TECHNOLOGY AND MANAGEMENT TRAINING FOR THE MINING AND PETROLEUM INDUSTRIES

The Example of the Australian Mineral Foundation

by

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Recognized internationally for the quality of its short-term intensive training and refresher courses and its wide range of earth science information services, the Australian Mineral Foundation (AMF) stands as a model of an independent, non-profit institution catering to the rapidly changing needs of several sectors - industry, government agencies, academic institutions and professional groups.

AMF headquarters are in Glenside, Adelaide, South Australia.

Introduction

One of the greatest problems facing applied scientists today is how to keep abreast of the rapid advances and changes in technology. In the mining and petroleum industries, the problem is accentuated by the need to maintain a wider knowledge of matters outside a professional's primary discipline. This is particularly true in the sphere of exploration where high risk and high-level expenditure are involved.

Interpretative techniques in the mineral industry encompass a variety of fields - geology (including mineralogy, petrology, structural geology), geochemistry, geophysics, mining engineering (along with associated specializations such as drilling, blasting, ventilation, rock mechanics), mineral processing, metallurgy, environmental sciences, mineral economics, law, marketing, accounting and management. It has been argued that a new graduate entering this industry is confronted, more than in any other, with rapid obsolescence of his knowledge and enormous gaps in his tertiary training.

The tensions which tend to arise between the geologist, mining engineer and metallurgist are all born of the inadequacy of interdisciplinary training (Parkin, 1975). In fact, as Parkin (1975) has pointed out, it is difficult to envisage any system of courses operating within reasonable time parameters which could accommodate the breadth required for an all-inclusive mineral industry training without destroying the required specializations.

As with many other aspects of modern society, the demands and challenges of the industry are changing rapidly. Geologists, for example, can no longer afford to be knowledgeable in matters specifically geological: they must also

have an understanding of mineral economics, computer technology and management, current legal requirements, government acts involving mining, petroleum exploration and development, the environment, the welfare and health of indigenous peoples. A continuing educational program geared toward well-designed, short-term, practical, interdisciplinary courses aimed at teaching new operational skills and presenting the latest theories can render vital assistance to industry.

In May of 1970, at the initiative of the South Australian Government and several Australian mining and petroleum companies, the Australian Mineral Foundation (AMF) was established for the express purpose of developing such a continuing education program covering the most recent developments in mineral and petroleum technology and related topics - as required by the resource industries. Since 1972, it has also provided a variety of information services through a specialized geoscience library and a resource and conference centre.

AMF's Educational Program

To date, 116 courses and seminars have been presented by the AMF in Australia, while another eight were offered in Southeast Asia - in Indonesia, the Philippines, Papua New Guinea and Singapore. Over 3,400 students have benefited from them; the bulk of the students have come from industry and in most cases, all expenses were met by their supporting company or organization. Course programs, therefore, have been designed with the broader needs of the industry in mind, rather than with specific individual requirements.

A photogeology class in session.

Many of the courses are intensive workshops, with the number of participants limited to a maximum of 35, thus ensuring group participation and individual attention. The emphasis is on practical application of principles. Informal discussion groups, syndicate work and case studies are considered vital.

Participants are often experienced professionals, and their involvement has contributed to the success of the program, particularly where case study material is concerned. Detailed course manuals are provided with each course and most are available for sale to the general public.

In selecting course leaders, the Foundation's policy has been to engage authorities recognized on a world-wide basis for their experience and practical knowledge in a specific field. Although this necessarily involves a relatively high fee structure, companies supporting the AMF regard the outlay of fees, travel and accommodation costs as money well spent. Overseas specialists constitute about 30% of the AMF course lecturers.

Course leaders generally design and present a course in accordance with some basic AMF specifications; sometimes they are assisted by a planning group. There is no permanent lecturing staff: course leaders are contracted for each program, thus allowing for flexibility in drawing on internationally acclaimed talent and expertise from industry, government, private consulting organizations and educational institutions.

Examples of a selected cross-section of subjects on the AMF syllabus might include:

- Exploration Management (a residential program)
- Advanced Petroleum Geology
- Decision Methods for Petroleum Exploration
- The New Seismic Interpreter
- Advanced Gas Conditioning and Processing
- Coal Geology
- Exploration Geophysics
- Geophysics for Geologists
- Photo-interpretation
- Geological Environments of Ore Deposits
- Mineral Development Decisions and Government Policy
- Mineral Economics and Commodity Economics
- Mining and Petroleum Law
- Automatic Control of Mineral Treatment Processes
- Applied Rock Cutting Mechanics
- Radiation Controls in Uranium Mining
- Geoscience Information
- Underground Water Schools

The fundamental principle behind the development of all programs is that of "user-orientation". In identifying the needs of industry, close liaison with other Australian institutions providing continuing education courses has been maintained.

A closer look at the development of the AMF "exploration management" program might serve to illustrate some of these points.

Exploration Management Program

In 1977, during the "need identification" phase of planning the AMF educational program, certain gaps in training for exploration managers were highlighted. In addition to general aspects such as exploration strategy and tactics, and personnel management (covered by conventional management schools), the mining and petroleum industries required the inclusion of topics related to the high risk, long lead-time nature of these two industries, as well as mining and petroleum law, impact on environment, the involvement of indigenous peoples, and the role of government in competitive exploration as opposed to its normal regulatory function.

