

MSHA APPROVAL PROCESS

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ABSTRACT

The hazardous nature of the underground mining environment necessitates the use of equipment and mining products designed to ensure safe usage in this hostile environment. Title 30, Code of Federal Regulations (30 CFR) includes requirements that equipment and products intended for use in potentially gassy areas of underground mines be approved by the Mine Safety and Health Administration (MSHA). Design and performance requirements for many of the products intended for use in the underground environment are also part of 30 CFR. This paper describes the processes available to potential applicants for obtaining MSHA approval. Emphasis is placed on ventilation-related products. A program available to operators for modifying approved equipment is described. A proposed regulation that would broaden the scope of design standards accepted by MSHA is discussed.

KEYWORDS

Mine Safety and Health Administration (MSHA), Approval and Certification Center, A&CC, Approval, Certification, Title 30 Code of Federal Regulations, and 30 CFR

INTRODUCTION

The Mine Safety and Health Administration's (MSHA) Approval and Certification Center (A&CC) was established for the purpose of testing and evaluating mine equipment and mine products to ensure compliance with the applicable parts of Title 30 Code of Federal Regulations (30 CFR). The A&CC is the only facility in the country solely responsible for ensuring safe equipment is provided to our nation's mines. However, in recent years, we have experienced an evolution in our responsibilities. Due to the proliferation of computers and other automation-related advancements in mining-related equipment, the designs submitted for approval have become significantly more complex. At the same time, the number of approval requests has declined as has the time required to process these requests. We have recently become much more involved with accident investigations and providing technical assistance to MSHA enforcement offices. Our quality control activities have increased. We perform approximately 800 post-approval product audits annually. We also investigate increasing numbers of field complaints. As a result, the name of our organization has become misleading. We are no longer strictly an approval and certification center, but more accurately a mining equipment and product technical assistance center.

The Mine Acts of 1969 and 1977 require that certain products used in gassy areas of underground mines meet the requirements of the applicable parts of 30 CFR. These parts include:

Part 7	Testing by applicant or third party
Part 15	Requirements for approval of explosives and sheathed explosive units
Part 18	Electric motor-driven mine equipment and accessories
Part 19	Electric cap lamps
Part 20	Electric mine lamps other than standard cap lamps
Part 22	Portable methane detectors
Part 23	Telephones and signaling devices
Part 26	Lighting equipment for illuminating underground workings
Part 27	Methane-monitoring systems
Part 28	Fuses for use with direct current in providing short-circuit protection for trailing cables in coal mines
Part 29	Portable coal dust/rock dust analyzers, and continuous duty, warning light, portable methane detectors for use in coal mines
Part 33	Dust collectors for use in connection with rock drilling in coal mines
Part 35	Fire-resistant hydraulic fluids
Part 36	Approval requirements for permissible mobile diesel-powered transportation equipment

Efforts are underway to eliminate Parts 26 and 29 because these parts represent out-dated technology and active applications are no longer received under these parts.

A&CC ORGANIZATION

The A&CC is divided into four operating divisions. The organizational structure ensures that those product approval areas requiring similarly qualified investigators are under the guidance of the same individual(s). The four divisions and their responsible program areas follow.

Electrical Safety Division

The Electrical Safety Division (ESD) consists of two branches. The Electrical Equipment Branch (EEB) evaluates and issues approvals for complete machines (e.g. continuous miners, shuttle cars, roof bolters, scoops, longwall mining systems, etc.). The EEB administers the field modification, the Standard Test and Evaluation (STE), the ground wire monitor, and the experimental permit programs. They also evaluate and issue certifications for explosion-proof (XP) components used to assemble machines. The Intrinsic Safety and Instrumentation Branch (IS&IB) evaluates and issues approvals or acceptances for electronic equipment that is intrinsically safe. Intrinsic safety means the device cannot discharge sufficient electrical or thermal energy to ignite a methane-in-air atmosphere or a layer of coal dust. Gas detectors, personal warning devices, and hand-held radios are several examples of types of equipment accepted by MSHA as intrinsically safe.

Mechanical Safety Division

The Mechanical Safety Division (MSD) consists of two branches. The Diesel Power Systems Branch (DPSB) evaluates and issues approvals or certifications for diesel engines and diesel power packages. The Mine Equipment Branch (MEB) evaluates and issues approvals for permissible diesel-powered equipment and dust collector systems on roof drills used in underground mines. MEB also evaluates subcomponents on mining equipment such as brakes, load locking valves, and emergency deenergization devices (panic bars).

