rule that were not quantified due to a lack of definitive information. For example, MSHA anticipates that the final rule will result in additional savings to mine operators by avoiding the production delays typically associated with mine accidents. Pinning, crushing, or striking accidents can disrupt production at a mine during the time it takes to remove the injured miner, investigate the cause of the accident, and clear the accident site. Such delays can last for a shift or more. Factors such as lost wages, delayed production, and other miscellaneous expenses, could result in significant costs; however, MSHA has not quantified these savings due to a lack of specific information. The monetized benefits and costs are explained further in sections D and E.

D. Benefits

The final rule will significantly improve safety protections for underground coal miners by reducing their risk of being crushed, pinned, or struck by continuous mining machines.

MSHA reviewed the Agency's investigation reports for all continuous mining machine accidents that occurred from 1984 through 2013 and determined that the use of proximity detection systems could have prevented 34 fatalities and 238 nonfatal injuries involving pinning, crushing, or striking accidents with continuous mining machines. From 2010 through 2013, six underground coal miners working in close proximity to continuous mining machines died from pinning, crushing, or striking accidents. MSHA's review concluded that the latest 15 years of data was the most appropriate data to project the number of incidents over the next 10 years. Based on the data, MSHA projects that the rule will prevent approximately 49 injuries and 9 deaths over the next 10 years.

To estimate the monetary values of the reductions in deaths and nonfatal injuries, MSHA uses an analysis of the imputed values based on a Willingness-to-Pay approach. This approach relies on the theory of compensating wage differentials (*i.e.*, the wage premiums paid to workers to accept the risk associated with various jobs) in the labor market. A number of studies have shown a correlation between higher job risk and higher wages, suggesting that employees demand monetary compensation in return for incurring greater risk. The benefit of preventing a fatality is measured by what is conventionally called the Value of a Statistical Life (VSL), defined as the additional cost that individuals would be willing to bear for improvements in safety (that is, reductions in risks) that, in the aggregate, reduce the expected number of fatalities by one.

Under the proposed rule, the value of deaths and injuries prevented were based on a 2003 meta-analysis by Viscusi & Aldy. Viscusi and Aldy did an analysis of several studies that use a Willingness-to-Pay methodology to estimate the imputed value of life-saving programs. Updating the 2003 values for inflation yields an estimate in 2013 dollars of \$8.7 million for each fatality prevented and \$65,000 for each nonfatal injury prevented for the lowest estimate.

For the final rule, MSHA revised the Agency's approach for monetizing the value of fatalities prevented to provide a range of VSLs. The regulatory economic analysis provides more detail; but, in summary, MSHA estimated three alternatives for VSL.

Low Benefit Estimate: The low estimate of \$8.7 million is from the 2003 Viscusi and Aldy estimate used in the proposed rule. However, this estimate does not include adjustments for real income changes.

Primary Benefit Estimate: MSHA used a primary estimate of \$9.2 million that is based on the new research and guidance by the Department of Transportation (DOT). MSHA reviewed DOT's findings and adjusted the VSL for real income growth. With the adjustment, the VSL reaches approximately \$10 million in the 10th year.

High Benefit Estimate: MSHA used a high estimate of \$11.1 million based on Viscusi's 2013 article that emphasizes, when possible, that labor characteristics should be used to develop VSLs. The 2013 article includes information that mining has one of the highest fatality rates and that estimates should capture industry or occupation specific information. As in the primary estimate, MSHA also applied the real income growth each year to generate VSLs for the 10 years after the final rule is effective. This provides a final value after 10 years of approximately \$12 million.

More detailed information about how MSHA estimated the primary benefits and alternate benefits estimates are available in the REA supporting this final rule.

E. Compliance Costs

MSHA estimated costs of the final rule based on the analysis of the most likely actions that operators will need to take to comply with the final rule. MSHA estimates that proximity detection systems purchases and installations in underground coal mines will occur over 3 years with 20 percent installed in the first year the rule is in effect, an additional 40 percent installed in the second year, and the remaining 40 percent installed in the third year. MSHA estimates a useful life of 10 years for all machine-mounted components of proximity detection systems and 5 years for miner-wearable components.

