

PUBLIC CONFIDENCE IN NUCLEAR POWER

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Abstract

Although, in the United Kingdom a healthy interest is maintained by the general public in the development of nuclear power as an energy source, concern has never been so widespread or as hostile as has been the case in the United States of America. This paper suggests reasons for this and discusses the origins of nuclear power in relation to the public and the government administrative machinery which has been built up around the subject. The method of obtaining consent to build and operate a nuclear power station is outlined and the intensive public relations exercise to which all parties contribute is put forward as a main reason why nuclear power is not only accepted by the majority but is actively encouraged.

Background

In the United Kingdom there are only two electricity utilities which operate nuclear power stations. They are the South of Scotland Electricity Board and the Central Electricity Generating Board. Both are nationalised industries and the latter is responsible for the generation and bulk distribution of electricity in England and Wales. It owns and operates 174 Generating Stations with an output capacity of 56,000 megawatts composed of a mixture of coal fired, oil fired, hydro, gas turbine and nuclear power units. The nuclear component at present consists of 8 twin reactor stations of the gas cooled magnox type whilst a further 4 twin reactor stations of the advanced gas cooled type are currently under construction. Because of the way in which the electricity supply industry is organised the general public are in direct contact with the retail distribution organizations and do not come into contact with the CEGB except on relatively rare occasions such as new generating station projects or the siting of high voltage transmission lines. With such a large organisation under unified control as the CEGB it is able to support a headquarters staff in both the planning and nuclear health and safety fields. This has enabled a uniform policy to be agreed centrally and implemented effectively. A further advantage is that single authoritative channels of communication have been established between the Board and the several Governmental regulatory authorities which are concerned with the whole field of nuclear energy.

History

The development of nuclear power in the United Kingdom started in a favourable climate in the early 1950s. Coal, the main energy source in the U.K. after the second world war was in short supply and increasing in price at a rate which was directly observable by the open coal fire burning public. Oil, then almost non-existent within the British Isles or its waters, was of foreign origin and subject to the uncertainties of foreign currency shortages and seizure of the wells mostly in the politically unsettled middle east. Gas was a rather expensive, and to many people a dangerous by-product of coal. The fanfare of publicity at the opening of the first nuclear power station at Calder Hall, dignified and given the seal of respectability by Her Majesty the Queen, did much to persuade the inhabitants of our cold and coal grimed cities that the millenium was at hand. The Windscale accident in retrospect, far from engendering hostility to the "atom", due mainly to the prompt and expert handling of the affair, did much to reassure possible antagonists that although accidents could happen, the Government and its traditional safety agencies were fully on top of the situation and no great catastrophe was likely in any way as devastating as the air raids so relatively recently endured. It is important to realize that the U.K. is so small and its communication and legislative structure so unified that attitudes and opinions are national rather than regional which the great area of the USA made almost inevitable in that country in the pre-universal television era.

With the conservative siting policy adopted for the first round of nuclear stations the plants were built in rural areas mostly on the coast and because of the influx of construction staffs, improved amenities and relatively large increases in taxes to the local authorities there was very little local opposition to the stations. Any opposition which existed was more concerned with the impact of the large structures on the visual amenities of the area and sometimes the effects of cooling water in the river or estuary.

Planning

Before a power station can be constructed irrespective of the prime heat source, planning permission is required under an Act of Parliament dealing with the supply of electricity in general. Notices giving the intent to build the station are posted in prominent places adjacent to the site and in public buildings such as the Post Office and Town Hall. Any individual, municipal authority or company business may object by writing, stating the reasons for so doing, to the Government Department concerned, which in this case is the Department of Trade and Industry, within 28 days. In practice in the interests of the public this period may be extended quite considerably.

Prior to this stage the Planning Department of the CEGB has discussed the project informally with the local government officials and their support for the proposal is solicited. If there are many objections then a public inquiry may be held at the discretion of the Secretary of State for Trade and Industry but if the local planning authority objects then the law requires

positively that such an inquiry be held. The decision as to whether to allow the station to be built rests with the Secretary of State and the inquiry merely serves to assist him. The CEGB mounts a public relations exhibition in the locality and senior Board officials including nuclear safety experts are in attendance to answer any questions in an informal atmosphere. If objections are mainly in the form of questions, public hearings are held and by discussing the various aspects of the station many of the objections are subsequently withdrawn. Quite distinct in law but coincident in time with the planning application, when a nuclear station is involved, a request for a nuclear site licence is made also to the Department of Trade and Industry and by previous informal discussion with officers of the Nuclear Installations Inspectorate, the site characteristics are derived so that argument of a lost cause is avoided. Although objections to the issue of a licence for a nuclear power station are not legislated for except by the freedom of the individual to write directly to the Chief Inspector of Nuclear Installations, questions concerning nuclear safety are asked and answered at the planning inquiry, by both CEGB and Government witnesses.

