

**TITLE: Standard Application Procedure for a Machine Mounted Proximity
Detection System Evaluation**

MSHA Mine Safety and Health Administration, Approval & Certification Center

1.0 PURPOSE

- 1.1. The purpose of this Standard Application Procedure (SAP) is to explain the basic investigative process, and specify the minimum documents and specifications necessary to initiate an investigation leading to the issuance of a Proximity Detection System Evaluation.
- 1.2. The Proximity Detection System Evaluation program provides the applicant with a means of having the machine mounted components of a proximity detection system evaluated by MSHA prior to being added to a permissible machine. This allows the machine applicant to specify an MSHA evaluation number and, therefore, not require a complete electrical investigation in conjunction with the machine approval application.

2.0 SCOPE

This SAP encompasses all applications submitted for a Proximity Detection System Evaluation under 30 CFR, Part 18. Note: Part 18 does not include performance requirements.”

3.0 REFERENCES

- 3.1. 30 CFR Part 18 “Electric Motor-Driven Mine Equipment and Accessories”
- 3.2. APOL1009 “Application Cancellation Policy”
- 3.3. ACRI2001 “Criteria for the Evaluation and Test of Intrinsically Safe Apparatus and Associated Apparatus”

4.0 DEFINITIONS:

Proximity Detection System – A system designed to alert miners as they approach known dangerous areas around mining equipment. Such a system may also initiate a set of controls that slow, stop, and/or disable the movement or certain functions of the subject mining machine.

5.0 APPLICATION PROCEDURE

- 5.1. All applications for a Proximity Detection System Evaluation must include the documentation listed in Sections 5.1.1 through 5.1.5.

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- 5.1.1. An evaluation application letter (Refer to Enclosure A). The application letter should include the applicant's name and address; application date; model and voltage rating of the Proximity Detection System; a six character Company Application Code assigned by the applicant (this number is used to identify the application and should not have been assigned to an application previously submitted by the applicant); the name, address, telephone number, FAX number, and e-mail address of the person MSHA is to contact regarding the application and billing. The letter should be signed by the applicant. The applicant is the person responsible for answering questions regarding the subject application.
- 5.1.2. A completed evaluation checklist (Refer to Enclosure B).
- 5.1.3. All drawings, bill of materials, specifications, etc., which show the details of the design and construction of the Proximity Detection System as related to the applicable requirements of 30 CFR. Unless modified, documents previously accepted by MSHA need not be submitted,.
- 5.1.4. A complete list of the drawings, bill of materials, specifications, certified components, intrinsically safe components, etc., that are submitted, referenced, or used to construct the Proximity Detection System (Refer to Enclosure C).
- 5.1.5. A Quality Assurance certified statement (Refer to Enclosure D). The certified statement can be included in the application letter under the Proximity Detection System description or it can be a separate letter.
- 5.2. Applications may be submitted in electronic format. The procedure is available on the MSHA web page:
<http://www.msha.gov/techsupp/acc/application/online.htm>
- 5.2.1. Upon receipt of the application package by the Approval and Certification Center (A&CC), a letter estimating the maximum anticipated fee to complete the investigation and a tentative starting date will be mailed to the applicant.
- 5.2.2. An authorization response form will also be included which indicates agreement, by the applicant, to pay expenses up to the maximum estimated fee for the investigation or requests cancellation of the application. This form must be returned to the A&CC, by the applicant, before any further action can be taken on the application. If the form letter is not returned by the date specified in the fee estimate letter, the application will be canceled.

