PROMOTING NUCLEAR EDUCATION AND TECHNOLOGY IN THAI HIGH SCHOOLS

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INTRODUCTION

The circumstances for the introduction of nuclear power have changed dramatically for nations which are considering this technology today compared to the circumstances for those who began such programs in the past. Historically the introduction of nuclear programs were seen as technical and economic decisions and were made by electric utility management and approved by central government authorities. Provision for public input into such decisions was limited.

This historic approach to internal decision making on large projects no longer applies, either in the case of nuclear power projects or for many other types of projects. Today, most major projects and even some of minor significance face public reviews in one form or another in most parts of the world. Forestry developments, energy facilities, pipeline, harbors, airports, hydro stations, highways, industrial complexes and recreational facilities, including golf courses, are all scrutinized through various forms of public review. Some at the local level, some at national levels and an increasing number at the international level.

Even in cases where projects are destined for an export market, shareholder groups, advocacy organizations and in some cases even national governments of the exporting countries are requiring their producers and manufacturers to undertake environmental reviews of the impacts such projects may have on the country where they will be built and operated.

In cases where projects are financed by international agencies such as the World Bank, Asia Development Bank or under loans or guarantee programs of many national governments, environmental reviews which include public participation on the part of the nation providing the finance, as well as the host nation are sometimes required. Anti-nuclear groups in Canada have recently instituted court action to require the government of Canada to conduct environmental reviews of the Qinshan Phase 3 nuclear project in China, on the grounds that Canadian law requires such an assessment when Canadian government guaranteed export credits are involved. The Canadian government, whose Export Development Corporation is providing project financing in support of Atomic Energy of Canada Limited's lead role in the project, is contesting this action. Similar calls have been made for Canadian environmental assessment of Canadian involvement in China's Three Gorges hydro project.

Such situations obviously present new challenges to organizations attempting to do business internationally, How does a business organization comply with a law which requires a foreign bidder to undertake an environmental assessment of a project in the jurisdiction of another sovereign nation? Although this example may represent a more extreme case and one which the Canadian authorities may be planning to amend, it serves as an example of the degree to which public involvement in the environmental process has evolved.

Only a few nations in the world today are not in some way or other influenced by this fairly universal requirement to include public involvement in their project approval processes.

NUCLEAR INDUSTRY ACCEPTS REQUIREMENT FOR PUBLIC INVOLVEMENT

Public involvement has been a familiar issue to the nuclear industry for a number of years. Perhaps this head start in public involvement over many other industries gives the nuclear industry some experience which can benefit others.

The requirement for increased public involvement by the nuclear industry was created from a number of important events which have shaped public opinion. This included the impact on public attitudes of the Chernobyl and Three Mile Island accidents, the potential for the association of nuclear power with nuclear weapons proliferation and public concerns over nuclear waste disposal. Concurrent with the above events, the rapid expansion of the environmental and advocacy movements worldwide and the ever expanding reach of television and instant reporting of events has meant that news travels very fast and can have a very strong influence on shaping public reactions.

First time nuclear programs or even expansion of such programs in nations which already have them, require a great deal more public acceptance effort than their predecessors. Few nations today would consider it prudent, either politically or on the basis of making a secure financial investment, to proceed with nuclear programs without making efforts to inform their populations of their plans. These efforts to increase public awareness of the benefits of nuclear power and explain and address misinformation are necessary ingredients to any increased public support for nuclear power programs.

How to effectively undertake such public acceptance programs is of importance to many ASEAN countries as they face expanding economies and a resulting growth in electricity requirements. For some, the nuclear option is a matter of considerable interest and in almost all cases, public acceptance is usually acknowledged as a major consideration.

A THAI APPROACH TO IMPROVED PUBLIC UNDERSTANDING

As a consequence of the Royal Thai Government's decision in 1994 to examine the nuclear power option, the Department of Nuclear Technology, Faculty of Engineering at Chulalongkorn University entered into a cooperation agreement with Canadian agencies to provide training aimed at increasing the supply and variety of nuclear technical expertise in Thailand. An additional component of the cooperation agreement was a project to undertake a pilot program on public education associated with nuclear power.

As might be expected various Thai organizations have related and sometimes overlapping responsibilities for this subject. The state owned electric utility, EGAT is the principal generator and distributor of electricity. The Office of Atomic Energy for Peace is the principal regulator of nuclear technology in Thailand. Chulalongkorn University has historically provided technical and engineering training in the field. National government policy is exercised through committees of various ministries.

Nuclear power programs are ambitious and expensive undertakings and require significant long term investments in technical and management training, infrastructure, capital and human resources capabilities. Because of these large commitments, most project proponents consider it essential that they posses a sound understanding of effective public acceptance approaches well in advance of any decisions on such programs themselves.

WHY CANADA?