Waste Discharge

The control of discharge of radioactive waste from any source is vested in two Ministries, the Department of the Environment and the Ministry of Agriculture Fisheries and Food. Neither of these organisations has any administrative connection with the Nuclear Installations Inspectorate and each has a long tradition dating back to the 19th Century, of responsibility for controlling the disposal of various industrial wastes of all kinds. The Radioactive Substances Act 1960 in effect extended the powers of these old established ministries to include radioactive wastes and the skilled administration which over many years had won the respect of the public in looking after its interest was readily accepted as being completely impartial by both the nuclear industry and the public at large. An important part of the requirements of the Act is that before an authorisation to dispose of radioactive waste is granted the Ministries must inform and consult representatives of the local authorities in detail about the proposals. Objections can be resolved and no public inquiry is called for at any stage. Consultation at a technical level takes place between the scientists of both the CEGB and the Government Department before a formal application to discharge is lodged and thus any divergence of opinion can be discussed calmly out of the limelight of lobbyists and extremist environmentalists.

Local Liaison

Having dealt with the discussions and consultations between the licensee and the statutory bodies before and during construction there is in addition a continuing relationship with local authorities and other interested parties. One of the more interesting of these is the setting up of Local Liaison Committees whose terms of reference are

- (a) To provide information and reassurance on the manner in which radioactive materials are used at the power stations.

- (b) To explain the significance of radiological measurements which are made outside the station boundaries.
- (c) To discuss schemes for the protection of the public in the event of an accident, the schemes to be prepared by the Board in consultation with the appropriate officers of the County and local authorities.

The committee is set up by the Generating Board and representatives are invited from County and local authorities - elected members and officers together with medical officers of health - local bodies who have statutory functions such as water undertakings and river authorities, farming interests both with the National Farmers Union and Country Landowners Associations. In addition any specific organisations within 4 - 5 miles such as Trinity House (due to the lighthouse on Dungeness Head) and the Lydd Airport Authority, also at Dungeness, are invited to attend. In addition senior representatives of the authorising Ministries responsible for the control and discharge of radioactive wastes are members of the committee. The chairman is the Station Superintendent and there are representatives of the station management and Headquarters Nuclear Health and Safety Department. The press are not in attendance at the meeting but an agreed press statement is issued at the end of each meeting.

Meetings take place at the power stations once or twice each year and the results of the routine district surveys and the total curies discharged to the environment as liquid and gaseous waste are reported by the representative of the Department of the Environment; a report of station operation is given by the Station Superintendent and details of emergency plan rehearsals are given by the Station Health Physicist and discussed in detail.

The district survey which is carried out by the Station consists of measurements of airborne radioactivity and gamma dose rate from deposited radioactivity. These readings are obtained at different distances from the reactor in order to give comparative rather than absolute results. In addition any land and marine species of animals which form part of the food chain to man are assayed and the results compared with derived working levels agreed between the regulatory authority and the licensee. Particularly, in rural areas milk is collected and analysed, both for its own sake and also because the cow is a very convenient collector and averager of several radioactive isotopes which may be contaminating pasture land.

Emergency Plans

The Emergency Plan is a statutory requirement. It is very comprehensive and specifies the actions required by both CEGB personnel and outside organisations. Frequent discussions and consultations take place with local authority officers during its preparation but particularly with the police who would have the job of instituting action including distribution of stable iodine tablets to local inhabitants and in the ultimate carrying out of any necessary evacuation. Copies of the plans are given to all members of the Local Liaison Committees and they report back to their parent organisation. In all cases the recipients have

behaved in a responsible manner accepting the effort which is put into ensuring safety both of site personnel and local inhabitants rather than using the necessity for such plans as implying an impending hazard.

Regular training sessions of site personnel in emergency actions are carried out including first aid and rescue. Once each year there is a complete exercise of the plan in which a specific incident is simulated and the plan is brought into action, those taking part in the exercise having no prior knowledge of the supposed accident. The police are involved but not the general public. The exercise is witnessed by inspectors of the licensing authority and by the Board's Nuclear Health and Safety Department. Post-exercise discussions and criticism takes place in which all participants, and inspecting authorities, take part and as mentioned above the results of these exercises are discussed at the Local Liaison Committee meetings.

We believe these committees have been a most useful public relations experiment, people have been treated like intelligent and rational human beings and they have behaved like it, at no time has any attempt been made to cover up any incident no matter how minor and on all occasions the committee members have reacted in a helpful manner. Some of these elected members who have been members of these committees for some years have become remarkably knowledgeable.