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- 5.2.3. The applicant may pre-authorize the application by authorizing up to a certain dollar amount of investigation time in the application letter. This will permit MSHA to initiate the investigation while the fee estimation process is taking place.
- 5.2.4. Applicants who submit applications to MSHA on a regular basis may choose to submit a blanket authorization indicating their agreement to pay incurred fees.
- 5.2.5. When the estimated fee is exceeded due to unforeseen circumstances encountered during the investigation, the applicant will be contacted and given the option of either canceling the action or accepting a revised fee estimate.
- 5.3. During the investigation, the A&CC Investigator assigned to evaluate the application will review the application and contact the person designated in the application letter to discuss any discrepancies. The applicant will receive a discrepancy letter listing additional documentation and components for evaluation and/or test necessary to continue the investigation. If the Applicant does not resolve all of the discrepancies listed in the letter within the time specified in the discrepancy letter, the investigation of the application will be cancelled per A&CC APOL1009 "Application Cancellation Policy".
- 5.4. The final Evaluation letter and drawing list will be mailed to the applicant when the investigation is completed.
- 5.5. The applicant will receive an invoice for the cost of the investigation after the investigation is either completed or cancelled.

(Enclosure A)

ABC Company, 950 Mining Road, Pittsburgh, PA 15293

July 1, 2012

Chief, Approval and Certification Center
765 Technology Drive
Triadelphia, West Virginia 26059

Sir:

This is a request for a new 12 volt, Model Electro, Proximity Detection System, Company Code No. 010100.

We request an evaluation of the subject Proximity Detection System assembled according to Layout Drawing 100. The subject Proximity Detection System consists of one 12 volt power supply enclosure, one switch enclosure, and four transmitters.

This Proximity Detection System will be completely assembled and available for inspection on November 1, 2012, at the ABC Company, 950 Mining Road, Pittsburgh, Pennsylvania 15293.

Enclosed are all the new or revised drawings and specifications pertinent to this application. If there are any questions, please contact Mr. John Doe at (555) 555-0001, fax (555) 555-0163, or email at doe.john@abcmining.com.

Sincerely,

John Doe
Design Engineer

Enclosure

(Enclosure B)

EVALUATION CHECKLIST
ASAP2032 – Machine Mounted Proximity Detection System Evaluation

Complete all of the following by adding a check mark or N/A on the lines provided. The check mark signifies the item has been positively addressed. N/A signifies the item is not applicable to the design of the proximity detection system.

Administrative

- _____ 1. The Evaluation application letter is enclosed.
- _____ 2. A drawing list is enclosed
- _____ 3. QA Certified Statement or a Factory Inspection Form is enclosed.
- _____ 4. All correspondence, specifications and lettering on documents are in English or translated into English and legible.
- _____ 5. All documents are titled, numbered, dated, and show the latest revision or date. If multiple pages are submitted, this information is on each page.
- _____ 6. There are no pencil or ink notations, or correction fluid (white-out) on the documents.
- _____ 7. All documents include a note: "Do not change without approval of MSHA" on each page or sheet.
- _____ 8. All submitted drawings, including sheet numbers, are traceable (referenced) back to the one or more drawings to which the equipment is built.
- _____ 9. All wiring diagrams showing intrinsically safe circuits include a warning statement: "Any change(s) in the intrinsically safe circuitry or components may result in an unsafe condition."

Technical

- _____ 10. The drawing(s) include the following:
 - _____ a. The location of all electrical enclosures and intrinsically safe components.
 - _____ b. Location of the evaluation plate and method of attachment.
- _____ 11. The location of all cables entering/exiting electrical enclosures is shown.
- _____ 12. All inter-component cables are identified by:
 - _____ a. Conductor size, (e.g., 1/0 A.W.G.).
 - _____ b. Type of cable, (e.g., G-GC).
 - _____ c. Number of conductors, (e.g., 3).