Canada has supported the development of nuclear technology in Thailand for over ten years, starting with the donation of equipment for an irradiation facility. Canada is a world leading exporter of medical isotopes, irradiation equipment, uranium, research reactors and CANDU power reactors and has an excellent record of technology transfer to many countries. Canada has several good universities that offer courses in nuclear technology. Canada also has over forty years of experience in public education and

public involvement activities associated with the nuclear industry, both in uranium mining and nuclear power. It has experienced both periods of high public support for its nuclear industry as well as public criticism and so has developed a broad understanding of public attitudes in this area.

THE PUBLIC ACCEPTANCE PROJECT

The project began in 1995 with activities based at Chulalongkorn University under the direction of an Associate Professor in the Department of Nuclear Technology. Canadian assistance was provided through a Canadian consultant with experience in Canadian nuclear power and uranium mining communications issues.

Objectives of the project were to:

- Inform the general public about the safe use of nuclear technology for peaceful purposes, including nuclear electric generation; and,
- Increase the understanding of nuclear technology and encourage high school students to choose science and engineering disciplines, including nuclear engineering, in their career choices.

A PILOT PROJECT

Although the resources available to the project were adequate, they were not sufficient to undertake a mass marketing or public information campaign. Nor would it have been appropriate for a university to undertake such a task on behalf of others. Instead, it was understood from the beginning that the project would be selective in its approach.

The project was intended to provide useful information on how to conduct a public education program on a sensitive topic and at the same time avoid having the sponsor of the program becoming associated with the public debate the subject matter itself might perhaps engender.

It was recognized that if the public utility were to undertake such a program many people might conclude that the decision to initiate a nuclear power program had already been made and the public debate would inevitably begin even though no such decision had even been taken. It was for this reason that Chulalongkorn University was seen as an appropriate initiator for such a program.

A NEW EXPERIENCE

This project was a new experience for faculty members at the Nuclear Technology Department of Chulalongkorn University. They had never before been asked to undertake an exercise which extended the University into the community in such a direct and specific way. Nor had they any previous experience with producing video materials or informational booklets.

The faculty members were aware that there were risks associated with the project. If the messages were not balanced and accurate, the University could quickly become embroiled in a debate about its intentions and perhaps even its integrity. These concerns were never far from the minds of faculty members. Fortunately to date, there has been no criticism of the University about its role in this nuclear education project.

IDENTIFYING A TARGET AUDIENCE

Although school age children were always the target group for the project to address, some consideration of age and grade level was necessary. In the end, Level 3 Secondary students were chosen. The children in this group were about 15 years of age and this was the last year in the school system where a common curriculum applied all students. After Level 3, students began to specialize in different fields and so would

have varying levels of understanding and interest. By choosing this category, the broadest possible range of students with approximately the same levels of knowledge could be reached.

Other reasons for selecting school age children for the project was the awareness that children would communicate information and views of their participation in this project to other members of their families and friends. In a limited yet important way, reaching school children was also a way of indirectly reaching their parents, brothers and sisters, aunts and uncles and altogether a much larger audience.

THE PROGRAM COMPONENTS

The program was designed in four phases in order to explain the basics of:

- Radiation - Natural and Manmade;
- Radiation Applications - In healthcare and other areas;
- Energy and the Environmental impacts of electricity generation; and,
- The role of nuclear energy in electricity production.

Video presentations of approximately 20 minutes in length were produced which addressed each of the above subjects. Booklets of about 25 pages in length were also produced which duplicated some of the information in the video but also provided additional new material.

The content of each set of video's and booklets was designed to complement each other. The booklet was intended to provide the reader with an understanding of the basic subject matter with the video providing additional illustration and explanation of the materials covered in the booklet. Together these materials were designed to reinforce learning by providing variety and interest.

These materials were designed to be a package which was presented to level 3 secondary school. To provide an incentive for schools, teachers and children to participate, an essay contest on the subject matter of the video's and booklets was organized for each topic. Posters were prepared announcing the essay contests, prizes, dates, rules etc. Letters were sent to each school announcing the program and inviting schools to participate.

MANNER OF DELIVERY

It was recognized that the time required for official approval for such a program to be undertaken in Thai schools as a part of the regular curriculum would require years to accomplish. For this reason that the material was introduced in the form of an essay contest, where prizes would be awarded to the student who wrote the essay, their teacher and their school. The program was voluntary and teachers were free to present it to their classes or not, depending on their judgement of the suitability of the material.

TIMETABLE

Each of the four essay contests was planned to be undertaken during a school semester. As there are two semesters per year in the Thai schools, the essay project would take a minimum of two full years to complete.

The first essay contest took place in 1996, the second in early 1997 and the third contest will commence in early 1998. The fourth and last contest will take place in the Fall of 1998.

THE APPROACH

There are approximately 3000 schools in Thailand with level 3 secondary students.

The project began by choosing only some schools in Bangkok for the first contest. This smaller sample of 296 schools was chosen because it was felt that time was needed to identify and correct any difficulties in the program before it was presented to a large audience.

Letters were written to each of the selected schools by the Chulalongkorn professor in charge of the program. Teachers were provided with copies of the video on Radiation, many copies of the booklets on radiation and posters which described the essay contest.