Engineering and Testing Division

The Engineering and Testing Division (E&TD) also consists of two branches. The Materials and Explosion Testing Branch (METB) is responsible for approval of mining products such as conveyor belts, electric and signaling cables, cable splice kits, hose conduit, brattice cloth and ventilation tubing, and hydraulic fluids. The primary characteristic tested and evaluated for these products is flame resistance. The other branch in the E&TD is the Engineering Support Branch (ESB). The ESB is a group of technical specialists devoted to providing technical support to our enforcement offices and the mining industry.

Quality Assurance Division

The Quality Assurance Division (QAD) consists of the Quality Engineering Branch (QEB) and the Quality Audit Branch (QAB). The QAD is responsible for ensuring the quality of MSHA-approved products. This is accomplished by various audit programs. The division is also responsible for evaluating all field complaints received. QAD does not have any approval programs under their direction.

PRE-APPLICATION CONSULTATION SERVICES

The A&CC offers consultation services for potential approval applicants. Manufacturers are encouraged to contact the A&CC prior to submitting an application to familiarize themselves with the current application requirements and to review their design with A&CC personnel to determine the appropriate approval request format.

APPROVAL PROCESS

A new application consists of a request letter and all necessary drawings and/or specifications to sufficiently describe the critical features of the proposed product. Depending on the product line, there may be additional materials required for submission (e.g. checklists, drawing lists, test samples, etc.) Each application is required to be assigned a unique company assigned application code number. This number is a maximum of six digit number that is unique to each application. Upon receipt of the application, the A&CC assigns its own tracking number (PAR) and forwards the package to the appropriate processing division and branch.

After determining that the application meets our basic guidelines (see 30 CFR), the assigned branch performs a preliminary review of the application. Fee estimates are prepared per 30 CFR Part 5 “Fees for Testing, Evaluation, and Approval of Mining Products”. The estimated maximum fee is provided to the applicant who replies by either authorizing charges up to the maximum fee or requesting cancellation of the application. The technical investigation can not begin until the manufacturer has provided written authorization to proceed with the investigation at the estimated fee.

Once the fee authorization has been received, the technical evaluation can begin. The investigator compares the submitted documentation with the requirements, existing policies and procedures, and performs any necessary tests on submitted products or components. If necessary, the investigator prepares a listing of discrepancies and/or additional information or test samples required. This information is put into a “discrepancy letter” that is sent to the applicant. A time limit for response is included.

When the additional requested information is received, the investigator reviews and, if necessary, performs any additional tests and evaluations. If additional information is necessary, another discrepancy letter is prepared.

In some cases, a field or factory inspection of the proposed product is required. For machines, the investigator normally visits the factory to inspect the prototype to ensure that it is built according to the submitted drawings. In some other cases, for example longwall mining systems, the inspection of the assembled system takes place at the mine site. Most other products may be submitted to the A&CC for inspection, and, if necessary, tests.

After all inspections and tests are completed, and all drawing discrepancies have been resolved, the paperwork is prepared for MSHA approval of the product. The final paperwork consists of an acceptance letter, copy of the approval plate design (if required) and a listing of drawings placed on file with MSHA, if applicable. These documents constitute formal notification of approval and are sent to the applicant with the official MSHA approval number.

The process of finalizing an approval can take several weeks. In order to expedite the notification of approval provided to the applicant, an advanced notification letter may be sent. The advance notification allows mines to use the products while the paperwork is processed.

As specified in 30 CFR Part 5, the applicant will receive an invoice for the cost of the investigation after completion. MSHA bills on a quarterly schedule.

APPROVAL TYPES

The aforementioned process applies to the majority of new approval applications received at the center. Approvals are historically issued to complete products and machines. An approval may be thought of as a stand- alone unit. There are some unique product approval processes that are noteworthy.

Certifications

Certifications (commonly called X/Ps) are investigations of individual components that make up an approved machine. These X/Ps are evaluated against Part 18 requirements for enclosures and are issued X/P numbers. The X/Ps may be referenced on applications for machine approvals. Typical X/P enclosures include switchgear, connection boxes, headlights and luminaires, and electric solenoids. Explosion-proof enclosure certifications do not stand alone.

Intrinsic Safety Evaluations

Intrinsically safe electrical equipment that is to be connected to an MSHA-approved machine is evaluated as a component of that machine, or is evaluated within specified electrical parameters, and is issued an intrinsic safety evaluation letter. This intrinsic safety evaluation letter specifies the conditions of use for that product. Electrical circuits evaluated for intrinsic safety can not be used as a "stand-alone" device and must be connected to a permissible machine or instrument. Examples of equipment evaluated for intrinsic safety include remote control circuits, position sensors, and alarms.

