



**REVIEW OF THE MINE SAFETY AND HEALTH  
ADMINISTRATION'S TECHNICAL EXPERTISE  
IN APPROVING AND CERTIFYING  
MINING EQUIPMENT**

U.S. Department of Labor  
Office of Inspector General  
Office of Analysis, Complaints and Evaluations

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## Table of Contents

	Page
Executive Summary.....	i
I Purpose.....	1
II Scope.....	1
III Background.....	2
IV Methodology.....	3
V Findings.....	3
VI Recommendations.....	5

### Appendix

A MSHA Response Letter.....	7
B OIG Response.....	11

## EXECUTIVE SUMMARY

The Office of Inspector General (OIG) conducted a review to determine whether the sources of scientific and technical expertise the Mine Safety and Health Administration (MSHA) uses for certification and approval of mining equipment are adequate. We believe MSHA's ability to determine that it has the necessary expertise in this area is critical given the increasingly fast pace of technological change and the ever present goal of ensuring American workers are afforded safe work places.

Our review focused on the process MSHA employs to fulfill its approval and certification mission. We reviewed: (1) whether MSHA knows what expertise they need, (2) whether the agency knows the resources it has in-house and (3) what other sources of expertise the agency uses for approval and certification of mining equipment.

We had three findings. First, no systematic and recurrent review is conducted of the expertise MSHA needs to fulfill its scientific and technical mission. Second, no comprehensive and systematic analysis is conducted to determine whether the expertise MSHA has in-house matches the technical and scientific requirements to certify and approve mining equipment. Third, no systematic search is conducted for other sources of expertise to augment what resources MSHA has in-house for approval and certification of mining equipment.

MSHA review their need and level of expertise informally through the Approval and Certification Center in Triadelphia, West Virginia. Agency personnel also take advantage of a variety of resources such as the Internet, membership in professional organizations, and training to scan the technological and scientific environment. However, these actions are not carried out systematically.

In order to enhance MSHA's program of approval and certification of mining equipment we make the following recommendations.

1. We recommend that MSHA conduct a systematic needs assessment on a recurrent basis to specify areas of scientific and technical expertise required to fulfill the agency's approval and certification mission.
2. We recommend that MSHA systematically track and monitor in-house expertise.
3. We recommend that MSHA develop a systematic method for identifying external scientific and technical sources of expertise for certifying and approving mining equipment.

The Office of the Inspector General (OIG) reviewed the Mine Safety and Health Administration's (MSHA) approval and certification of mining equipment. Our purpose was to determine whether the agency has the necessary technical and scientific expertise for approval and certification of mining equipment. This expertise is critical given the increasingly fast pace of technological innovation.

During an earlier review of a self-contained self-rescuer (SCSR) procurement contract and the Portal-Pack Recall<sup>1</sup>, we became aware of the informality with which the agency determines whether it has the necessary scientific and technical expertise for approval and certification of mining equipment. To determine whether MSHA's sources of scientific and technical expertise are adequate to fulfill its mission, we posed the following evaluative questions:

1. Does MSHA know what expertise they need to approve and certify mining equipment?
2. Does MSHA know what scientific and technical resources they have in-house to approve and certify mining equipment?
3. What other sources of expertise does MSHA use to approve and certify mining equipment?

## **II. SCOPE**

Our review focused on MSHA's approval and certification mission. We specifically reviewed the agency's ability to determine whether it has the necessary expertise to approve and certify mining equipment. MSHA performs many other technical functions in support of mining safety and health programs that were beyond the scope of our evaluation. For example, other MSHA activities include investigations of safety and health concerns relating to product approvals and litigation assistance; and research assistance to other government agencies on research programs that directly relate to MSHA. We did not review these functions.