(Enclosure B)

- ____d. Electrical rating, (e.g., 2KV).
 - ____e. Outer diameter, (e.g., 1.65", ± 0.04 ").
- ____13. All explosion-proof electrical enclosures are identified by:
- ____a. Manufacturer.
 - ____b. Model/Type Number.
 - ____c. Electrical Rating (if applicable).
 - ____d. Function, (e.g., switch).
 - ____e. Certification/approval number, including extension number. If the original issuance is used, indicate "-0" for the extension number. If no certification/approval number was issued, indicate the approval number and extension number under which the enclosure was accepted.
 - ____f. Quantity.
- ____14. All intrinsically safe circuits/components are identified by:
- ____a. Manufacturer.
 - ____b. Model/Type Number.
 - ____c. Quantity.
 - ____d. MSHA Evaluation Number, including extension number. If the original issuance is used, indicate "-0" for the extension number.
- ____15. All plugs and receptacles are explosion-proof or mechanically or electrically interlocked unless used in an intrinsically safe circuit.
- ____16. The ampacity rating for each inter-component cable is adequate for the full load current of its load or a justification for the use of the cable is included with the application.
- ____17. All energy storage devices (not including batteries) housed in explosion-proof enclosures have a means of being discharged before they are accessible to personnel. The maximum discharge time of the device is specified on the drawing.
- ____18. The cross-sectional area(s) of the grounding conductor(s) is at least 50 percent of one of the power conductors on No. 6 (AWG) or larger cables, and at least the same size on cables smaller than No. 6 (AWG).
- ____19. There are no insulating materials in the enclosures that give off flammable or explosive gases when decomposed electrically. Additionally, all parts coated or impregnated with insulating materials were heat treated to remove any combustible solvents before assembly. Note: Air drying insulating materials are excepted.

(Enclosure B)

- _____20. The temperature of the external surfaces of the mechanical or electrical components does not exceed 150 °C (302 °F) under normal operating conditions.
- _____21. If the Proximity Detection System is equipped with fiber optic cable(s), which does not contain current-carrying electrical conductors, the cable must meet the following criteria:
- _____a. The cable is MSHA accepted flame-resistant unless totally enclosed within an MSHA flame-resistant hose conduit or other MSHA flame-resistant material, or totally contained within an explosion-proof enclosure.
 - _____b. A strain relief device is provided at both ends of the cable where it enters an explosion-proof enclosure not on a common frame.
 - _____c. All the conductive members are grounded on cables which contain noncurrent-carrying conductive members, such as metallic strength members and metallic vapor barriers.
 - _____d. Any cable exiting an explosion-proof enclosure was explosion tested in a gland arrangement similar to that being used and in an MSHA tested enclosure at a pressure of approximately 150 psi or the tests were waived based on a previously accepted similar design.
 - _____e. The cable manufacturer, type and outside diameter (including tolerance) is specified. The outside diameter can be specified as either a nominal quantity, with a given tolerance, or by providing the cable's minimum and maximum diameter.

Note: Cables which contain both optical fibers and current-carrying electrical conductors will be classified as electrical cables and must meet the requirements of 30 CFR Part 18.

- _____22. All circuit-interrupting devices can be reset without opening the compartment in which they are enclosed and no explosion-proof enclosure is required to be opened to operate a switch, rheostat or other device. A circuit-interrupting device does not need a method for external operation if the following criteria are met:
- _____a. The circuit-interrupting device is not required by 30 CFR 18.51(a).
 - _____b. The circuit-interrupting device protects only control circuit wire(s) or device(s).
 - _____c. The circuit-interrupting device provides protection only for cables or components internal to the explosion-proof enclosure.
 - _____d. The circuit-interrupting device can be re-closed without exposing personnel to any energized power circuit.

(Enclosure B)