A planning group was established comprising representatives of some major Australian exploration companies, government geological surveys and tertiary institutions. Conventional management schools were consulted and their programs eval-

uated to avoid duplication of effort. The resulting intensive three-week residential course has evolved to cover the following key areas:

1. Exploration in Perspective

- In the context of Australian and world economy;
- In the context of the objectives of large resource corporations, government bodies, and small organizations.

2. Management of Exploration

- Factors for success
- Exploration strategy - targets, incentives and advancing technology
- Exploration tactics - choice and sequence of techniques
- Management
 - organization and structure
 - personnel, resources and services
 - planning, control and communication
- Project assessment and the transition to development
- Joint ventures and consortia

3. Exploration and the Public Sector

- Relationship between government and industry
- Mining legislation
- Public and professional relationships
- Environmental aspects.

Applicants must have a minimum of 10 years' experience in exploration and must be serving in capacities equivalent to District Managers or Chief Geologists. Candidates are selected on the basis of their experience and current level of responsibility, and the course has generally had representation from mineral and petroleum exploration companies in Australia, government bodies, and overseas companies. The 1980 program includes overseas representation from Malaysia, Nigeria and the Philippines. All candidates present a case study on a management exercise of their own choosing.

The course is currently led by Professor Rex Davis of Imperial College, London, England, assisted by a range of resource people drawn from the ranks of senior executives of the mining and petroleum industries and senior staff of government instrumentalities and educational institutes in Australia.

The 1980 "Exploration Management" Class.

Other AMF Services

Information Transfer

In addition to developing and distributing a monthly "current awareness" bulletin (an annotated bulletin covering earth science and related information of interest to the Foundation's member organizations - culled from selected world technical literature), the AMF has been instrumental in coordinating the development of a bibliographic data base known as AESIS (Australian Earth Sciences Information System). A central recording of all documented information generated in Australia or relevant to the continent of

Australia, it contains both published and unpublished documents in the earth sciences. The latter includes company reports written on their exploration leases and lodged with government departments; initially confidential, these reports are released to open file once the ground is released. The AESIS data base has now been operating for four years and contains 11,000 citations.

Another information service is a literature search facility for all disciplines relevant to the mineral and petroleum industries, including manual and on-line retrospective searches of AESIS and other international data bases. A geoscience library is quickly expanding its collection of books, monographs, geological maps and journals, and provides the usual facilities for reading, reference and literature search.

Public Relations

The Foundation is seen increasingly as a centre of valuable resource material for various educational spheres. In the State of South Australia, it has been closely involved in developing seminars on mining and petroleum for secondary school teachers and higher education lecturers. Based on some initial seminars conducted in the Australian State of Queensland for this purpose, the program of information transfer to educators is now an annual exercise throughout Australia.

The AMF headquarters building at Glenside (Adelaide) provides a wide range of modern facilities for rent, catering to groups of up to 400 people. Facilities include an auditorium, seminar and committee rooms and offices, secretarial services, audio-visual equipment and operators, and complete catering services with dining rooms and lounges. Financed initially by two private gifts (which covered the cost of the building) and significant support from 27 mining and petroleum companies, AMF's main source of income now is through membership subscriptions, course fees, charges for information services and the rental fees for use of headquarters' facilities and services.

Summary

In less than a decade of operation, the AMF has successfully achieved the objectives laid down by its founders. A large part of its success can be attributed to the following factors:

- It is a private and independent organization strongly supported not only by the mining and petroleum industries but by government departments and various instrumentalities related to the earth sciences.
- The emphasis at AMF is on user-oriented services geared to the immediate demands of both industry and government.
- Course leaders have been carefully selected for international eminence in their field, and they have oriented their courses toward timely and practical objectives.

Lee Parkin, M.Sc., A.S.T.C., inaugural Director of the AMF.

ABOUT THE AUTHOR: Director of the Australian Mineral Foundation since 1977, Dean S. Crowe, B.E., is a graduate of the University of Adelaide in Metallurgical and Chemical Engineering. Former Chairman of the Adelaide Branch of The Australasian Institute of Mining and Metallurgy, Mr. Crowe served as AMF's Manager of Administration from 1973 until 1977.

- Close cooperation has been maintained with industry, government, professional groups and tertiary institutions alike.

The Foundation is administered by a 20-member Council; each appointment to Council is for a two-year period, which enables the nominating bodies to rotate their representation through a number of institutions. Council representation is geared toward full coordination of AMF programs and services with the interests of the groups concerned. Council members come from:

- Colleges of Advanced Education
- University Schools of Geology
- University Schools of Mining and Metallurgy
- The Australasian Institute of Mining and Metallurgy
- Australian Coal Association
- The Australian Mineral Development Laboratories
- Australian Mining Industry Council
- Australian Mineral Industries Research Association
- The Australian Petroleum Exploration Association
- Commonwealth Department of National Development and Energy
- Commonwealth Scientific and Industrial Research Organization
- Petroleum Exploration Society of Australia
- State Departments of Mines and Geological Surveys.

References

- Parkin, L.W., 1975, Continuing Education in the Minerals Industry: Paper presented to Annual Conf., The Aus. Inst. Min. Met., Adelaide, 1975, 6 p.
- Crowe, D.S., 1978, Continuing Education for the Mining and the Petroleum Industry: Conference on Engineering Education, Papers, Sydney, 1978, Barton Act, Institution of Engineers, Australia.

One of the best medium-sized convention centres in Australia, the AMF includes an auditorium which seats 400.

EDITOR'S NOTE: For further information on the AMF, its current syllabus, course manuals and other publications, write to:

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