THE USE OF ON-SITE PROJECT OFFICERS
BY A NUCLEAR REGULATORY BODY

by

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ABSTRACT

Although the Atomic Energy Control Board (AECB) was formed in 1946 it was not until 1956 that it became actively involved in the licensing and safety review of nuclear power plants. Even then, much of the licensing activity rested with a part-time committee, the Reactor Safety Advisory Committee (RSAC), consisting of experts in appropriate fields and representatives from some other government departments and agencies. Since the president of the AECB was also the chairman of the RSAC, close co-ordination between the two bodies was assured. The role of the RSAC was to advise the AECB on all aspects of reactor safety: to review supporting documents and to make recommendations on applications for site approval and construction and operating licences; to develop basic safety criteria and principles; periodically to review progress during construction from the safety point of view; and periodically to review the safety-related aspects of plant operation.

The work of the RSAC was supported by a small number of the staff of the AECB with staff members becoming organized along project lines as the nuclear power program developed. Because of the small size of the staff, project officers also had, and still have, general responsibilities to support the overall licensing program as well as specific project responsibilities. Project officers, therefore, are involved in all aspects of the licensing and safety review process.

A novel aspect of the AECB licensing program which developed from the early days is the use of on-site project officers. It is our practice to send project officers to the site full-time about 18 to 24 months before first critical, i.e. not long after commissioning activities begin, and to maintain project officers at the site at least until the plant has reached a mature operating status. At large, multi-unit nuclear power plants it is likely that on-site project officers will be present for the life of the plant.

Despite the theoretical objections to such an arrangement, the use of on-site project officers has demonstrated practical advantages which far outweigh the theoretical disadvantages. Not the least of these advantages in these days of increasing public interest in nuclear power plant safety is the visible presence of representatives of the regulatory body at the plants. The theoretical disadvantages can be overcome by careful selection of on-site project officers, by close and frequent communication with headquarters and by ensuring that project officers are properly motivated. Experience has demonstrated that, far from being subverted by close association with the licensee, project officers tend to become better and more objective "critics" in the long run.
1. The Beginnings

The Atomic Energy Control Board (AECB) was formed in 1946 under the Atomic Energy Control Act to control and develop the use of atomic energy. The centre of atomic energy research and development was the Chalk River Nuclear Laboratories (CRNL) which was an offshoot of the National Research Council. Until 1952, CRNL reported directly to the AECB. In 1954, the Act was amended to allow the Minister to incorporate crown companies to promote the use of atomic energy and Atomic Energy of Canada Limited (AECL) was formed for this purpose. The activities of the Board thereafter concentrated on the regulation of atomic energy although until recently it retained a role in funding fundamental research mainly by a system of grants to universities.

Because AECL is a Crown Corporation, it was left to be self-regulating and, in particular, nuclear reactors wholly owned by AECL were exempted from AECB licensing. Therefore, it was not until the late 1950's, when construction of the Nuclear Power Demonstration (NPD) Generating Station (G.S.) began that the Board became actively involved in the licensing of nuclear power plants.

The Reactor Safety Advisory Committee (RSAC) had been formed earlier to review the safety of a research reactor located at a university. The first Chairman of the RSAC later was appointed as the President of the Board and retained the chairmanship of the Committee. A senior member of the Board's staff was also a member. The membership also included experts in various engineering and scientific fields, including medicine, and representatives from the public service of the three levels of government: federal, provincial and municipal. The RSAC, therefore, served the dual purpose of safety review and inter-governmental co-ordination. A few professionals were hired by the Board to assist the RSAC in its work.

Since the NPD project is only about 20 km from CRNL, and CRNL was the centre for most of the research and development for the nuclear power program, the Board maintained a field office at CRNL from which the NPD project was inspected. Also, Ottawa, the headquarters of the Board, is less than 200 km from CRNL.

With the advent of the Douglas Point G.S., it was recognized that changes had to be considered. Compared to the NPD project, there were two major differences from the point of view of accessibility, administration and inspection. Both the site and the project design offices were about 500 km or more from the AECB headquarters. To assure good communications between the licensees and the Board and to keep abreast of design, construction and commissioning activities the Board sent one officer to the Douglas Point site full time and for a time had one officer located at the design centre.

Since then, as far as staffing considerations allowed, one Board officer has been posted to the design offices of AECL in Toronto where most of the design for the nuclear steam supply systems is done. However, it
has not always been possible to have an officer in both the design office and at the site at any given time.

These trials were successful and on-site project officers have become a regular feature of the AECB's licensing program for nuclear power plants. Increased priority has been given recently to re-establishing a full time liaison office at or near the design offices.

Since the Douglas Point operation there have been only five projects involving three sites which have reached a stage to date which has warranted having project officers in the field full time. Considering the small number of projects and the rapid evolution of nuclear technology changes in the licensing process and the impact of public interest in nuclear safety, it would be a bit presumptuous to speak about a "typical" case history. These days, the only "constant" in nuclear safety and licensing is "change". Any case history which we would describe would have to be reviewed in context with the other priorities and activities of the Board and the changing views regarding the breadth and depth of the regulatory review of nuclear power plants.