- _____23. All components and quantities (enclosures, intrinsically safe circuits, components, etc.) listed on the bill of materials, etc., are also shown on the drawing(s).
- _____24. The schematic/wiring drawing(s) includes/specifies the following, where applicable.
- _____a. Short-circuit protective devices for all cables exiting explosion-proof enclosures, including their electrical ratings and trip settings, in amperes. If one protective device is used to protect several cables, the protective device must protect the smallest cable.
 - _____b. Primary and secondary transformer voltages and any voltage change from AC to DC.
 - _____c. Labels for all major switches (as to their function).
 - _____d. Identification of all intrinsically safe circuits by the MSHA evaluation number, including extension number. If the original issuance is used indicate "-0" for the extension number.
 - _____e. The note: "Any change(s) in the intrinsically safe circuitry or components may result in an unsafe condition." is stated on each schematic/wiring diagram that contains intrinsically safe circuits.
 - _____f. A "cover interlock circuit", on covers providing access to power fuses located on the load side of the circuit interrupting device (other than headlight and control circuit fuses). The interlock circuit must de-energize the explosion-proof enclosure and prevent it from automatically re-energizing until the explosion-proof integrity of the enclosure is reestablished.
 - _____g. The location of the basic electrical parts such as the circuit breakers, overloads, fuses, switches and contactors in relationship to the enclosures.
- _____25. Where applicable, the following information shall be provided (notes/statements are acceptable).
- _____a. All electrical cables are isolated from hydraulic lines.
 - _____b. All generators and other enclosures associated with the system are protected by guarding or location.
 - _____c. Wiring for non-intrinsically safe circuit conductors and intrinsically safe circuit conductors is not intermingled with wiring for other intrinsically safe circuit conductors. An exception applies only if the circuit was evaluated in that manner.
 - _____d. The voltage ratings of all conductors and cables within the enclosures are compatible with the impressed voltage.

(Enclosure B)

- ____ e. All components on a common frame are solidly frame grounded when the inter-component cable(s) to those components do not have separate grounding conductors.
 - ____ f. All electrical cables/cords are MSHA accepted flame-resistant or enclosed in MSHA accepted flame-resistant hose conduit. The conduit must completely enclose the cable. Clamping the hose conduit to the cable is not acceptable. This includes intrinsically safe cables.
 - ____ g. All cables are protected from mechanical damage and clamped in place to prevent undue movement.
 - ____ h. Electrical clearances within enclosures are in accordance with 30 CFR 18.24.
 - ____ i. The approximate location of all field generators and other enclosures is depicted. This can be a generalized layout respective to the applicable machine.
 - ____ j. The actual connections to the mining machine are depicted. This can be a generalized connection schematic showing pin outs of all connections made to the applicable mining machine.
 - ____ k. A detail explanation of what functions are controlled and at what alarm/alert levels. This should also include any customer set options that can be programmed. i.e.; "Zone 1 disables cutterhead as per customer request."
- ____ 26. A justification detailing the minimum safe distance to blasting circuits, detonators, and explosives must be provided by the applicant for any radio frequency (RF) device. One acceptable method of justification is through the calculation of the electric field strength and comparison of this value to the acceptable limits published by the Institute of Makers of Explosives (IME) in Standard Library Publication (SLP-20). For this calculation, the near field/far field boundary is assumed to be three times the wavelength of the radiate frequency unless the applicant justifies a different distance. The applicant must specify the maximum output power, normal operating frequency, maximum antenna gain and the minimum safe distance from blasting circuits, detonators and explosives.

(Enclosure C)

INVESTIGATION NO. (leave blank)

DRAWING LIST

ABC Company
Model Electro, 12 volt, Alternating Current,
Proximity Detection System Evaluation
Built According to Assembly Drawing 100
Evaluation No. (leave blank)

TITLE	DRAWING NO.	REVISION
Layout Drawing	100	A
Electrical Diagram	C-500	A
Wiring Schematic	D-500	A

(Enclosure D)

ABC Company, 550 Mining Road, Pittsburgh, PA 15201

July 4, 2012

ABC Company
950 Mining Road
Pittsburgh, Pennsylvania 15293

SUBJECT: Model Electro - Proximity Detection System
Company Application Code No. 010100

I, John Bolter, Design Engineer, certify that the ABC Company will conduct regular inspections of the subject Proximity Detection System manufactured by ABC Company to ensure that this product is made and assembled in strict accordance with the drawings and specifications evaluated by MSHA.

Sincerely,

John Bolter
Design Engineer