A reception was held at Chulalongkorn University where teachers who had indicated an interest in the project were provided with information about the essay contest and had the opportunity to ask questions and discuss the project.

A total of 39 schools participated in the first essay contest, approximately 15% of those who were invited.

The teachers at each school were responsible for grading the essays from their school and forwarding only the best essay from all of the contestants in their school.

By the deadline for completion of the first essay contest, 32 winning essays had been chosen from participating schools and forwarded to Chulalongkorn University. A committee of faculty and graduate students then ranked them in order of excellence. An awards ceremony was held where prizes were awarded to the student, their school and the teacher who had participated in the program.

This awards ceremony which was held at Chulalongkorn University was well attended. In addition to the actual prizes they received, the students and teachers were obviously pleased with the recognition they had received.

A second essay contest was held in the Spring of 1997 where 937 schools out of a total of nearly 3,000 from across Thailand indicated an interest in participating in the essay contest. Sixty two essays were eventually selected as winners and awarded prizes from this second contest.

The topic for the second essay contest was the application of radiation for medical and other miscellaneous purposes. This provided the student the opportunity to learn and write about the many applications of nuclear technology to human health and provide an insight into the many millions of lives which are affected each year because of technologies such as x-rays, radiation treatment of cancers, radiation sterilization applications, radiopharmaceutical and other technologies.

To date, a further two essay contests are planned. The first will address various energy alternatives and their impacts on the environment. The last contest will address nuclear power.

The essay's have provided much useful information about how the students have absorbed the material they were provided. These essays quite clearly indicate what matters appear to have been understood and what areas appear to be in need of further explanation. This information has permitted changes to be incorporated in later material which addressed such problems.

Preliminary Findings

Although as of this date the program is only a little more than 50% completed some interesting findings are available.

The materials have reached a large and diverse audience of teachers, students and parents. If there had been any serious public concern to Chulalongkorn University being involved in such a project, they would have been expressed. To date there have been no criticisms of the role the University has played in promoting public awareness of nuclear technology. This is attributed to the very balanced and even handed manner in which the University personnel approached the task and the content of the materials produced.

The lack of public criticism is also attributed to the voluntary manner in which schools were approached and the self selection process of their involvement. Those teachers that had concerns simply choose not to participate in the essay contest, while those who had an interest, did. Thus each school made an independent decision to participate and the teachers were in a position to explain both to students and parents the basis of their participation.

The same voluntary approach applied to students, if they did not wish to compete in the essay contest even though their school had chosen to do so, they were not required to do so. Again, this voluntary nature of the process meant that potential critics had little basis to launch an attack since in effect they would be criticizing those people who participated as much as the University for initiating the project.

This voluntary approach, of offering teachers factual material to assist them in their teaching of science is considered to be an important finding of the project. Teachers have reported that they consider the booklets and video materials to be useful teaching aids in what many consider to be a difficult subject area. An additional positive feature of the project for some teachers was that by requiring the student to write an essay, the writing and research skills of the student were also developed.

There is an awareness that if the electric utility rather than the University had initiated such a project, it would likely have been subject to very severe public criticism. Although its involvement was critical to the project, the Thai electric utility, EGAT understood that the best way for it to participate was in a low key and quiet manner. The personnel from the utility were always available for discussion and assistance but their style was not to interfere or try to manage the project in any way. A more appropriate manner would be hard to imagine and great credit must be given to the EGAT personnel who carried out this activity.

An unexpected and pleasant surprise was the reception that the video and printed materials produced by the Chulalongkorn project have received from the electric utility and other government organizations. Personnel from the communications branches of some of those organizations have already met with university personnel to express their interest in generating additional materials based on the Chulalongkorn approach.

Next Steps

The two remaining essay contests will provide further experience for this public acceptance initiative. The final topic, nuclear power, will address the objective of the entire project and the response to this event will be closely monitored by the University, the utility and government policy makers to determine the suitability of expanding the public education program to other audiences and the possible encouragement of other institutions to participate in such public awareness programs.

Summary

The public acceptance project which Thailand is undertaking through the Chulalongkorn University project is based on the awareness that increased public support of nuclear power is an essential precondition to the consideration of a nuclear power program for the country.

By approaching public education on this matter via an independent and recognized authority such as Chulalongkorn University, the issue has remained as an education and information process rather than becoming a political issue and falling victim to all of the pitfalls of that process.

The model of selecting independent partners and organizations to conduct public education and public acceptance activities appears to be more effective than for the utility itself to more directly address such issues.

It is of course recognized that at some time there will be a public discussion and debate of the issue of nuclear power in Thailand. However the work done by such public education projects in advance of any

public announcements on any project plans should help to ensure that the ensuing public discussion will take place amongst a better informed public. Since the Chulalongkorn project is a pilot project, the results will be of assistance in designing future public acceptance programs for nuclear power, in Thailand and elsewhere.

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