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PROGRAM POLICY LETTER NO. P13-V-09

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SUBJECT: Re-Issue of P11-V-07 - Two-Way Communication and Electronic Tracking System: Potential Interference of RF Electromagnetic Fields with Electric Blasting Circuits

Scope

This Program Policy Letter (PPL) applies to Mine Safety and Health Administration (MSHA) Coal Mine Safety and Health (CMS&H) personnel, coal mine operators, manufacturers of communication and electronic tracking systems, and other interested parties.

Purpose

This PPL provides guidance concerning minimum safe distances necessary to prevent interference with blasting circuits by electromagnetic waves produced by Radio Frequency (RF) from communication and electronic tracking systems. PPL P11-V-13, Guidance for Compliance with Post-Accident Two-Way Communications and Electronic Tracking Requirements of the MINER Act, provides that communication and electronic tracking systems should be installed to prevent interference with blasting circuits and other electrical systems.

Policy

Shot-firers in mines using electric initiation to produce coal by conventional mining methods or using electrical initiation for other purposes need to work in close proximity to electric blasting circuits. 30 C.F.R. § 75.1323(a) requires blasting circuits to be protected from sources of stray electric current. Thus, when shot-firers and other miners are wearing or carrying RF transmitting devices, consideration must be given to the total RF energy transmitted by these devices and the corresponding safe distances required to prevent the potential for RF interference with electric blasting circuits.

Operators must also account for other sources of RF, such as leaky feeder cables, and their impact on electric blasting circuits, whether they are used in inby or outby areas.

Mine operators must specify these safe distances in their ERPs in accordance with manufacturers' instructions and account for the total amount of energy transmitted from all devices and other sources used in the vicinity of blasting circuits. Mine operators also should specify in the ERP the administrative controls that must be used to eliminate interference with blasting circuits and other electrical systems while maintaining effective communication and tracking capability. Examples of these administrative controls include the use of manual tracking methods while blasting and the practice of leaving communication devices at a safe distance from blasting circuits when miners are working in close proximity to electric blasting circuits.

Background Information

The guidance given in PPL P11-V-13 provides that wireless communication and electronic tracking systems should be installed to prevent interference with blasting circuits and other electrical systems. Coal mines that use conventional mining methods utilize explosives in the face area to separate the coal from its natural deposit. Underground coal mines also utilize explosives to construct overcasts, create additional height for conveyor belt drives, clean up roof falls, etc. Communications and electronic tracking systems are sources of RF energy that can interfere with blasting circuits. MSHA's Approval and Certification Center requires, as part of the approval provisions for communication and electronic tracking systems and components, that manufacturers specify the minimum safe distances that must be maintained between their equipment and blasting circuits to prevent interference and unintentional initiation of blasting circuits. MSHA has approved in ERPs a separation distance of up to 50 feet between components of communication and tracking system and blasting components when the mine operator was unable to specify a safe distance based on manufacturer's recommendation.

MSHA conducted testing using the L-3 Communications ACCOLADE Communication and Tracking System in an underground anthracite mine to determine whether the radio frequency output levels of the system components and the resulting inducted current on a simulated blasting circuit would pose a hazard to miners. MSHA concluded that the radio frequency outputs from the L-3 components did not result in induced currents sufficient to detonate blasting caps. MSHA will require that certain separation distances between components of communication and tracking system and blasting components be maintained to provide additional protection.

The Institute of Makers of Explosives (IME) Safety Library Publication No. 20 (SLP-20) provides recommended minimum separation distances between RF sources and explosives, based on power and frequency. This publication was intended to apply to surface blasting where RF energy propagates in free space. RF energy, however, may behave differently in underground coal mine environments.

SLP-20 bases the distances in the tables and graphs between RF sources and blasting circuits on a 40-mW "no-fire" level for the electric detonator. The "no-fire" power level is that DC power delivered directly to the detonator such that the probability of not initiating the detonator is 0.999 at a 95% confidence level. The actual amount of energy extracted from a RF field by an electric

detonator and its blasting circuit is a function of transmitting power, transmitter frequency, distance between the RF source and the blasting circuit, the antenna gain of the source antenna, and the orientation, size and impedance of the blasting circuit (acting as a receiving antenna). Therefore, RF fields from tags and other electronic devices may or may not pose a threat to the detonator and its circuit.

It should be noted that the IME is developing safety guidance similar to SLP-20 that will be applicable to underground environments. While this guidance ultimately may be instructive, it is incumbent on manufacturers of communications and electronic tracking systems and mine operators to specify minimum safe distances that prevent interference with electric blasting circuits in the underground mining environment.

Authority

Section 316 of the Federal Mine Safety and Health Act of 1977, as amended, 30 U.S.C. § 876; 30 C.F.R. §§ 18.23, 75.1312, 75.1313, and 75.1323.

Internet Availability

This PPL may be viewed on the World Wide Web by accessing MSHA Home Page at (<http://www.msha.gov>) under MSHA's Major Laws, Regulations and Policies choose "Compliance Information (PIBs, PILs, the PPM, and More) and select "Program Policy Letters."

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