MSHA estimates that, after adjusting for the West Virginia Rule, the total undiscounted cost of the final rule over a 10-year period is \$46.7 million, \$41.3 million at a 3 percent rate, and \$35.7 million at a 7 percent rate. The corresponding values annualized over 10 years are \$4.7 million (undiscounted), \$4.7 million (3 percent), and \$4.7 million (7 percent).

IV. Feasibility

The requirements of the final rule are both technologically and economically feasible.

A. Technological Feasibility

The final rule is technologically feasible. The final rule is not technology-forcing and does not involve new scientific or engineering knowledge. The technology necessary to meet the requirements of the final rule already exists, is commercially available, and is in use in underground coal mines. By allowing mine operators to phase in the installation of proximity detection systems over a 36-month period, the final rule provides coal mine operators sufficient time to obtain necessary modification to the existing technology, obtain necessary approvals, install proximity detection systems on continuous mining machines, and train miners.

B. Economic Feasibility

MSHA has traditionally used a revenue screening test—whether the estimated compliance costs of a standard are less than one percent of revenues, or are negative (*e.g.*, provide net cost savings) to establish presumptively that compliance with the standard is economically feasible for the mining industry. Based on this test, MSHA has concluded that the requirements of the final rule are economically feasible.

The estimated annualized compliance cost to underground coal mine operators is \$4.7 million. This represents less than one-tenth of one percent of total annual revenue of \$23.1 billion (\$4.7 million costs/\$23.1 billion revenue) for all underground coal mines. Since the estimated annualized compliance cost is below one percent of estimated annual revenue, MSHA concludes that the final rule is economically feasible for the underground coal industry.

V. Regulatory Flexibility Act and Small Business Regulatory Enforcement Fairness Act

Under the Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), MSHA has analyzed the compliance cost impact of the final

rule on small entities. Based on that analysis, MSHA certifies that the final rule will not have a significant economic impact on a substantial number of small entities. The factual basis for this certification is presented in Chapter 7, Regulatory Flexibility Analysis, of the REA and is summarized below.

A. Definition of a Small Mine

Under the RFA, in analyzing the impact of a rule on small entities, MSHA must use the Small Business Administration's (SBA's) definition for a small entity or, after consultation with the SBA Office of Advocacy, establish an alternative definition for the mining industry by publishing that definition in the Federal Register for notice and comment. Because the Agency has not established an alternative definition, MSHA is required to use SBA's definition. The SBA defines a small entity in the mining industry as an establishment with 500 or fewer employees.

MSHA has also examined the impact of the final rule on mines with fewer than 20 employees, which MSHA and the mining community have traditionally referred to as small mines. These small mines differ from larger mines not only in the number of employees, but also in economies of scale in material produced, in the type and amount of production equipment, and in supply inventory. Therefore, their costs of complying with MSHA's rules and the impact of the Agency's rules on them will also tend to be different.

This analysis complies with the requirements of the RFA for an analysis of the impact on “small entities” while continuing MSHA's traditional definition of “small mines.”

B. Factual Basis for Certification

MSHA's analysis of the economic impact on small entities begins with a screening analysis. The screening compares the estimated yearly costs of the final rule for small entities to their estimated annual revenue. When estimated costs are less than one percent of estimated revenues for small entities, MSHA believes it is generally appropriate to conclude that the final rule will not have a significant economic impact on a substantial number of small entities. If the estimated cost is equal to or exceeds one percent of revenue, MSHA investigates whether further analysis is required.

C. Derivation of Revenues and Costs for Mines

MSHA calculated the revenue for underground coal mines from data on coal prices and production. The average open market U.S. sales price of underground coal for 2013 was \$67.56 per ton (estimated from Department of Energy (DOE), Energy Information Administration (EIA), *Annual Coal Report 2012*, December 2013, pg. 48, adjusted by the 2013 GDP deflator from the Bureau of Economic Analysis (BEA)).