Part 7 Approvals

Testing by Applicant or Third Party (30 CFR Part 7) is a relatively new concept for MSHA. Product lines currently evaluated under Part 7 are:

- brattice cloth and ventilation tubing
- battery assemblies
- multiple shot blasting units
- diesel engines intended for use in underground coal mines
- diesel power packages intended for use in areas of underground coal mines where permissible electric equipment is required
- electric motor assemblies
- electric cables, signaling cables, and cable splice kits

This approval part has been developed for mature product lines where the manufacturers and/or other outside laboratories have established the capability to perform the necessary MSHA-defined tests for the applicable products. The type of tests required under Part 7 are typically those that can be performed without the application of subjective judgement. An important feature of Part 7 is that MSHA does not perform the required testing. MSHA accepts testing results from the manufacturer or from independent laboratories, after MSHA has evaluated their testing capabilities. MSHA generally will witness a laboratory's first testing to acquire a comfort level with regard to that applicant's ability to manufacture the product according to MSHA requirements.

Experimental Permits

The experimental permit program is a 30 CFR Part 18 program intended to permit the use of research-type equipment in areas of the mine requiring the use of permissible equipment. Unlike an approval application, complete documentation of the proposed equipment is not required for an experimental permit application, as long as the evaluation and inspection reveal the design does not pose a fire or explosion hazard. Each component included under an experimental permit is inspected and tested. Permits are issued for a limited amount of time (6 months). Additional extensions of time are permitted if requested.

APPROVAL MODIFICATIONS

There are several programs that grant acceptance of proposed modifications to approved mining products.

Extensions

The extension of approval process permits the acceptance of substantial modifications to previously approved designs. In this case, the same processes that were previously described are followed in acquiring the approval. An extension of approval results in change in the approval number by the addition of an extension number to the original approval number.

RAMPs

The Revised Acceptance Modification Program (RAMP) is a recently developed program within the A&CC intended to simplify and expedite the process for manufacturers to gain acceptance of minor modifications to their approved products. This program was announced in September of 1998 through the A&CC's Customer Service Newsletter. The concept is that all the manufacturer is required to submit is the revised documentation and a letter describing the proposed modification(s). The A&CC evaluates the proposal and returns to the applicant a revised listing of drawings and associated revision levels as the notification of acceptance of the RAMP. No change in the MSHA approval number results from a RAMP.

Field Modifications

The field modification program is a program that permits the owner of a 30 CFR Part 18 approved electrical machine to modify his product without affecting the machine approval. In this case, the operator submits an application with the modification described either in writing, via drawings, or a combination of both. After evaluation of the proposal by the A&CC, the modification is inspected by the local MSHA enforcement office or an A&CC investigator to verify that the modification was accomplished according to the submitted specifications. Field modifications are serial number and site specific.

TECHNICAL REQUIREMENTS

The technical requirements for each product line are specified in the appropriate part of 30 CFR and MSHA policies. These may include design, performance and test requirements.

The following are other available sources of information that pertain to the approval requirements and should be considered when applying for MSHA approval:

MSHA Program Policy Manual

Official agency policies are included in the MSHA Program Policy Manual (available on the Internet at www.msha.gov). This manual is divided into five volumes.

- Volume I applies to the 1977 Mine Act,
- Volume II applies to Testing and Evaluation,
- Volume III applies to 30 CFR Parts 40-50 and 100,
- Volume IV applies to Metal and Nonmetal Mines, and
- Volume V applies to Coal Mines.

Industry Standards

Several of the parts in 30 CFR make reference to other industry standards for the applicable requirements. Some of the standards that are referenced in 30 CFR and are recommended information sources include:

- NFPA-70 "National Electrical Code"
- Military Specifications for quality control
- Military Specifications MIL-F-15160D, "Fuses; Instrument, Power and Telephone"
- Underwriters Laboratories Inc., standard for alternating current fuses (UL-198)
- American Welding Society (AWS)
- Insulated Cable Engineers Association (ICEA)
- American Society for Testing and Materials (ASTM)

The personnel at the A&CC are involved in a number of standards development committees to provide input to the development and revision of standards that effect mining equipment.

Application Procedures

The Center has written application procedure packages for most products it approves. These application procedures specify the equipment and documentation required for MSHA investigators to evaluate that product. These are available, upon request, from the A&CC.