## **III. BACKGROUND**

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<sup>1</sup> U.S. Department of Labor, Office of Inspector General, *Review of a Self-Contained Self-Rescuer Procurement Contract for the Mine Safety and Health Administration*, 1999. (2E-06-001-0003)

Under the Federal Coal Mine Safety and Health Act of 1969, as amended by the Federal Mine Safety and Health Act of 1977<sup>2</sup>, MSHA has primary authority for all inspections and compliance activities for more than 15,000 mines around the nation. A critical part of the certification process is testing/inspecting mining products to ensure conformity with high technical and safety standards. We became concerned about MSHA's ability to execute its scientific and technical mission with mining equipment during a previous study on the "Review of a Self-Contained Self-Rescuer Procurement Contract and the Portal-Pack Recall for the Mine Safety and Health Administration."

This report identified a number of deficiencies in management and technical areas. Given the fast-paced growth of technological innovation and the difficulties inherent with staying current with it, we are concerned about MSHA's ability to determine that it has the necessary expertise to approve and certify mining and safety equipment.

MSHA provides engineering and scientific expertise to assist the states and the mining industry in the resolution of safety and health issues through two technical centers one located in Bruceton, Pennsylvania and one in Triadelphia, West Virginia. We visited the Bruceton facility during our previous study.

For this review we visited the Approval and Certification Center (A&CC) located in Triadelphia. This center is responsible for approving and certifying mining products for use in underground coal and gassy underground metal mines. Technical experts evaluate and test equipment, instruments, and materials for compliance with Federal regulations. Products evaluated and tested range from extremely small electronic devices to very large mining systems.

The A&CC in Triadelphia consists of four divisions: Engineering and Testing, Mechanical Safety, Electrical Safety and Quality Assurance. 40 employees of the Center are engineers or scientist; the remainder are technicians, administrators, and support staff.

Approval and certification of mining equipment follows a sequence. After successful completion of evaluation and testing of a product, MSHA issues a license authorizing a manufacturer to produce and distribute the product for use in mines. If a product is not manufactured as it was approved, MSHA can order the manufacturer to correct the problem or revoke the approval.

#### **IV. METHODOLOGY**

For this review we examined the authorizing legislation and underlying statutory basis

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<sup>2</sup> Public Law 95-164.

of MSHA's approval and certification mission. We conducted interviews with various MSHA officials including national administration and A&CC staff in Triadelphia. We also collected and examined written agency documentation, policies, and procedures.

We conducted our review according to the *Quality Standards for Inspections* published by the President's Council on Integrity and Efficiency. We did not independently verify the validity and accuracy of the information received from MSHA officials and employees.

## **V. FINDINGS AND RECOMMENDATIONS**

### **A. Findings**

#### **1. Needs Assessment**

We found that no systematic and recurrent review is conducted to evaluate the expertise needed to fulfill MSHA's scientific and technical mission. We discovered through interviews with MSHA officials and employees that if a needs assessment is conducted it is informal and does not involve a systematic approach. Although the agency does review their need and level of expertise through the A&CC, the review is not of a systematic and recurrent nature that would justify continued reliance on the current procedure.

Agency staff takes advantage of a variety of resources such as the Internet and membership in professional organizations to scan the technological and scientific environment. However, there is no evidence that the agency's approach is systematic. A systematic approach would ensure MSHA has the requisite expertise to approve and certify mining equipment.

Agency officials stated in a 1992 internal memorandum that although significant advances have occurred in technology, MSHA "...tests and inspects products for approval as it has done for the past forty to fifty years." Some MSHA officials believed that the agency would not be able to remain on the cutting edge of technology. Agency officials today recognize that although the agency has made advances in this regard since the 1992 memo was written, MSHA can continue improving. We believe that, because of the rapid pace of technological innovation, the agency's current informal system of meeting its need for scientific and technological expertise is inadequate.

#### **2. In-House Expertise**

No comprehensive and systematic analysis is conducted by MSHA to determine whether the expertise it has in-house matches scientific and technological requirements for approval and certification of mining equipment. MSHA officials acknowledge that it is important that the agency stay abreast of the latest technological innovations in order to match the requisite expertise needed to approve and certify mining equipment.