For mines excluding West Virginia, with 1-19 employees, 2013 underground coal revenue was \$112 million (1.7 million tons × \$67.56 per ton). For mines with 1-500 employees, 2013 underground coal revenue was \$12 billion (175.4 million tons × \$67.56 per ton). Total 2013 underground coal revenue, excluding West Virginia, was \$17.5 billion. The 2013 total underground coal revenue including West Virginia was \$23.1 billion.

D. Screening Analysis for Underground Coal Mines

The estimated annualized cost of the final rule for underground coal mines with 1-19 employees is approximately \$0.5 million, which represents approximately 0.5 percent of annual revenues.

When applying SBA's definition of a small mine, the estimated annualized cost of the final rule for underground coal mines with 1-500 employees, excluding West Virginia, is approximately \$4.1 million, which represents less than one-tenth of one percent of annual revenue.

Table 1 shows MSHA's estimate of the annualized cost of the final rule compared to mine revenue, by mine size. MSHA has provided, in the REA accompanying this final rule, a complete analysis of the cost impact.

Table 1—Cost of Final Rule Compared to Mine Revenues for Underground Coal Mines (Excluding West Virginia), by Mine Size

Mine size (employees)	Number of Mines	Annualized cost of final rule (in millions)	Annual revenues (in millions)	Annual cost per mine	Cost of final rule as percent of revenues
1-19	45	\$0.5	\$112	\$11,111	0.5
1-500	209	4.1	11,848	19,617	<0.1
All Mines	220	4.7	17,518	21,364	<0.1

Based on this analysis, MSHA has determined that the final rule will not have a significant economic impact on a substantial number of small underground coal mines.

VI. Paperwork Reduction Act of 1995

A. Summary

The Paperwork Reduction Act (PRA) provides for the Federal government's collection, use, and dissemination of information. The goals of the PRA include minimizing paperwork and reporting burdens and ensuring the maximum possible utility from the information that is collected (44 U.S.C. 3501). The information collections contained in this final rule are submitted for review under the PRA to OMB, Control Number 1219-0148. The final rule contains minor adjustments to burden hours for an existing paperwork package with OMB Control Number 1219-0066. MSHA does not include estimated burden hours and the cost of revising training plans on an annual basis because this burden is accounted for under the OMB Control Number 1219-0009. Underground coal mine operators routinely revise their training plan at least yearly in accordance with 30 CFR part 48.

MSHA estimates that in the first 3 years the final rule is in effect, the mining community will incur 1,182 annual burden hours with related annual burden hour costs of approximately \$115,952 and other annual costs related to the information collection of approximately \$22,359. A detailed

explanation of the burden hours and related costs are in the Paperwork Reduction Act section of the REA for this final rule.

B. Procedural Details

The information collection package for this final rule was submitted to OMB for review under **44 U.S.C. 3504**, paragraph (h) of the Paperwork Reduction Act of 1995, as amended. MSHA requested comment on its estimates for information collection requirements in the proposal and responded to these comments earlier in the preamble and in the REA.

The regulated community is not required to respond to any collection of information unless it displays a current, valid, OMB control number. (See **5 CFR 1320.5(a)** and 1320.6.) MSHA displays the OMB control numbers for the information collection requirements in its regulations in **30 CFR part 3**. The total information collection burden is summarized as follows:

- Title of Collection: Testing, Evaluation, and Approval of Mining Products. OMB Control Number: **1219-0066**.
- Title of Collection: Training Plans and Records of Training, for Underground Miners and Miners Working at Surface Mines and Surface Areas of Underground Mines. OMB Control Number: **1219-0009**.
- Title of Collection: Proximity Detection Systems for Continuous Mining Machines in Underground Coal Mines. OMB Control Number: **1219-0148**.

