Practical experience in nuclear safety

by H. Andres*

Of the many activities the Agency's Division of Nuclear Safety is pursuing, one stands out clearly in its ambitious scope, the manpower and funds invested, the direct and indirect involvement of many experts in Member States, and the results that have been accomplished. This is the Agency's Nuclear Safety Standards programme, perhaps better known as *NUSS*. When it was started in 1974, many within and outwith the Agency saw it as an ambitious, if not impossible, undertaking, since it aimed at nothing less than establishing a set of comprehensive safety standards and safety guides for nuclear power plants based on a consensus of all Member States.

However, the results achieved and the progress made in the last eight years have been remarkable. This encouraging development can be attributed to several factors. One is the interest of Member States, including all countries with a nuclear industry and most countries with an active nuclear power programme: they have actively supported the programme by providing information, expertise, and funds. Another important factor has been the devotion of the participating national experts and institutions. Of paramount importance has been the highly effective procedure devised to develop the documents, which ensures that the necessary consensus is obtained at each step.

When the programme is completed in 1985, it will have produced 60 documents covering five areas: governmental organization; siting; design; operation; and quality assurance. For each area, one Code of Practice is being written, containing minimum requirements and safety objectives; and each Code of Practice is supplemented by a number of Safety Guides, which provide guidance on how the requirements and safety objectives can be achieved. That so many contributors have helped develop this programme can be attributed to their awareness of the broad benefits which will results from it. Since the NUSS documents represent a consensus of countries from east and west, north and south, including all supplier countries, they are compatible with the various practices used by Member States with an active nuclear power programme. Thus by following NUSS guidelines, a country embarking on a nuclear power programme can organize and develop its own programme in an effective and economic manner, without being tied to the practices of any one supplier country.

Although the development of NUSS documents began eight years ago, and although thousands of experts in many countries have been involved, the programme has not had much publicity, and many experts are not aware of it. But standards and guides cannot serve their purpose, unless potential users know of their existence.

With a sizeable number of documents now published, it has become imperative to "beat the drum" for NUSS. This is being done in various ways: through written publicity (brochures, newsletters, articles in periodicals, etc.); through presentations at conferences, symposia, and seminars; through missions, in which experts and staff members directly involved in the programme go on request to a Member State to explain and discuss the contents of the documents; through seminars dealing specifically with the NUSS programme; through training courses, where NUSS documents are used as the exclusive basis (e.g. on seismic aspects of the siting of nuclear power plants), or in combination with national practices (e.g. on safety analysis review, quality assurance, operational safety); and through meetings with NUSS users, so that the IAEA can obtain the vital feedback of Member States' experience with the documents.

Of these means of conveying information, missions provide the most direct exposure of a NUSS expert to the conditions in a Member State and to the opinions of its experts. The Agency, in particular through the Division of Nuclear Safety, tailors such missions to the needs of its Member States. Several such missions have been carried out. Two examples, one to Indonesia and one to the Syrian Arab Republic, will serve to illustrate how missions vary from country to country.

The Indonesian Government had requested a NUSS mission in the areas of governmental organization, siting, and quality assurance. In response to this request, the Agency sent three staff members from the Nuclear Safety Division to Jakarta for one week, one member of staff to deal with each subject. The mission was received and assisted by the representatives of the local United Nations Development Programme (UNDP), and the Indonesian National Atomic Energy Agency (BATAN).

The organizers gathered more than thirty professionals from several Indonesian organizations, and the experts presented lectures on the NUSS documents in their respective areas. The pre-agreed programme devoted a Monday to governmental organization; the Tuesday and Wednesday morning to siting; the Thursday and much of the Friday morning to quality assurance; and late Friday

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Mr Jasif Iljas (right) of the Indonesian National Atomic Energy Agency (BATAN) introducing the members of the IAEA mission, seated at the front desk.

morning to a concluding discussion of all three areas. The first three days were spent at BATAN Headquarters in Jakarta and the last two days at the Nuclear Research Centre in Bandung. Time was used most effectively, with lunch being served in the classroom during short breaks. The audience showed a strong interest in the presentations, and there were lively discussions which always extended beyond the planned closing hour. On the Saturday the mission members met Professor Baikuni, Director General of BATAN, at his office in Jakarta for a final discussion of the mission and related aspects.

Another mission of quite different character was carried out in September 1980 to the Syrian Arab Republic, at the request of the newly established Syrian Atomic Energy Commission. Since that Commission was then in its very early stages of organization, the scope of the mission was kept flexible, but it included siting considerations for a research centre, and questions related to the organization and tasks of the Commission. The IAEA sent an expert from Switzerland, one from Poland, and one from the IAEA Secretariat.

The mission members first met Professor Haddad, Director General of the Syrian AEC, for a round of discussions. They received first-hand information on the AEC's plans, intentions and objectives, on the current situation with respect to nuclear applications, and on the areas in which their advice was needed. The following day they continued the discussion with Professor Haddad, and clarified questions that had arisen. The experts then discussed the structure of their report, agreed its outline, and established a first draft. This first draft, which included the information that had been presented to them, its evaluation, and their conclusions and recommendations, was then discussed with Professor Haddad and two other professors from Damascus University. When the mission members returned to Vienna, the report was revised and transmitted as an IAEA report to the Syrian Government.

The identification of areas in which additional efforts can be useful is one important benefit a mission can provide. These additional efforts may or may not require outside assistance. In the case of the Syrian Arab Republic, a follow-up mission took place in 1982, dealing with the implementation of a radiation protection project. This is a good example of how recommendations made by a mission can be translated into useful further Agency assistance.

If missions are helpful for a country just considering a nuclear power programme, they are even more important for a country with an ongoing programme. As the programme progresses, the issues become more complex and more specific, and the need for assistance becomes more diverse and more detailed. The Agency can respond by sending missions which address topics in as much detail as is needed. Example of topics include siting – from scanning the whole territory for possible sites (site survey) to specific topics relating to a selected site (seismology, meteorology, hydrology, etc.); quality assurance – from establishing a quality assurance programme and organization to the proper implementation; or governmental organization – from legal considerations to the performance of the regulatory body.

These are but a few examples of the types of missions the Agency, and its Division of Nuclear Safety in particular, can provide. The potential for missions on specific topics has not yet been fully utilized, especially by countries with an active nuclear power programme. However, it is logical that missions reflect the stage of a nuclear power programme, by explaining and discussing the contents of NUSS documents at initial stages, and by their actual implementation in connection with specific projects.