This process should be carried out systematically in a highly-developed manner. We have found that this is not the case. Responses from interviews indicate the agency depends on institutional memory residing in their staff and their Intranet site for information on the expertise and specialty of their employees. However, institutional memory can be unreliable, their site is not consistently updated, and some employees are not listed.

The mission of MSHA is to be the expert certification body of mining equipment. According to technical support officials, the lack of institutionalized systematic training requirements-another means of enhancing in house expertise-may hinder their certification and approval mission. Employees at the A&CC stated that their training requests are not denied but that training is rarely mandated or tracked by the agency to link training to achieving its mission. However, MSHA officials told us that the agency is in the midst of a new training program that includes tracking training but that the program has not been implemented at the A&CC yet.

### **3. Identifying External Scientific and Technical Resources**

We have found that no systematic search is conducted for other sources of expertise to augment the expertise MSHA has in-house for the approval and certification of mining equipment. Realizing cooperation with other federal agencies can improve and expand the effort to prevent mine accidents and occupationally caused diseases in the mining industry, MSHA sought Memoranda of Understanding with other federal agencies. MSHA has a number of federal interagency agreements that help facilitate this objective within a limited scope. MSHA also relies on a limited number of laboratories that they are familiar with. We are concerned with the process MSHA employs in seeking expertise. Not enough is done to identify external scientific and technological expertise considering the scope of MSHA's authority.

## **B. Recommendations and MSHA Response**

The purpose of our recommendations is to improve scientific and technical knowledge available to MSHA by recommending a systematic approach be established and enacted.

1. We recommend that MSHA conduct a systematic needs assessment on a recurrent basis to specify areas of scientific and technical expertise required to fulfill the agency's approval and certification mission.
2. We recommend that MSHA systematically track and monitor in-house expertise.
3. We recommend that MSHA develop a systematic method for identifying external scientific and technical sources of expertise for certifying and approving mining equipment. For example: MSHA can join the Federal Laboratory Consortium in order to provide a network for MSHA scientific and technical staff to communicate with their peers and to link MSHA laboratories with other federal and partnership laboratories.

We suggest that MSHA implement the above recommendations by April 30, 2000.

#### MSHA Response

*"...we concur with the recommendations and will take the necessary steps to implement them. We believe that we can implement the recommendations ... by October 1, 2000. In regard to Recommendation No. 3, we will explore the feasibility of joining the Federal Laboratory Consortium in order to network more effectively with scientific and technical peers. We also intend to look at other options for developing a systematic method for identifying external scientific and technical sources of expertise for certifying and approving mining equipment. The objective will be to determine the systematic method that best suits the needs of both A&CC and the mining community which it serves."*

#### OIG Conclusion

We concur with MSHA's proposed corrective actions and consider this recommendation resolved. To close this recommendation, we would appreciate receiving a copy of the report detailing the implementation of a systematic needs assessment and a copy of the report implementing tracking and monitoring of in-house expertise. In regard to Recommendation No. 3, we would appreciate receiving a copy of the report that details the implementation of a systematic



method for identifying external scientific and technical sources of expertise. This includes but is not limited to providing OIG with an assessment concerning the feasibility of joining the Federal Laboratory Consortium.

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**Appendix A**



24 SEP 1999

MEMORANDUM FOR AMY C. FRIEDLANDER  
Director, Division of Evaluations  
and Inspections  
Office of the Inspector General

FROM:

MARK E. SKILES

Director of Technical Support

*for* *Mark E. Skiles*

SUBJECT: MSHA Comments on OIG Draft Report  
No. 2E-06-001-0005

Thank you for the opportunity to comment on Draft Report No. 2E-06-001-0005. We appreciate the effort of the Office of Inspector General (OIG) in conducting this review. We are constantly looking for ways to improve and we believe that your recommendations will be helpful in this regard. We are in full support of any modification to our programs, processes or procedures that will facilitate increased efficiency, productivity or improved quality. The mission of the Approval and Certification Center (A&CC) has expanded in recent years to include more field investigations, technical assistance, participation in accident investigations and increased product audits. Therefore, it has become more important than ever to manage our technical and scientific resources as effectively as possible.

