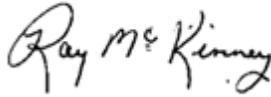


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PROCEDURE INSTRUCTION LETTER NO. I06-V-06

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SUBJECT: Procedures for Evaluation of Requests to Make Extended Cuts With  
Remote Controlled Continuous Mining Machines

### **Scope**

This Procedure Instruction Letter (PIL) applies to all Coal Mine Safety and Health enforcement personnel.

### **Purpose**

This PIL is to provide a guide for use in evaluating requests for approval of extended-cuts. This guide will also assist in the reevaluation of previously approved extended-cut plans should the need arise. These procedures deal with the evaluation of plans and include supplemental information to assist inspectors and specialists in plan evaluation.

### **Procedure Instructions**

#### **A. DEFINITION**

An extended cut (deep cut) is defined as any cut in which the on-board manual controls of the continuous mining machine are advanced inby the last row of permanent roof supports or any cut in which the mining machine is advanced more than 20 feet inby the last row of permanent roof supports. This measurement is made from the last fully completed row of undisturbed roof bolts to the point of deepest penetration of the working face.

## **B. PLAN PROCESSING**

Coordination between the groups responsible for roof control and ventilation plan review is essential to eliminate conflicts between plans.

These procedures provide a systematic approach for evaluating new extended-cut approval requests. In most cases, an on-site evaluation should be made to assess the adequacy of a proposed plan to determine if extended cuts can be safely made. However, a separate on-site evaluation for each mine may not be necessary, provided that the equipment proposed for use is similar and coal seam and roof conditions are historically consistent.

## **C. MINE HISTORY EVALUATION**

The following factors should be considered when reviewing the mine history:

1. coal seam characteristics;
2. roof falls;
3. remote-control machinery accidents;
4. ignitions;
5. face methane liberation; and
6. ventilation and respirable dust compliance.

Much of the history for the mine will be available through the Management Information System (MIS) and the Part 50 Operator and Contractor System databases. Since not all roof falls are reportable and part of the computer record, it is important to solicit input from inspectors who regularly inspect the mine to assess the extent of non-reportable falls. This information should be considered during the evaluation process.

Methane liberation may be a limiting factor for some mines. In some instances, the improved air distribution achieved using scrubbers, spray-fans or diffuser fans may alleviate some of the dust or methane control problems. Evaluation of these factors on a standard-cut should be made before considering approval of an extended-cut.

## D. PLAN PROVISIONS

The following information, specific to extended-cuts (if different than for standard-cuts), should be included in the appropriate plan.

1. All face ventilation systems used, including sketches illustrating system use, and minimum air quantities and velocities in the working place.
2. A sketch that shows the standard sequence of mining entries and crosscuts on an advancing working section including the air quantity in the last open crosscut and at the working face (if greater than the minimum quantities required by the regulations), face ventilation controls in the working place being mined, and any other working place where face ventilation controls are required.

The following information should also be included on the sketch:

- a. maximum cut depth, width, and sequence of lifts taken when mining the extended-cut;
  - b. the maximum distance that line brattice or tubing will be maintained from the point of deepest penetration of the face (setback) in entries, rooms and crosscuts;
  - c. number, location, orientation, flow rate, and pressure of water sprays; and
  - d. inlet and discharge locations and capacity of dust collectors and diffuser fans.
3. A sketch showing the width, length and sequence of pillar lifts, supplemental roof support to be installed, and ventilation quantities and controls for retreating working sections if applicable.
  4. Method used to make the 20-minute gas test.
  5. Method used to make the methane test before other equipment (i.e., roof bolting machine) enters the extended-cut.
  6. Provision for safe positioning of continuous mining machine operator and helper during all cut sequences.

7. Procedure to be followed when adverse roof conditions are encountered during the extended-cut.

## **E. TRAINING REQUIREMENTS**

Training plans should be reviewed and revised, if necessary, to ensure that they emphasize the purpose of safeguards required due to extended-cut mining and proper operation and maintenance of the special equipment used to make these cuts. All affected persons should receive this instruction prior to beginning extended-cut mining, and it should be included in the annual refresher training and task training for those miners assigned to extended-cut mining sections.

## **F. ON-SITE EVALUATION**

The on-site evaluation of an extended-cut mining system will require the cooperative effort of the regular inspector and specialists. Each specialist must be fully aware of each of the areas of concern (roof control, noise, dust and ventilation) during an investigation. This will require good communication by the specialists.