Table 2—Summary Crosswalk of Rule, REA Cost Analysis, and OMB Control Number

Collection burden	OMB No.	Annual burden hours	Annual burden hours cost	Other annual costs to respondents
§ 75.1732(a)	1219-0066	189	\$18,824	\$22,359
§ 75.1732(d)(1)	1219-0148	958	95,417	0
§ 75.1732(d)(2)	1219-0148	33	1,654	0
§ 75.1732(d)(3)	1219-0148	2	57	0
Total		1,182	115,952	22,359

Affected Public: Private Sector Businesses or Other For-Profit Businesses.

Estimated Number of Respondents: 109.

Estimated Number of Responses: 315,333.

Estimated Number of Burden Hours: 1,182.

Estimated Hour Burden Costs: \$115,952.

Estimated Annual Burden Costs (non-hours) Related to the Information Collection Package: \$22,359.

MSHA received comments on the information collection requirements contained in the proposed rule. The comments are addressed in the applicable sections of Section II, the Section-by-Section Analysis of this preamble, and in the Supporting Statement for the information collection requirements accompanying this final rule. The Information Collection Supporting Statement is available at <http://www.reginfo.gov/public/do/PRAMain>, on MSHA's Web site at <http://www.msha.gov/regspwork.htm>, and at <http://www.regulations.gov>. A copy of the Supporting Statement is also available from MSHA by request to Sheila McConnell at mccconnell.sheila.a@dol.gov, by phone request to 202-693-9440, or by facsimile to 202-693-9441.

VII. Other Regulatory Considerations

A. The Unfunded Mandates Reform Act of 1995

MSHA has reviewed the final rule under the Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1501 et seq.). MSHA has determined that the final rule does not include any federal mandate that may result in increased expenditures by State, local, or tribal governments; nor does it increase private sector expenditures by more than \$100 million (adjusted for inflation) in any one year or significantly or uniquely affect small governments. Accordingly, the Unfunded Mandates Reform Act of 1995 requires no further Agency action or analysis.

B. Executive Order 13132: Federalism

The final rule does not have “federalism implications” because it does 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.” Accordingly, under E.O. 13132, no further Agency action or analysis is required.

C. The Treasury and General Government Appropriations Act of 1999: Assessment of Federal Regulations and Policies on Families

Section 654 of the Treasury and General Government Appropriations Act of 1999 (5 U.S.C. 601 note) requires agencies to assess the impact of Agency action on family well-being. MSHA has determined that the final rule has no effect on family stability or safety, marital commitment, parental rights and authority, or income or poverty of families and children. Accordingly, MSHA certifies that this final rule does not impact family well-being.

D. Executive Order 12630: Government Actions and Interference With Constitutionally Protected Property Rights

The final rule does not implement a policy with takings implications. Accordingly, under E.O. 12630, no further Agency action or analysis is required.

E. Executive Order 12988: Civil Justice Reform

The final rule is written to provide a clear legal standard for affected conduct and was carefully reviewed to eliminate drafting errors and ambiguities, so as to minimize litigation and undue burden on the Federal court system. Accordingly, the final rule would meet the applicable standards provided in section 3 of E.O. 12988, Civil Justice Reform.

F. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

The final rule does not adversely impact children. Accordingly, under E.O. 13045, no further Agency action or analysis is required.

G. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This final rule does not have “tribal implications” because it does not “have substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes.” Accordingly, under E.O. 13175, no further Agency action or analysis is required.

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

Executive Order 13211 requires agencies to publish a statement of energy effects when a rule has a significant energy action that adversely affects energy supply, distribution or use. MSHA has reviewed this final rule for its energy effects because the final rule applies to the underground coal mining sector. Because this final rule results in annualized costs of approximately \$4.7 million to the underground coal mining industry, relative to annual revenues of \$23.1 billion in 2013, MSHA has concluded that it would not be a significant energy action because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Accordingly, under this analysis, no further Agency action or analysis is required.