2. The Licensing Process, Organizational Aspects and the Role of Project Officers

Site Approval is a semi-formal step in which an applicant first makes public his intention to construct a nuclear power plant at a particular site and submits a Site Evaluation Report to the Board. The Board's primary role is radiological health and safety and the Site Evaluation Report gives a general description of the site and the plant from that point of view. Depending on the province in which the site is located and whether there is any federal government involvement in the project, an environmental assessment is conducted in parallel with the Board's review of radiological health and safety.

It may be of interest to point out that the environmental assessment process usually features public hearings but by virtue of a section in the Atomic Energy Control Regulations the Board's approval and licensing process is currently not a public one. It is expected that this anomaly will soon be eliminated by changes to the atomic energy legislation. We will probably also lose that distinguished but obsolete term "atomic energy" in our name. This change will mark the end of an era in more ways than one.

During the site approval process the Board requires the applicant to allow time for the public to comment and encourages the applicant to hold public meetings particularly if the circumstances are such that there is no provision for public hearings as part of an environmental assessment. The Board itself cannot hold formal public hearings.
The RSAC may meet a few or several times during the site approval process depending on the number and the nature of safety-related issues concerning the site and the design concept of the plant.

The formation of the project team begins with one officer being assigned to a project from the project licensing division. He is assisted by headquarters staff of the division and, as far as possible, by other project officers. Project officers, therefore, have both specific project and general duties in licensing and safety review activities. For an experienced officer the ideal division of effort is about two-thirds of his time to his project and one-third to general and other project activities. Such an arrangement makes the most efficient and effective use of the background and experience of the staff, promotes uniformity and consistency in dealing with safety and licensing issues that arise, broadens the outlook of individual officers and counters the tendency for a project officer to become isolated and overly preoccupied with his project. Such an approach is also the only practical one for a regulatory organization such as the Board which has been described as "spartanly staffed".\(^1\)

It can be seen from the previous paragraph that a project officer must be a generalist. His training is exclusively "on-the-job" training, so initially in the development of such a staff professionals with prior experience in nuclear energy fields are the most promising candidates. We have found it advantageous to employ professionals with different kinds of experience including specialists who are seeking to broaden their experience. Once a cadre of experienced project officers is established it is possible to employ a few recent graduates from university.

The Board is also building up a technical division of specialists to examine designs and safety assessments in greater detail than the project licensing division can accomplish. The work of the technical division, organized by discipline and topic rather than by project, complements the work of the project licensing division. The technical division is also responsible for the regulatory standards program which is now underway; however, it is expected that all officers will contribute to that program.

To return to the description of the licensing steps it should be mentioned that, following a preliminary assessment of the site and any public participation, activities conducted by the applicant or a federal or provincial environmental authority, a final evaluation of the acceptability of the site from the point of view of radiological health and safety is made by the Board. A final site approval is followed by consideration of an application for a construction licence. Even at the stage of the issuance of
a construction licence the design information and the safety assessment is usually in a preliminary state. Much if not most of the design work and, therefore, the detailed safety assessment and regulatory review is done during the course of construction.

As far as circumstances have permitted, the Board has maintained a liaison office at the design centre in Toronto. Our long term objective is to have a few permanent liaison officers at the liaison office and also to locate there one or more project officers for projects in the first few years of design and construction. In the early construction period it is possible that we may have one project officer at headquarters and another at the design liaison office. From these centres periodic visits are made to the plant site during construction.

About one to two years before a nuclear power plant is scheduled to commence operation, that is, about the time commissioning begins in earnest, the project officers move to the site to review the commissioning and, later the operation of the plant. This is the peak period of activity for the project team because our experience has been that much of the design safety assessment is submitted during this period, a large number of design manuals become available in their final form, and commissioning procedures and commissioning operations have to be reviewed.

By this time a third project officer may be added but even so it is evident that only a sample of the large amount of documentation and the large number of activities that exist can be reviewed in varying degrees of detail.

When an operating licence has been issued and operation of the plant at power commences the project team completes its transition from monitoring design and commissioning to monitoring operation of the plant. By this time a co-operative working relationship should be established with the operating staff.

Compliance and inspection activities take the form of reviewing operating and maintenance records and incident reports, holding discussions with the operations staff and conducting limited physical inspections of the facility. Some effort is made to become conversant with plant problems that at first sight, at least, do not appear to be related to nuclear safety. We find that paying attention to such matters improves our understanding of what influences the attitude and priorities of the operations staff and sometimes we find nuclear safety connotations to problems which are mainly production or economic ones.

There are formal annual reviews by the Reactor Safety Advisory Committee until it is considered that the plant is in a mature operating condition from the point of view of health and safety. Annual reviews are subsequently conducted by the staff.
The project team remains at the site at least until the date of "maturity". At large, multi-unit sites it is likely that project officers will remain at the site indefinitely. At each of two sites we have one or more of the four units of an "A" station operating while a "B" four-unit station is under construction or about at the start of construction. In these cases, the project team is responsible for both stations; and they have their hands full.

