

ASAP3005

# Field Modification Application Procedures (Electrical Lighting Systems, under Part 36, 30 CFR

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U.S. Department of Labor  
Mine Safety and Health Administration  
Approval and Certification Center

Program Circular  
PC 4015-0  
1985



This publication is one of a series that is intended to aid those interested in applying for an approval of their mining product from the Mine Safety and Health Administration's (MSHA) Approval and Certification Center. The A&CC series of publications outlines the Approval and Certification Center's standard procedures for investigations, applications, and testing.

Additional single free copies of this booklet are available from the:

Approval and Certification Center  
Technical Support  
Mine Safety and Health Administration  
U.S. Department of Labor  
RR 1, Box 251  
Industrial Park Road  
Triadelphia, West Virginia 26059

PART 36 - FIELD MODIFICATION APPLICATION PROCEDURES

Procedures for Equipment Owners (Mine Operators) to Follow When Modifying or Adding an Electrical Lighting System on Permissible Diesel-Powered Equipment Approved Under 30 CFR, Part 36.

GENERAL PROCEDURES

An equipment owner (mine operator) desiring to add or modify a lighting system on a machine approved under Part 36 must submit an application request in DUPLICATE to the Approval and Certification Center. In addition, two (2) copies of all drawings and specifications related to the proposed modification must also be included. These Field Modification Requests should be mailed to:

Chief, Approval and Certification Center  
U.S. Department of Labor  
Mine Safety and Health Administration  
Industrial Park Boulevard  
RR 1, Box 251  
Triadelphia, West Virginia 26059

Separate Field Modification Requests must be made each time a different type of electrical lighting system modification is proposed. In addition, a separate request must be made for each different type, model number, approval number of machine modified, even though the same lighting system may be utilized.

Upon receiving a Field Modification Request Application, the Approval and Certification Center will contact the MSHA District Office where the modification is being performed. A copy of the Field Modification Request will be forwarded to the District along with copies of all drawings and pertinent specification.

An MSHA Electrical Inspector will be assigned to verify the accuracy of the information supplied and to insure that the lighting system is properly installed. Upon completion of the evaluation, the Inspector will send an Inspection Report to the Approval and Certification Center.

Center personnel will evaluate the actual modifications made to the machine(s), based on the information contained in the Inspector's Report, for compliance with the applicable requirements of 30 CFR, Part 18. If the lighting system installation is determined to meet Part 18 requirements, a letter of Field Modification Acceptance will be sent to the applicant.

APPLICATION REQUIREMENTS

The Approval and Certification Center requires detailed information concerning proposed modifications to or the proposed installation of complete electrical lighting systems on permissible diesel-powered equipment. This information, when properly presented, will insure the expeditious processing of each Field Modification Request.

The following items must be addressed in the application and an appropriate response provided:

1. Company name and mailing address.
2. Name of Company Official to be contacted.
3. Type of equipment to be modified (scoop, lube truck, etc.).
4. Manufacturer of the equipment.
5. Model number, MSHA approval number, and serial number(s) of each machine.
6. Mine name/number.
7. Mine I.D. number and location (nearest post office, city and state).
8. Local MSHA office (city, state).
9. A concise description of the modification including: electrical components removed; electrical components added (provide appropriate Certification Number(s)/Model Number(s)/Part Number(s)); complete description of cable runs added or modified; hose conduit specifications; detailed packing gland information, if glands are modified; and revised wiring diagram(s), machine layout(s), gland drawings, etc.
10. Signature of company official and date.

The preceding information is considered the minimum necessary for processing. Except for drawings and other related specifications (lighting system component manufacturer's data, information, etc.) the required information may be provided on a "Field Modification Request Form" (attached). All applicants are advised and encouraged to use this form when submitting Field Modification Requests.

PERMISSIBILITY REQUIREMENTS

Lighting systems used on permissible diesel-powered equipment must be designed and installed according to the applicable requirements of 30 CFR, Part 18. As a minimum, lighting system components must be installed:

1. In compliance with the requirements of Part 18 with respect to joints, lead entrances, and other pertinent design features.
2. In a manner which provides mechanical protection for all cables by: (a) enclosing the cables in hose conduit, metal tubing, troughs, or other equally effective means; (b) removing all sharp corners or edges which may contact the cable jacket; (c) clamping the cables to prevent undue movement; and (d) positioning the cables apart from hydraulic lines or components.
3. In a manner which provides protection against damage to headlights, pushbuttons, switch operators, and any other vulnerable electrical component.