When conducting an evaluation of an extended-cut section, the inspectors and/or specialists should make the following observations and measurements for comparison with plan requirements and for evaluating the adequacy of the plan.

1. Measure the air quantity as close as practicable to the inby end of the line brattice or ventilation tubing.
2. Determine the mean entry air velocity in places using exhaust ventilation systems.
3. Check the number, type, location and direction of discharge of sprays used for spray fan systems.
4. Measure the operating spray pressure for all water spray systems (dust suppression and air moving).
5. Check the exhaust of dust scrubbers (a dirty or extremely wet exhaust may indicate improper scrubber operation).
6. Observe scrubber maintenance procedure, if applicable.

7. Ensure that the ventilation parameters (including dust control parameters) for the working section have been evaluated and approved, and that the parameters specified in the plan are in place and operational.
8. Determine that the necessary equipment to make gas tests is available.
9. Observe the method used to make the 20-minute gas check.
10. Observe the section cut sequence.
11. Observe the positioning of the continuous mining machine operator and helper and the foreman relative to permanent support, machine movements, and scrubber discharge, if applicable.
12. Determine compliance of entry/crosscut widths, pillar dimensions, depth of cut, and roof support spacing.
13. Observe the following during a complete roof bolting cycle:
  - a. method used to measure methane prior to entering place to be bolted;
  - b. support installation sequence;
  - c. drilling of test holes; and
  - d. location of roof bolting machine operator(s) and helper during the roof bolting cycle.
14. Evaluate roof and rib conditions and look for:
  - a. changes in roof strata;
  - b. changes in roof stress as evidenced by cutters or rib spalling;
  - c. geologic discontinuities such as faults, kettlebottoms, sand channels, and clay veins;
  - d. change in joint spacing or direction; and

- e. presence of water.
15. Evaluate the effectiveness of the existing support methods, including Automated Temporary Roof Support (ATRS) systems, for the roof/rib conditions observed as they relate to extended-cuts.

## **G. SUPPLEMENTAL INFORMATION**

This section presents supplemental information only and is not intended to be used as additional plan requirements or on-site evaluation criteria.

The following information, subdivided into the areas of cut-depth, ventilation, respirable dust, methane and roof control, is included to assist inspectors and specialists in plan evaluation.

### **1. CUT-DEPTH**

- a. Evaluation of proposed extended-cut systems may be necessary on a mine-by-mine basis because of the number of variables involved. In some isolated instances, evaluation of proposed systems may be necessary on a section-by-section or area-of-a-mine basis.
- b. Investigations have shown that a maximum depth of cut should be established as well as a maximum curtain setback. Given present technology, experience indicates that maximum cut-depth should not exceed 40 feet. Beyond this distance, it becomes difficult for the machine operator to judge height, depth and width, and the operator may be likely to go beyond supports to see and hear better. Roof evaluation by visual observation becomes extremely difficult, if not impossible, at distances greater than 40 feet. The deeper the cut, the more roof is exposed and the probability of undermining bad roof without detection increases. If plans for depths greater than 40 feet are considered for approval, significantly better methods of control should be provided for the machine operator. Some form of roof assessment should be required to detect slips and other geologic anomalies that can trigger falls. Laser guidance, electronic distance measuring devices, and other high-technology tools may be considered.

- c. The methane release of the working places is critical. Each face ventilation system has a limited amount of methane that it can dilute. This limit is a function of several variables, including the quality and quantity of intake air provided, the curtain setback, and the mixing capabilities of the supplemental ventilation system being used.
- d. The section cut sequence should match depth of cut with entry and crosscut spacing when practicable. Cut sequences that encourage mining extended cuts greater than approved in the plan should be avoided; for example, a cut sequence that leaves a final lift of less than 5 feet.

## 2. VENTILATION

- a. Cut sequence proposed - sump cuts should be limited to 20 feet unless in-mine investigations show that deeper sumps can be effectively ventilated at all times.
- b. Cut sequences should be planned so cut-throughs are from intake to return when practicable.
- c. Requests for brattice or tubing setbacks greater than 40 feet should not be approved without an in-mine investigation. The in-mine investigation should ensure that adequate face sweep and dilution of methane are provided.
- d. Scrubber maintenance is important in maintaining the rated capacity of the scrubber system. Appropriate maintenance as per manufacturer's specifications should be followed. As an example, one major manufacturer recommends the following for a flooded-bed dust collector:
  - 1) Twice each shift: Clean filter with water.
  - 2) Each shift: Replace filter; back flush dirty filter with water and allow to dry; and when dry, shake remaining dirt from filter before re-using.
  - 3) Daily: Wash inlets and duct work with water.