3. General Considerations for Project Teams

Maintenance of an independent, professional and critical attitude by the project team depends on the establishment of the proper working relationship between the project team and the staff of the licensee, or his contractors, and between the project team and the headquarters of the regulatory body. The project team must be the interface between the regulatory body and the licensees for day-to-day matters and must be vested with sufficient real authority that it plays an important part in the overall decision-making process of the regulatory body. At the same time the project team must know that it is accountable to headquarters for its actions or inactions. The project team must establish a rapport with designers, constructors and operators by developing an understanding of them and their problems. Bear in mind that "understanding" does not necessarily imply "agreeing" or "sympathizing". Even if a licensee does not agree with a decision made by a regulatory body on a certain issue, he will have more respect for that decision if he believes that at least the regulatory body considered all the aspects of the issue, that is, economic aspects as well as the safety aspects. In this respect, the project team is in a good position to get the licensee's point of view and to critically assess it.

Equally important to the establishment of good communications between the project team and the licensee is the establishment of good communications among project teams and headquarters staff. In a system such as ours this latter line of communication promotes a uniform and consistent approach to safety from project to project and very often serves to keep headquarters on the track, because much of the initiative for safety assessments comes from the project teams. Besides the usual written and telephone communications, regular meetings of headquarters staff and senior project officers are held and, at a lesser frequency, meetings are held for all reactor licensing division staff. Each project team must be viewed and must view themselves as part of a larger team and not as an isolated unit. This is made both necessary and possible in our situation by the fact that a project team of three officers comprises 10% to 15% of the total staff complement engaged in nuclear power reactor safety assessments and licensing.

Since members of a project team acquire a very broad knowledge in a number of aspects of reactor safety and many officers have specialized knowledge from their previous experience, they are called upon to contribute
to non-project oriented activities such as the development of regulatory standards, participation in industry sponsored nuclear codes and standards committees or working groups and making a contribution to the regulatory research and development program which is now getting underway. Ideally, a project officer should devote two-thirds of his time to his specific project and one-third to general project and non-project oriented activities. These extra-project activities counteract any tendency to isolationism, add to job interest and make most efficient and effective use of limited human resources.

For obvious reasons there should be at least two project officers in any field office.

The use of full time, on-site project teams has netted many benefits and, with the modus operandi previously described, we have not experienced the drawbacks that one could postulate with such a concept. Much of the success of the concept rests with the licensees themselves. Besides the professional attitude which they exhibit vis-a-vis their relationship with the project officers, and which must be reciprocal, the staff of the licensees can derive some benefit from the good communications with representatives of the regulatory body. Decisions from the regulatory body, for better or worse from the licensee's point of view, can often be expedited and misunderstandings avoided because no other method of communication has yet surpassed the effectiveness of face-to-face communication.

4. Selection of Project Officers

A project officer's work is composed about half dealing with technical matters and half dealing with people. One could argue that no problem, however technical it may seem, is less than 50% a "people problem". This latter aspect is at least as challenging and interesting as the former one.

It is evident that a certain amount of care is required in selecting the right kind of person to be a project officer, just as for any other kind of job; however, we have not found this to be difficult. The key to selection is to explain fully to an applicant the nature of the job and the different requirements it imposes on an individual. After the explanation, if an applicant is still interested in the challenge to be met, this is one good indicator as to his suitability. We look for individuals with 5-8 years experience with a university education in science or engineering. As indicated earlier, hiring professionals with a variety of backgrounds in a nuclear field, specialist or generalist, has proved useful.

We have also begun to hire a few recent graduates with nuclear engineering degrees. In the most recent cases we have started them in the section that
sets examinations for licensing utility control room operators and shift supervisors. This phase of on-the-job training quickly gives an individual some feeling of what a nuclear power plant is all about.

We have no established policy regarding rotation of project officers. So far transfers, career progression and a very low turnover of staff have resulted in residence periods of about four to six years or less at any location, although, it is possible that a project officer may work on the various aspects of a project for longer periods.

5. Concluding Remarks

The practice of having project officers resident at the design centre and at nuclear power plant sites full time started because of necessity. The practice has proved to be so successful that, given a few elementary precautions in the selection of personnel and establishment of good intra-organisational communications, we would highly recommend it to any nuclear regulatory body. Much of the success of the practice depends on the establishment of a co-operative, but correct and professional working relationship with the licensee and his agents.

A spin-off benefit, which is only now becoming evident as public interest grows in Canada in the nuclear power program, is the visible evidence to the public of representatives of the nuclear regulatory body at the nuclear power plant. However, it should be noted that "full time, on-site project officers" does not mean "around-the-clock, on-site project officers". Except for time spent observing special events or tests conducted after normal working hours, the on-site project officers work normal hours and we see no need to extend the coverage. We make this point to emphasize that the presence of on-site project officers is to promote good communications and to improve the Board's perception of what goes on in the "field", whether a design office or a nuclear power plant site. It is not an indication of the absence of trust in our licensees.

As the Board grows we expect to see safety reviews done in more detail by a centralized group of specialists. We expect, however, that the use of on-site project officers will remain a permanent feature of the nuclear power reactor licensing process in Canada.
Reference