Furthermore, applicants are advised that all machine-mounted lighting fixtures (headlights) must be electrically grounded to the machine by a separate grounding conductor. Although NEW OR MODIFIED lighting system installations require the use of three-conductor headlight cables (two power, one ground), the Approval and Certification Center will accept field modifications where two-conductor headlight cables are specified provided:

1. The installation of the lighting system was made prior to the development of these field modification procedures;
2. The lighting fixtures will not accommodate three-conductor cables without remachining and/or replacing packing gland parts;
3. Each lighting fixture is provided with a separate external ground conductor securely attached to the headlight housing and to the machine frame. The ground conductor must have an electrical rating which meets or exceeds the current carrying capacity of the headlight circuit under fault (short circuit) conditions. If external ground conductors (ground straps) are utilized, information concerning the location and method of attachment to the lighting fixtures and to the machine frame must be provided with the Field Modification Request;

4. The "Ground Straps" are made from a material which resists deterioration in a mine environment and are inspected frequently; and,
5. The use of external ground conductors does not conflict with other (existing or future) permissibility regulations in Title 30.

#### MACHINE INSPECTION PREPARATION

Each modified machine should be prepared for an examination by an MSHA Inspector in the following manner:

1. Each machine will be moved to a fresh air location outby the last open crosscut and free from obstructions or, if the machine is located on the surface, moved to a clear area.
2. All covers of enclosures affected by the change will be removed.
3. The flanges and interior of each enclosure affected by the change, including the cover, must be cleaned thoroughly.
4. All new hoses, cables, and cords must be cleaned to expose surface markings.
5. All electrical components must be cleaned to reveal all stampings, identification plates, certification numbers, or explosion test markings.

#### ADDITIONAL MODIFICATIONS

An equipment owner (mine operator) is NOT required to submit a Field Modification Request to the Approval and Certification Center which duplicates modifications to identical machines of the same model and approval number for which the Center has issued a letter of acceptance. In this case, the applicant must notify the MSHA (District or Subdistrict) Office of the additional machines modified. The machines will be inspected during the next scheduled electrical inspection.

The follow-up letter that is sent to the MSHA District or Subdistrict Office must include:

1. Date of the original Field Modification Request and the date of the letter from MSHA (Approval and Certification Center) granting an acceptance for modification.
2. The type, model number, approval number, and serial number(s) of the original machine(s) modified and of the machines to be modified.

3. The total number of machines modified.

This procedure also applies to lighting system changes which involve:

1. Duplicating the original equipment manufacturer's approved electrical lighting system design on an identical machine which has been granted a Part 36 Approval by MSHA.
2. The removal of electrical components from a machine. For example, if a machine is equipped with multiple headlights (i.e., two front and two rear), one front headlight and one rear headlight may be removed without conflicting with a Part 36 machine approval requirement (Ref. 30 CFR, 36.33(d)). All unused cable entrances must be plugged and the plugs secured in place in accordance with 30 CFR, Part 18. (See Figure 10 of Part 18 for an example.)
3. Changes made within an explosion-proof electrical enclosure which do not conflict with Part 18 (Note: Circuit protective devices such as circuit breakers, fuses, etc., must be retained as originally approved.).
4. Replacement of electrical lighting system components which are identical to those originally approved with the system; or,
5. Changes in location of the electrical lighting system components, provided that the nature of changes made do not conflict with Part 18 (Ref.: 18.20(d); 18.30(b); 18.32(f); 18.36; 18.46(b); and 13.61(b)(3)).

It is not necessary to send a copy of the follow-up letter to the Approval and Certification Center. Records of these additional modifications will be retained by the District or Subdistrict Office on a mine to mine basis.

#### PART 36 - FIELD MODIFICATION REQUEST FORM

Guidelines and Instructions For Completing Equipment Owner's (Mine Operator's) Field Modification Request Form for Adding or Modifying an Electrical Lighting System on Permissible Diesel-Powered Equipment Approved Under 30 CFR, Part 36.