- 4) Weekly: Wash venturi, sump and de-mister module.

This recommended maintenance schedule is generally sufficient. However, field investigations have shown that in some instances more frequent cleaning of filters is necessary. In some cases, filters should be cleaned with water before each cut. Additionally, inlets and duct work may require more frequent cleaning on some occasions.

e. When a supplemental system such as a dust scrubber or spray fan becomes inoperative, the extended-cut is no longer considered to be adequately ventilated. For mining to continue, the operator must revert to a previously approved standard-cut plan that does not require the supplemental system to be functional.

f. Each spray fan system should be checked with a water pressure gauge at the spray nozzle. Systems should also have a means for adjusting the pressure to the desired level. Filters should be maintained to prevent plugging that would decrease the water pressure and flow rate.

g. When diffuser fans are used, consider the following:

- 1) air flow capacity of the diffuser fan;
- 2) location of the diffuser fan on the continuous mining machine; and
- 3) direction of discharge and whether a single or dual system will be used.

### **3. RESPIRABLE DUST**

a. Shuttle car operators should not be located in the direct discharge of the dust collector.

b. When practicable, the machine operator and helper should remain in intake air during the mining cycle.

c. Section cut sequence will affect the positioning of the roof bolting machine relative to the continuous mining machine. The roof bolting machine operator's exposure downwind of the miner should be minimized.

#### 4. METHANE

a. Methane tests are required at the face. On sections using a blowing ventilation system, tests should be made on the side of the entry opposite the line brattice or ventilation tubing. An extendable probe is an effective method for accurate evaluation.

b. The alarm/warning system for machine-mounted methane monitors should be located so it is always visible to the machine operator. This can be accomplished through enlarged or magnified displays and high-intensity warning lights on the machine or displays and warning lights on the remote control panel.

c. Sensors for machine mounted methane monitors should be positioned to detect the peak methane concentration in the face area. Studies have shown that for most ventilation systems this occurs on the off brattice side immediately behind the cutter head. However, for some systems the maximum methane concentration occurs in the scrubber discharge. In mines where methane is more prevalent and requires special consideration, the use of a dual sensor system increases the likelihood of detecting the peak methane concentration and its use should be encouraged. Proper sensor location could be determined through field investigation for each system.

d. Before the roof bolting machine enters a deep cut and during the bolting operation, tests for methane are required. The use of an extendable probe is an acceptable method.

#### 5. ROOF SUPPORT

a. The technology currently available to make extended-cuts possible is also sufficient to provide permanent full overhead support for all personnel. Special situations may occur in which full compliance with this provision is not possible. Under no circumstances should these exceptions be used as a means to provide a routine working location beyond the protection of permanently supported roof or a fully functional ATRS. The following provisions could be considered. No person shall proceed beyond the last full row of permanent supports except to:

- 1) install roof supports;
- 2) repair equipment according to procedures outlined in the roof control plan; or

- 3) extend ventilation controls when these controls must be extended to repair equipment. In this case the procedures outlined in the roof control plan must have been implemented. When ventilation controls are extended as part of the normal mining cycle, they should be extended remotely from under permanently supported roof.

b. When extended-cuts are made, test holes that extend above the anchorage zone of the roof bolts being used can help identify changes in roof strata.

c. The criteria provision of 30 CFR 75.222(e) addresses unsupported openings at intersections and specifies a minimum of one row of temporary support across the opening in lieu of permanent supports. The extent of unsupported roof possible when these openings involve extended cuts combined with other roof characteristics may dictate more support in these situations.

**Authority**

Sections 302 and 303 of the Federal Mine Safety and Health Act of 1977 and Title 30, Code of Federal Regulations, Sections 75.220 and 75.370.

**Filing Instructions**

This PIL should be filed behind the tab marked "Procedure Instruction Letters" in the binder for Program Policy Handbooks and Procedure Instruction Letters.

**Issuing Office and Contact Person**

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