It is well recognized that exposure of explosive material to impact or high temperatures can be hazardous. From 1977 to 1988, as reported in MSHA's Program Circular (PC-7026) on "Blasting Incidents in Mining," (August 1988), there were at least 22 impact- and temperature-related blasting incidents, six of which resulted in fatalities. Therefore, MSHA is proposing that paragraphs (a) and (b) of §§ 56.6905 and 57.6905 require protection against temperatures in excess of 150 °F and impact with the exception of tamping and dropping during loading. When tamping and dropping explosive materials during loading, operators must comply with existing §§ 56/57.6304, Primer protection.

Proposed paragraph (c) of § 57.6905 is derived from the general requirement in § 57.6302 that explosives be protected from impact. It would require the use of detonating cord to initiate explosives placed in raises, chutes, and ore passes to free hang-ups. Freeing hang-ups is inherently hazardous because it potentially exposes both explosives and miners to unsupported material. Detonators could be hit by falling material and prematurely detonate.

Virtually all detonators used in mining contain highly sensitive primary explosive compositions which make them impact sensitive. Detonators, whether electric or nonelectric, are the most impact sensitive of commercially used explosive products. Detonating cord is not highly impact sensitive so long as the outer covering material remains intact.

MSHA has reviewed the available literature on freeing hang-ups and surveyed its field offices and found that a variety of procedures are used. Hangups are commonly freed by placing charges of explosives in contact with, or as near as possible to, the blockage, often with poles. Some mine operators use detonating cord to initiate the charges while others use detonators. MSHA believes that the use of detonating cord to initiate the explosives allows for complete control of the firing time and provides greater safety for the miners involved.

The proposal would not preclude the use of such devices as ballistic disks which are initiated by a detonating cord.

Sections 56/57.6306 Loading, blasting, and security. The proposal would revise existing §§ 56/57.6306, which address loading and blasting precautions. In addition, the proposal would add provisions to ensure that the blast site is secure from unauthorized entry when loading is interrupted or firing is delayed. It would replace the security provisions of §§ 56/57.6313. Existing paragraphs (a) and (b) would be redesignated as paragraphs (b) and (c) without change and a new paragraph (a) would be added. Existing paragraph (d) would be redesignated as (e). Existing paragraphs (c) and (e) would be revised and combined with the provisions of existing §§ 56/57.6313 as proposed paragraph (d). No changes are proposed to existing paragraphs (f) and (g).

When explosive materials or initiating systems are brought to the blast site, proposed paragraph (a) would require that the area be barricaded and posted, or flagged against unauthorized entry. MSHA intends that this new requirement would prevent unauthorized or inadvertent entry by persons onto the blast site. The proposal would ensure that the blast site is clearly demarcated so that all persons are aware of the perimeter of the blast site. This precaution would protect against the risk of unplanned detonations and possible subsequent misfires caused by unauthorized persons, including trespassers, disturbing the blast site. Trespassing is a continuing, recognized problem on mine property. Although explosives were not involved, MSHA records show that there have been four deaths of trespassers on mine property to date in 1994.

Proposed paragraph (d)(1) of §§ 56/ 57.6306 revises provisions in existing paragraphs (c) and (e) which require loading to be continuous and the blast to be fired without undue delay. This paragraph also replaces §§ 56/57.6313 by addressing blast site security when loading is interrupted or firing is delayed.

The proposal would require that loading and firing of a blast be conducted without undue interruption or delay. This requirement reflects the longstanding and generally accepted safety practice that loading and firing be completed as soon as practicable after the process begins. The Agency recognizes that there are circumstances which cause an interruption of loading or a delay in firing. Examples of these circumstances include emergencies, unfavorable atmospheric conditions, shift changes, and large equipment failure.

When loading is interrupted or firing is delayed for any reason, the proposal would require the mine to be "attended" to prevent unauthorized entry to the blast site. "Attended" is defined in §§ 56/57.6000. MSHA believes that requiring the mine be attended when loading is interrupted or firing is delayed provides the protection needed to miners. Entry by unauthorized persons on a blast site

where explosive materials are present can present hazards to those persons and to miners. For example, a person may throw lighted smoking materials into a blast hole, disturb the initiation system, or kick material into a holeany one of which could contribute to a premature detonation. Even if premature detonation does not occur, these incidents could later expose miners to the hazards associated with misfires. Further, trespassers could remove explosive materials from a loaded hole which would constitute a violation of Bureau of Alcohol, Tobacco and Firearms (BATF) security regulations. MSHA enforces security regulations on mine property under a Memorandum of Understanding with BATF (45 FR 25564). Requiring the mine to be attended would provide a reasonable measure of protection against these risks.

MSHA believes that the proposed requirement is practicable for the mining industry because interruptions are rare and when they do occur work schedules and the availability of mine personnel generally could be adapted to satisfy the proposed requirement. For example, many large mines are operated continuously with personnel routinely on site around the clock, seven days a week. In some cases, these operations load a series of blast holes sequentially before firing. At small operations working one shift a day, specific arrangements may have to be made for the mine to be attended when an interruption in loading or delay in firing of explosives results in a delay beyond the end of the shift. It is MSHA's experience, however, that small operations ordinarily load and fire explosives during a single work shift. The presence and routine activities of these persons on site could be sufficient to prevent unauthorized entry to the blast site.

With regard to underground blasting, the proposal would require that the mine be attended when loading is interrupted or firing of explosives is delayed. However, the proposal would recognize that underground areas of a mine are secure against unauthorized entry if entrance to the mine is through vertical shafts. Slope and adit mines are secure if surface entries are locked to prevent access by unauthorized persons.

When underground blast sites are not secure against unauthorized entry, however, the proposed rule would require a person to be present at the mine to prevent unauthorized entry to the blast site when loading is interrupted or firing of explosives is delayed. Agency experience indicates that maintenance and other personnel