I. Executive Order 13272: Proper Consideration of Small Entities in Agency Rulemaking

MSHA has reviewed the final rule to assess and take appropriate account of its potential impact on small businesses, small governmental jurisdictions, and small organizations. MSHA has determined and certified that the final rule does not have a significant economic impact on a substantial number of small entities.

List of Subjects in 30 CFR Part 75

- Mine safety and health
- Reporting and recordkeeping requirements
- Underground coal mines

Dated: January 8, 2015.

Joseph A. Main,

Assistant Secretary of Labor for Mine Safety and Health.

For the reasons set out in the preamble and under the authority of the Federal Mine Safety and Health Act of 1977, as amended, chapter I of title 30 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, 813(h), 957.

2. Add § 75.1732 to subpart R to read as follows:

§ 75.1732 Proximity detection systems.

Operators must install proximity detection systems on certain mobile machines.

(a) *Machines covered.* Operators must equip continuous mining machines, except full-face continuous mining machines, with proximity detection systems by the following dates. For proximity detection systems with miner-wearable components, the mine operator must provide a miner-wearable component to be worn by each miner on the working section by the following dates.

(1) Continuous mining machines manufactured after March 16, 2015 must meet the requirements in this section no later than November 16, 2015. These machines must meet the requirements in this section when placed in service with a proximity detection system.

(2) Continuous mining machines manufactured and equipped with a proximity detection system on or before March 16, 2015 must meet the requirements in this section no later than September 16, 2016.

(3) Continuous mining machines manufactured and not equipped with a proximity detection system on or before March 16, 2015 must meet the requirements in this section no later than March 16, 2018. These machines must meet the requirements in this section when placed in service with a proximity detection system.

(b) *Requirements for a proximity detection system.* A proximity detection system includes machine-mounted components and miner-wearable components. The system must:

- (1) Cause a machine, which is tramming from place-to-place or repositioning, to stop before contacting a miner except for a miner who is in the on-board operator's compartment;
- (2) Provide an audible and visual warning signal on the miner-wearable component and a visual warning signal on the machine that alert miners before the system causes a machine to stop. These warning signals must be distinguishable from other signals;
- (3) Provide a visual signal on the machine that indicates the machine-mounted components are functioning properly;
- (4) Prevent movement of the machine if any machine-mounted component of the system is not functioning properly. However, a system with any machine-mounted component that is not functioning properly may allow machine movement if it provides an audible or visual warning signal, distinguishable from other signals, during movement. Such movement is permitted only for purposes of relocating the machine from an unsafe location for repair;
- (5) Be installed to prevent interference that adversely affects performance of any electrical system; and
- (6) Be installed and maintained in proper operating condition by a person trained in the installation and maintenance of the system.

(c) *Proximity detection system checks.* Operators must:

- (1) Designate a person who must perform a check of machine-mounted components of the proximity detection system to verify that components are intact, that the system is functioning properly, and take action to correct defects—
 - (i) At the beginning of each shift when the machine is to be used; or
 - (ii) Immediately prior to the time the machine is to be operated if not in use at the beginning of a shift; or
 - (iii) Within 1 hour of a shift change if the shift change occurs without an interruption in production.
- (2) Check for proper operation of miner-wearable components at the beginning of each shift that the components are to be used and correct defects before the components are used.

(d) *Certifications and records.* The operator must make and retain certifications and records as follows:

- (1) At the completion of the check of machine-mounted components required under paragraph (c)(1) of this section, a certified person under § 75.100 must certify by initials, date, and time that the

check was conducted. Defects found as a result of the check, including corrective actions and dates of corrective actions, must be recorded before the end of the shift;

(2) Make a record of the defects found as a result of the check of miner-wearable components required under paragraph (c)(2) of this section, including corrective actions and dates of corrective actions;

(3) Make a record of the persons trained in the installation and maintenance of proximity detection systems required under paragraph (b)(6) of this section;

(4) Maintain records in a secure book or electronically in a secure computer system not susceptible to alteration; and

(5) Retain records for at least one year and make them available for inspection by authorized representatives of the Secretary and representatives of miners.