We are in agreement with your recommendations and will take the necessary actions to comply with them. However, we would like to take this opportunity to clarify several points in the draft report. The comments are provided by section from the report.

I. PURPOSE

In this section the report indicates that the OIG "became aware of the informality with which the Agency determines whether it has the necessary scientific and technical expertise for approval and certification of mining equipment." We agree that our current methodology for needs assessment is informal. We also believe that a more formal approach can offer advantages. However, we feel that our informal approach has not resulted in any problems or technical deficiencies relative to the proper

application of health and safety standards in the certification of mining equipment. In fact, the Mine Safety and Health Administration (MSHA) is a recognized leader on the international level relative to the approval and testing of mining equipment and products. Many other mining nations recognize and accept MSHA approvals without further testing or evaluation. Other national laboratories and testing authorities respect our capabilities and experience and regularly consult with us to exchange technical information and seek advice.

## II. SCOPE

This section makes the point that MSHA performs many other technical functions that were beyond the scope of the OIG review. In listing some of these other functions, accident investigation activities were not included in the list. We believe this is a significant omission as accident investigation work has become a major activity for A&CC in recent years.

## III. BACKGROUND

The last sentence of the first paragraph alludes to a previous OIG study on the "Review of a Self-Contained Self-Rescuer Procurement Contract and the Portal-Pack Recall for the Mine Safety and Health Administration." The draft report states that the OIG "became concerned about MSHA's ability to execute its scientific and technical mission with mining equipment" during this previous study. The first sentence of the next paragraph goes on to say that "the report identified a number of deficiencies in management and technical areas." We believe that this is somewhat misleading because the earlier report actually focussed primarily on administrative and management issues such as procurement practices, communications, quality assurance, training issues, auditing standards, database development, etc. There really wasn't much discussion or findings relative to technical issues, particularly as it relates to MSHA's assessment of its scientific and technical expertise. Secondly, the approval and testing of SCSRs is atypical of the majority of approval and certification activities conducted by the A&CC. The approval and testing of SCSRs is a jointly held responsibility with the National Institute for Occupational Safety and Health (NIOSH). The technical expertise related to respiratory protection, however, resides primarily with NIOSH where all SCSR testing takes place. In other mining equipment approval programs, where the testing and evaluation of the product takes place at A&CC or under its supervision, this is not the case. Therefore, it does not seem to us to be appropriate to use the SCSR program as a basis for drawing conclusions about A&CC's approval and certification activities in general.

#### IV. METHODOLOGY

In this section the draft report indicates that the review consisted primarily of interviews of MSHA officials and staff both at the National office and at the A&CC. The draft report goes on to say that the OIG "did not independently verify the validity of the information received from MSHA officials and employees." We acknowledge again that we are in agreement with the findings of the draft report. However, we believe that the findings, while accurate, may be based more on perceptions and inferences obtained from MSHA officials and staff rather than on substantive evidence that MSHA's scientific and technical expertise has been inadequate as determined from complaints from manufacturers, mine operators, users or other third parties.

#### V. FINDINGS AND RECOMMENDATIONS

##### A. Findings

##### 1. Needs Assessment

The third paragraph of this section refers to a 1992 internal memo which stated that the "A&CC has not been able to maintain its position of being at the cutting edge of technology." The draft report does acknowledge that "agency officials today recognize that ... the agency has made advances in this regard since the 1992 memo was written." However, we believe that it is important to indicate that some formal, systematic steps have been taken to close the gap which was perceived to exist in 1992. That same 1992 memo goes on to say that "active participation on technical committees and working groups with industry, labor organizations, test laboratories, foreign countries, etc. will be pursued." This has indeed been the case. Today, A&CC engineers serve on industry and labor technical advisory groups such as the diesel particulate PEL, national and international consensus standard committees and working groups such as UL-ANSI, ISA, IEC, SAE, SEE and others. A&CC has also worked closely with foreign testing laboratories such as SIRA and HSE in the United Kingdom, BVS in Germany, and CANMET in Canada. This activity has included witnessing and supervising third party testing and exchanging technical data and information.