Other MSHA Criteria

MSHA has developed criteria for products not specifically regulated by 30 CFR or for which the regulations are incomplete. These include:

- Criteria for Test and Evaluation of Intrinsically Safe Apparatus and Associated Apparatus
- Interim Fire Criteria which is a voluntary program for obtaining a fire resistance evaluation of products and materials intended for use underground.
- Mine-Wide Monitoring Systems, Barrier Classifications, and Sensor Classifications

PROPOSED INDEPENDENT LABORATORY REGULATION

The A&CC published via the Federal Register dated November 30, 1994, a proposed rule (30 CFR Part 6) titled "Testing and Evaluation by Nationally Recognized Testing Laboratories (NRTL) and Use of Equivalent Testing and Evaluation Requirements." This proposed rule would establish new procedures and requirements for the testing and evaluation of products MSHA approves for use in underground mines. It required manufacturers to use an independent laboratory to perform the necessary testing and evaluation for approval. This would permit the Agency to expand its post-approval product audit program and pursue the evaluation of new and safer technology as applied to underground mining products. This rule also would enable the Agency to approve products based upon testing and evaluation requirements other than MSHA's, if MSHA determines they provide an equivalent level of safety.

This proposal received an overwhelmingly negative reaction from the industry through comments received and reactions expressed at a public hearing that took place on May 2, 1995. The commenters were primarily concerned about the potential for increased costs and time delays through the introduction of independent laboratories in the approval process. They also expressed concern about the potential for the creation of monopolies when only one laboratory was certified to test a specific product line.

A final rule is currently being developed which addresses these and other concerns that were raised on the proposal during the comment and public hearing stages of the rulemaking. MSHA is evaluating how best to modify the proposal and still permit testing and evaluation by independent laboratories to be used for approvals in lieu of MSHA doing such work. Regarding that part of proposed part 6 which permits alternate testing and evaluation requirements to be used if found by MSHA to provide an equivalent level of safety; MSHA is in the process of considering appropriate revisions to this aspect of the proposal, in light of comments expressed by the mining community and other interested parties.

POST-APPROVAL SERVICES

The A&CC also offers a variety of post-approval services to the mining industry and to our enforcement offices.

Post-Approval Product Audits

The A&CC's Quality Assurance Division (QAD) travels to mine sites across the country to audit MSHA-approved mining products to ensure that they were manufactured according to the MSHA-approval specifications. The QAD investigators select samples of products from mine site warehouses and compare the products with the drawings on file at the A&CC. If non-conformances are noted, they are classified by QAD and other qualified A&CC personnel. The manufacturer is then given the opportunity to demonstrate or achieve compliance with the approval specifications. A manufacturer may be subject to approval rescission for failure to demonstrate or achieve compliance on an MSHA-approved product.

Field Complaints

The QAD investigates complaints about MSHA-evaluated products. These may come from MSHA enforcement, mine operators, miners, distributors or product manufacturers. These complaints may be regarding non-conforming products, non-performing products, or misrepresented products. QAD personnel investigate the complaint, and if it is justified, the manufacturer is given the opportunity to demonstrate and achieve compliance. If they are unable to do so, the acceptance number is rescinded. Products may have to be recalled or retrofitted to achieve compliance.

Accident Investigations

As a result of acquiring the expertise to evaluate proposed equipment designs, the A&CC has developed a staff of highly competent technical personnel. These persons have specialized knowledge in particular equipment or mining product areas. Because of this specialized expertise, the A&CC is often asked to assist the MSHA or OSHA enforcement offices in the investigation of mining related accidents. Accident investigations have recently grown into a significant portion of the A&CC's responsibilities. The industry is realizing a great benefit from this involvement because in many cases the lessons learned from an accident investigation have resulted in modification to the product design or in the approval requirements helping to minimize the potential for a similar accident to occur.

SUMMARY

The A&CC has a staff of highly skilled, technical personnel dedicated to ensuring that safe mining equipment and products are provided to the mining industry. This is accomplished by evaluating and approving equipment and products that meet the requirements of 30 CFR and applicable agency policies and criteria.

The post-approval product audit program supplements this approval process by helping to ensure that approved products are manufactured according to the approved documentation.

The A&CC is continually improving and streamlining its processes to achieve the most timely and cost-effective evaluations possible. The A&CC's staff is available to potential applicants for consultation prior to submitting an application for product approval. Programs are also available to the manufacturers and end users to obtain modifications to approved products.