Public Interest

The Board encourage visitors to all its sites both during construction and operation. Special low radiation routes through the station are planned including a visitors gallery on pile cap. Guides consisting of the wives of staff employed on the station are provided with uniforms and given instruction about the power station and they attend as and when required. A typical nuclear power station may have as many as 20,000 visitors each year including parties of children from local schools.

Two projects which are both interesting and important relate to fish farming and trout fishing.

The possibility of using power station discharges for rearing marine fish and shellfish was first discussed with the White Fish Authority about 10 years ago. The objective was to maintain the growth of these animals over the winter months, thereby bringing them to marketable size much sooner than occurs in the sea.

Initial studies were undertaken at the South of Scotland Electricity Board's Hunterston Nuclear Power Station and a conventional CEGB power station. These preliminary investigations using flatfish showed that increased growth occurred. It was decided then, that nuclear stations with their high load factors would be the most suitable sites at which to undertake future studies. Also, many of these stations are sited on open coasts where the water is unpolluted and the salinity is less variable than in estuaries.

At Hinkley Point Nuclear Power Station a private individual

in collaboration with the CEGB, is undertaking pilot scale studies on rearing crustaceans (prawns) and molluscs (oysters and clams) together. He has progressed considerably towards developing the necessary technology for a more extensive project.

The Ministry of Agriculture Fisheries & Food is planning to establish a laboratory on the Wylfa Nuclear Power Station site to investigate all aspects of rearing shellfish. They have undertaken extensive laboratory studies to develop the technology of spawning and rearing larvae. At the same time, rainbow trout have been grown in the discharge on a small pilot scale basis.

Fish farming will be a large scale development of the future, and many countries are undertaking extensive research programmes into the rearing of a variety of species. It is very probable, that in the temperate latitudes warmed discharges will make a valuable contribution to the success of such ventures. Already in the Board, provision is made at suitable new stations to build-in the necessary access to C.W. systems, so that if need be, water can be drawn for use in a fish farm.

The Trawsfynydd Nuclear Power Station, 500 MWe, has been operating successfully since 1965, it uses an inland lake as its source of cooling water. The lake was formed in 1924 to serve a small hydro-electric station to provide a local supply of electricity. An angling club, the Prysor Angling Association, was formed by local inhabitants in the early 1930's to use the natural fishing of the lake comprising brown trout coming from local streams. The lake was emptied and enlarged in 1959 prior to the commencement of the construction of the nuclear power station. At the public inquiry the Board undertook to preserve and assist the fishing rights of the angling club which has in fact continued to control the fishing of the lake. Its activities are managed by a Lake Management Committee and the Power Station Superintendent is a member of the Committee by invitation. The club realised that the lake could be developed far beyond the naturally occurring fish and since 1967 it has been trying to increase the fish population artificially. Unfortunately the brown trout, although giving good sport and good eating, is difficult to rear artificially due, amongst other things, to the predatory activities of perch. It was decided to introduce rainbow trout into the lake and the current programme consists of adding 16,000 fish per annum. Some brown trout continue to be raised on an experimental basis.

The success of the experiment is illustrated by the fact that recently the trials to choose the Welsh team for International fishing competitions were held on the lake. In addition the Board use the lake water to raise trout for stocking other lakes in the area.

The liquid radioactive effluent from the station is discharged into the lake which is also used as a source of cooling water for the turbine condensers.

The presence of small but detectable quantities of radioactive materials in the trout has not deterred the fishing and eating of the catch.

Local Involvement

Power stations employ small numbers of people, large power stations even of 2,000 MW capacity rarely employ more than 500 people. The Board's policy is to employ locally recruited labour and therefore the power station employees rapidly become part of the local community, unlike large Atomic Energy Authority establishments employing several thousand people imported into a locality and who remain in a separate group. The result is that a power station very quickly becomes "our power station" and "our nuclear power station" is even better.

Finally the activities of some of the radiological protection societies notably the Society for Radiological Protection should be given an honourable mention. This Society provides a lecturing service, free of charge, to a variety of organisations from Rotary Clubs to Mothers' Unions and this has proved a very popular and widely appreciated service to the community as a whole.

Conclusions

It is believed that the urgent need for nuclear power in the United Kingdom predisposed the public to accept the large structures comprising the power stations as necessary. The accompanying small risk of radiation exposure was also readily accepted because of the confidence which had been built up in the Government Agencies involved by virtue of their historical role in the so-called conventional safety matters such as chemical and biological control.

Whilst the future cannot be predicted with confidence it is hoped that ten years successful and safe operation now achieved will reinforce the tolerance and goodwill which has always existed between the CEGB and its neighbours.