The Field Modification Request Form must be filled out completely. Leave no blanks. If a section does not apply, write N/A. The information contained on this form is the minimum needed for processing by the Approval and Certification Center.

Separate requests must be made each time a different type of modification is proposed. In addition, a separate request must be made for each different type, model number, and approval number of machine, even though the same lighting system may be utilized.

The following guidelines should be used when completing the form:

1. The description of change should be a narrative describing all of the changes made to the machine, including specific references to the electrical components modified or added in addition to details of the modification(s).
2. If electrical components are removed or added, the type of component, including the electrical rating, manufacturer, part number, and the MSHA certification number, must be specified for each electrical enclosure.
3. If an explosion-proof electrical enclosure is added and that enclosure does not have an MSHA Certification Number, it must be identified by the Approval Number of the machine from which it was removed.
4. Information concerning the "Cable Runs Added or Modified" should be provided only if cable(s) and/or packing gland parts are added or modified.
5. If an electrical cable is added or changed, the AWG size, number of conductors, cable type (SO, SJO, etc.) outside diameter (including tolerances), and MSHA acceptance number must be provided. (Note: Lighting System Cables are not required to have an MSHA Acceptance Number if they are totally enclosed in MSHA Accepted Flame-Resistant Hose Conduit.) Furthermore, information concerning short-circuit protection for each cable must be indicated.
6. The inside diameter, location, and MSHA Acceptance Number must be provided for all hose conduit specified.
7. If a light is added or its location changed, the method of providing protection for the light must be described.
8. The gland entrance parts for all the electrical enclosures added or modified must include: nipple (stuffing box), bushings, hose tube, and nut. The packing size, type, and method of plugging unused entrances should also be noted. If the manufacturer's gland assembly part number(s) and drawings are not available for each component of the gland assembly, then the type of material and dimensions of each part must be noted on the form. (Note: Both diameters of the stuffing box must be specified.)



A sample Field Modification Request Form has been prepared for use as a guide and reference purposes. This form and format must be used for presenting the required information for each request submitted.

Equipment Owner's (Mine Operator's) Field Modification Request Form  
for Adding or Modifying an Electrical Lighting System on Permissible  
Diesel-Powered Equipment Approved Under 30 CFR, Part 36.

Date: January 3, 1983

Company Name: A&CC Mining Company

Address: RR 1 BOX 251

TRIADELPHIA WV 26059

Name of Company Official to be Contacted: R.C. Boring

Type of Equipment: Rockduster

Manufacturer: B&S Company

Model: RD-1 Serial No.(s): 00013

Number of Machines Modified: 1 MSHA Approval No.: 31-200-2

Operating Company: A&CC Mining Company

Mine No.: A&CC #2 ID No.: 9900001

Mine Location: Triadelphia, WV 26059

Local MSHA Office: Northeastern - Pittsburgh Subdistrict

Nature of Changes Made:

1. Concise Description of Change: AN XYZ CORPORATION ENGINE-DRIVEN  
ALTERNATOR LIGHTING SYSTEM WILL BE ADDED TO THE SUBJECT MACHINE.

THE LIGHTING SYSTEM WILL CONSIST OF THE FOLLOWING EXPLOSION-PROOF

ELECTRICAL COMPONENTS:

1) XYZ CORPORATION MODEL E, 12 VOLT, 15 AMP ALTERNATOR; X/P-1234-1

2) XYZ CORPORATION SERIES 1, 12 VOLT, 20 AMP, 2 POLE, 3 POSITION

(CENTER OFF) LIGHT SWITCH ENCLOSURE; X/P-5678-0

3) TWO (2) XYZ CORPORATION TYPE 60, 12 VOLT, 60 WATT, PAR 46, HEAD-

1. Continued

LIGHTS; X/P-9876-14 IN ORDER TO INSTALL THE LIGHTING SYSTEM, TWO (2)  
SELF-CONTAINED, POWERED, CLASS 1 HEADLIGHTS APPROVED UNDER 30 CFR,  
PART 20, WILL BE REMOVED AND REPLACED BY XYZ CORPORATION  
HEADLIGHTS. THE ALTERNATOR WILL BE MOUNTED IN THE ENGINE  
COMPARTMENT TO A BRACKET WELDED TO THE FRAME OF THE MACHINE. THE  
BRACKET WILL BE BOLTED TO THE ALTERNATOR USING THE PREMACHINED  
HOLES PROVIDED IN THE END BELL HOUSING OF THE ALTERNATOR. THE  
ALTERNATOR WILL BE DRIVEN BY A HYDDRAULIC PUMP MOTOR. THE LIGHT  
SWITCH ENCLOSURE WILL BE INSTALLED IN THE OPERATOR'S COMPARTMENT.  
THE ELECTRICAL COMPONENTS WILL BE CONNECTED USING NO. 12 AWG, 3  
CONDUCTOR, TYPE SO, 600 VOLT CORDS ENCLOSED IN 3/4" I.D. MSHA  
ACCEPTED FLAME RESISTANT HOSE CONDUIT (2G-300). THE CONDUIT ENDS  
WILL BE SECURELY ATTACHED TO THE PACKING GLANDS WITH APPROPRIATE  
SIZE HOSE CLAMPS.

EXCEPT FOR THE HEADLIGHTS, ALL PACKING GLANDS WERE SUPPLIED WITH THE  
ELECTRICAL COMPONENTS. AN XYZ CORPORATION NO. A-1234 GLAND ASSEMBLY  
WILL BE INSTALLED IN ONE (1) OF THE TWO (2) GLAND ENTRIES PROVIDED  
WITH EACH HEADLIGHT. THE REMAINING GLAND ENTRY ON BOTH HEADLIGHTS  
WILL BE CLOSED WITH AN XYZ CORPORATION B-1234 STEEL PLUG. THIS PLUG  
WILL BE TACKWELDED TO THE HEADLIGHT GLAND LOCK BAR AND BOLT.

TWO (2) 15 AMPERE FUSES (ONE FOR EACH POWER CONDUCTOR) WILL BE  
INSTALLED, USING APPROPRIATE FUSE HOLDER, INSIDE OF THE ALTERNATOR  
HOUSING FOR CIRCUIT PROTECTION. A THIRD WIRE (GROUND) WILL BE  
ATTACHED INSIDE EACH OF THE ENCLOSURES WITH AN APPROPRIATE WIRE  
TERMINAL AND MOUNTING SCREW.





4. Complete Description of Cable Runs Added or Modified

Cable Size AWG Outer Dia.	Fuse/Breaker Setting	From Component Entrance Gland Parts	To Component Entrance Gland Parts
12/3C,SO, .632" - .02" 3/4" I.D., 2G-300 Hose Conduit	(2) 15 amp fuses (15 amp 32 volt, located inside alternator housing)	XYZ Corporation Alternator As Certified _____ _____ _____	XYZ Corporation Switch As Certified _____ _____ _____
12/3C,SO, .632" - .02" 3/4" I.D., 2G-300 Hose Conduit	(2) 15 amp fuses (15 amp 32 volt, located inside alternator housing)	XYZ Corporation Switch As Certified	XYZ Corporation Headlight As Certified
12/3C,SO, .632" - .02" 3/4" I.D., 2G-300 Hose Conduit	(2) 15 amp fuses (15 amp 32 volt, located inside alternator housing)	XYZ Corporation Switch As Certified	XYZ Corporation Headlight As Certified

Wiring diagrams (showing changes), drawings, pertinent specifications, and photographs, if any, are attached.

Sincerely,

(Company Official's Signature,  
Name, Title)

Equipment Owner's (Mine Operator's) Field Modification Request Form for Adding or Modifying an Electrical Lighting System on Permissible Diesel-Powered Equipment Approved Under 30 CFR, Part 36.

Date: \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name of Company Official to be Contacted: \_\_\_\_\_

Type of Equipment: \_\_\_\_\_

Manufacturer: \_\_\_\_\_

Model: \_\_\_\_\_ Serial No.(s): \_\_\_\_\_

Number of Machines Modified: \_\_\_\_\_ MSHA Approval No.: \_\_\_\_\_

Operating Company: \_\_\_\_\_

Mine No.: \_\_\_\_\_ ID No.: \_\_\_\_\_

Mine Location: \_\_\_\_\_

Local MSHA Office: \_\_\_\_\_

Nature of Changes Made:

1. Concise Description of Change:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_











Wiring diagrams (showing changes), drawings, pertinent specifications, and photographs, if any, are attached.

Sincerely,

(Company Officials's Signature,  
Name, Title)