

and milling of radioactive ores. The IAEA, ILO and WHO, recognizing the need to enhance the appreciation of developing countries in Africa of the risks involved in the nuclear mining industry and associated radiological protection measures, planned the seminar accordingly.

The topics of the seminar were chosen to cover all aspects of radiation protection in the nuclear mining industry, namely the philosophy of the International Commission on Radiological Protection (ICRP) in radiation protection, types of radiation and their interactions with matter and with living cells, sources of radiation hazards in mines and mills and associated radiological protection standards, radiation protection in the nuclear mining industry, optimization of radiation protection in the mining and milling of uranium, regulatory and licensing aspects, organization of radiation protection programmes, occupational and environmental monitoring, radioactive waste management, engineering and ventilation controls, inspection and compliance and training of personnel, protective equipment and radiation hygiene, medical and socio-

medical aspects, and handling of radiation accidents. The programme also included short reports on national activities in the areas of exploration, mining, and milling of radioactive ores. Practical demonstrations were organized through the courtesy of the French Atomic Energy Commission (the Commissariat à l'Énergie Atomique); these demonstrations included a number of experimental set-ups for measurements of radiations encountered in the uranium mining industry.

The seminar was attended by 44 participants including the invited speakers and the three Scientific Secretaries. The countries represented from Africa were Egypt, Gabon, Ivory Coast, Morocco, Niger, Nigeria, Sudan, and Zaire. The programme included 20 lectures, five practical experiments, poster presentations, and documentary film shows. A visit to the Oklo uranium mine in Gabon was arranged through the courtesy of the Compagnie Minière d'Uranium de Franceville (COMUF). The seminar was acclaimed by all participants as a most useful exchange of information on the subject of the nuclear mining industry.



## Transport of radioactive materials by post

by R.B. Pope\*

Uniform standards are essential for the safe and expeditious transportation of radioactive materials. This is especially true of transport by post where, because of the small quantities of material involved and their low associated hazard potential, minimal effort is made to identify package contents, and individual item inspection is not feasible. However, only a few countries currently permit such shipments.

To explore the reasons for this, the Agency undertook in 1980 to arrange a Seminar on Transport of Radioactive Materials by Post. At the Agency's invitation, the Universal Postal Union (UPU) and the International

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Civil Aviation Organization (ICAO) agreed to be co-sponsors. The objective of the seminar, which was held in Vienna from 24 to 27 October last year, was to encourage the safe and efficient carriage of radioactive material by post. It was designed to bring together postal administrations, competent authorities for other modes of transport, carriers, shippers, and radiation safety people, to discuss the nature and magnitude of the hazards associated with radioactive items that can be transported by post, safety and administrative requirements, the need for and advantages of allowing such shipments, and any concerns they may cause. The seminar was attended by 73 people from 31 countries and six international organizations, and 19 papers were presented.

It has been estimated that nearly a third of all shipments of radioactive materials could be made by

post, although only a much smaller fraction is being transported by that mode at present. The desire to encourage shipment by post does not arise from a wish to promote the shipment of radioactive materials *per se*, or to increase the use or profitability of postal systems; it derives rather from the interest of the IAEA, UPU and ICAO, and shippers, in having the materials transported by the fastest, cheapest and safest possible means. At its best, the postal service can be characterized as expeditious, inexpensive, and reliable. It is important that shipment by post be available, world-wide, as an option.

International organizations have developed requirements (or regulations) which are recommended for adoption and implementation by their member countries. Only a small number of countries, however, have adopted national regulations for the shipment of radioactive materials by post which are consistent with those accepted internationally by the IAEA, UPU, ICAO and the International Air Transport Association (IATA). In some countries, national regulations are less stringent than their international counterparts; in others they are more stringent. Some countries allow only domestic postal shipments, others allow only import and/or export, and still others allow both. It was felt that a uniform set of rules for national *and* international postal movement is the only viable and realistic alternative. Countries not currently permitting shipment of radioactive material by post were urged to adopt the internationally developed requirements, and countries which have requirements other than these were encouraged to reconsider their practices.

If the option of shipment by post were available world-wide both the safety and the economy of the transport of radioactive materials would be enhanced – especially in many developing countries, where alternative distribution systems are not yet functioning effectively. Although many countries do not allow postal shipments, it was suggested that some shipments are taking place illegally. It was agreed that it would be better to legalize all consignments within specified limits, and to encourage the implementation of simple, safe, uniform, and easy-to-follow rules, rather than having illegal, unsatisfactory and possibly unsafe packages in the mail.

Participants in the seminar generally agreed that postal shipment of medical compounds, such as radio-immunoassay kits, should be allowed for humanitarian reasons. Also, an extensive mail order market exists in certain countries where consumer products containing small amounts of radioactive material, such as smoke

detectors and some watches, are sold and mailed. It would be meaningless to impose rules on the transport of these products which are stricter than those which apply to their use and disposal. This does not necessarily mean that such products would always be sent by mail, if their shipment was allowed. But the option should be left open, through the uniform implementation of proper regulations by member countries of the UPU.

Countries having experience of the postal transport of radioactive materials reported that no special problems had been identified and that no serious accidents involving the shipment of radioactive materials by post had occurred. Most postal items are carried by air, and the documentation needed is very simple. Both ICAO and IATA confirmed that no additional documentation is required for items accepted for postal shipment.

One question raised at the seminar was whether undeveloped, ultra-high sensitivity photographic film could be damaged by radiation penetrating from adjacent radioactive consignments. Given that the surface dose-rate limit for postal packages of radioactive materials is  $5 \cdot 10^{-3}$  mSv/h (0.5 mrem/h), this was believed to be virtually impossible.

Some concern was expressed that no matter how safe consignments are *per se* accidents resulting in the dispersion of activity, contamination, and perhaps even ingestion of some material, could occur. However, it was generally agreed that the total risk is very low because the Regulations prescribe low activity limits for each postal package. If the contents of a package were to be dispersed as the result of an accident, resultant radiation doses would be within safe limits.

As noted earlier, general acceptance of the shipment of radioactive materials by post is essential if the option is to be used to its fullest potential. Psychological barriers and misconceptions frequently encountered in the field of radiation protection can only be remedied by information and – where applicable – training. This seems to be particularly important in the area of international postal transport. A distinction was made between training, which should be reserved for shippers, and the information to be offered to postal staff and carriers. The object should be to reassure the latter groups that packages containing radioactive materials can be handled safely if a few simple rules are followed. Any material supplied for use by postal employees should be kept at a very basic level, far less technical than the current Regulations. The presentation of facts and prescriptions would be even more valuable if some advisory material and practical examples were added.