#### B. Recommendations

As previously indicated, we concur with the recommendations and will take the necessary steps to implement them. We believe that we can implement the recommendations of the draft report by October 1, 2000. In regard to Recommendation No. 3, we will explore the feasibility of joining the Federal Laboratory Consortium in order to network more effectively with scientific and technical peers. We also intend to look at other options for developing a systematic method for identifying external scientific and technical sources of expertise for certifying and approving mining equipment. The objective will be to determine the systematic method that best suits the needs of both A&CC and the mining community which it serves.

### OIG Response

In preparation of this report we solicited comments from MSHA after providing them with a copy of the final draft. We appreciate MSHA's cooperation during this evaluation, and for their contributions to the final report. We respond to some of their comments here.

#### MSHA Comment

*"We agree that our current methodology for needs assessment is informal. We also believe that a more formal approach can offer advantages. However, we feel that our informal approach has not resulted in any problems or technical deficiencies relative to the proper application of health and safety standards in the certification of mining equipment."*

#### OIG Response

Our position is that the issue is not whether there have been past problems or deficiencies but whether the agency can limit problems or deficiencies in the future. The purpose of conducting a needs assessment is to be pro-active. The agency's informal approach can be improved by a more formal needs assessment in order to keep pace with the rapid development of technology.

#### MSHA Comment

*The draft report states that the OIG "became concerned about MSHA's ability to execute its scientific and technical mission with mining equipment" during this previous study. The first sentence of the next paragraph goes on to say that "the report identified a number of deficiencies in management and technical areas." We believe that this is somewhat misleading because the earlier report actually focussed [sic] primarily on administrative and management issues such as procurement practices, communications, quality assurance, training issues, particularly as it relates to MSHA's assessment of its scientific and technical expertise.*

#### OIG Response

MSHA stated that in our review we used "...the SCSR program as a basis for drawing conclusions about A&CC's approval and certification activities in general." That contention is inaccurate. In our study the "Review of a Self-Contained Self-Rescuer Procurement Contract and the Portal-Pack Recall for the Mine Safety and Health

Administration” we became aware and concerned about a number of deficiencies in management and technical areas. We drew no conclusions from the previous study, but simply stated the impetus for our review and stated it in the background section. We clearly stated our findings and conclusions under separate headings, none of which included any discussion of the earlier report.

#### MSHA Comment

*We acknowledge again that we are in agreement with the findings of the draft report. However, we believe that the findings, while accurate, may be based more on perceptions and inferences obtained from MSHA officials and staff rather than on substantive evidence that MSHA’s scientific and technical expertise has been inadequate as determined from complaints from manufactures, mine operators, users or other third parties.*

#### OIG Reponse

We drew our conclusions based upon the assertions of MSHA officials as well as the lack of documentation from these officials which would support any systematic approach to determine whether its sources of scientific and technical expertise are adequate to fulfill its mission. An examination of complaints, or the lack thereof, from manufactures, mine operators, users or other third parties the testimonials would not change our conclusions or recommendations.

#### MSHA Comment

*We believe that it is important to indicate that some formal, systematic steps have been taken to close the gap which was perceived to exist in 1992...Today, A&CC engineers serve on industry and labor technical advisory groups such as the diesel particulate PEL, national and international consensus standard committees and working groups such as UL-ANSI, ISA, IEC, SAE, SEE and others.*

#### OIG Response

We accept the agency’s statement that it has taken steps to close the gap which was perceived to exist by agency officials in 1992. The expertise derived from participation in technical conferences, advisory groups, and other activities is a step in the right direction. However, the knowledge that resides in individuals as a result of such participation must be made available to the greater institution in a systematic way that ensures institutional memory. Further, the continued education and participation in these groups by agency employees should be systematically pursued after conducting a formal needs assessment and tracked.