MEASURES FOR THE ENHANCEMENT OF PUBLIC RECOGNITION ON RADIOLOGICAL RISKS

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Abstract

This paper reviews the Korean status of atomic energy uses, which is in its vigorous growth and introduces the comprehensive programme of activities toward the enhancement of the public recognitions. Those activities tackle the issue of public acceptance as the public have become less supportive to the atomic energy uses and radiation applications. This paper also provides the recent survey results on the perceptions and concerns of the public. Finally the public acceptance activities newly begun by Korean regulatory body were introduced and discussed.

I. Introduction

South Korea has a population of 47 million and a land area of 99,237 square kilometers of which 70% is covered with gentle mountains. It is on a peninsular with three sides surrounded by sea and the other by North Korea. It has no natural resources but it has maintained a sustained development in the peaceful uses of atomic energy boosted by an average annual growth of 8.6% in the GDP (Gross Domestic Product) for the last three decades [Chung, 2001].

In March 1962, a nuclear criticality was first achieved in Triga Mark II research reactor with particular interest from the President. Ten years after the first criticality, construction work began on the first Korean commercial NPP (Nuclear Power Plant), Kori unit 1, which is rated at 587 MWe and the second era of Korean nuclear history began in 1978, when it started operation.

Since then atomic energy activity in Korea has become more vigorous and ever expanding. In spite of the financial crisis in 1997, which resulted in a series of big changes in the society's morale including the introduction of management fashions such as privatization, down-sizing, re-organization, out-sourcing etc., the vigorous growth in atomic energy activities has not slowed down.

The country's rapid and sustaining growth in atomic energy activity suggests a good example for the peaceful use of atomic energy to international societies. However, for the further development of atomic energy uses and resulting improvement of quality of life, it is natural that it needs more supports from the public. A comprehensive programme of PA(public acceptance) activities which is in progress is introduced together with the summary of the country's status of atomic energy activities and public perceptions on them.

II. Status Of Atomic Energy Uses In Korea

II. A. Nuclear Power Plants

Currently, seventeen commercial NPPs are in operation. Nuclear power capacity is around 14.7 GWe, which accounted for more than 40% of total power generation as of May 2002. Korea also has a high availability for its nuclear units: 90.2% in 1998, 88.2% in 1999 and 90.2% in 2000.

Three NPPs (Ulchin units 5 & 6 and Yonggwang unit 6) are under construction. In addition, eight new nuclear power plants are planned for construction from 2008 till 2014. (Table 1)

Meanwhile, two Korean Standardized Nuclear Power Plants (KSNPs) are under construction in North Korea as the Korean Energy Development Organization (KEDO) project. In the NPP industries, a total of 8,048 persons are registered as radiation workers in 2000.

II. B. Radiation Application Areas

In the field of radiation application, the first and second permits for utilizing radioactive isotopes was issued in 1963 to a medical facility and an education-research institute. As of

Table 1. Status of Nuclear Power Plants in Korea.

NPP Unit	Reactor Type	Capacity (MWe)	Start of Construction	Operation	
Kori # 1	PWR	587	May.'72.	Apr.'78	In Operation (14,716 MWe)
Kori # 2	PWR	650	Nov.'78.	Jul.'83.	
Kori # 3	PWR	950	Dec.'79.	Sep.'85.	
Kori # 4	PWR	950	Dec.'79.	Apr.'86.	
Wolsong # 1	CANDU	679	Feb.'78.	Apr.'83.	
Yonggwang # 1	PWR	950	Dec.'81	Aug.'86.	
Yonggwang # 2	PWR	950	Dec.'81.	Jun.'87.	
Ulchin # 1	PWR	950	Dec.'83.	Sep.'88.	
Ulchin # 2	PWR	950	Jan.'83.	Sep.'89.	
Yonggwang # 3	KSNP	1,000	Dec.'89.	Mar.'95.	
Yonggwang # 4	KSNP	1,000	Dec.'89.	Jan.'96.	
Wolsong # 2	CANDU	700	Aug.'92.	Jul.'97.	
Ulchin # 3	KSNP	1,000	Jul.'93.	Aug.'98.	
Wolsong # 3	CANDU	700	Feb.'94.	Jul.'98.	
Ulchin # 4	KSNP	1,000	Jul.'93.	Dec.'99.	
Wolsong # 4	CANDU	700	Feb.'94.	Dec.'99.	
Yonggwang # 5	KSNP	1,000	Jun.'97.	Apr.'02	
Yonggwang # 6	KSNP	1,000	Jun.'97.	Dec.'02. *	Under Construction (3,000 MWe)
Ulchin # 5	KSNP	1,000	May.'99.	Jun.'04. *	
Ulchin # 6	KSNP	1,000	Apr.'99.	Sep.'05. *	
Shin Kori # 1	KSNP	1,000	?	Sep.'08. *	Planned (9,600 MWe)
Shin Kori # 2	KSNP	1,000	?	Sep.'09. *	
Shin Wolsong # 1	KSNP	1,000	?	Sep.'09. *	
Shin Wolsong # 2	KSNP	1,000	?	Sep.'10. *	
Shin Kori # 3	APR	1,400	?	Sep.'10. *	
Shin Kori # 4	APR	1,400	?	Sep.'11. *	
Not Decided	APR	1,400	?	Jun.'13. *	
Not Decided	APR	1,400	?	Jun.'14. *	

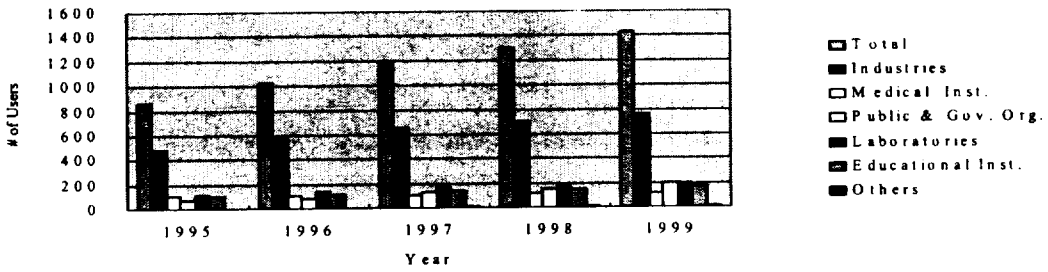
* : Planned date of commercial operation
PWR : Pressurized Water Reactor
CANDU : CANadian Deutrium Uranium reactor
KSNP : Korean Standardized Nuclear Power plant, (PWR type, 1,000 MWe)
APR : Advanced Power Reactor, (Korean next generation reactor, PWR type, 1,400 MWe)
Shin : (means "new" in Korean)

August 2000, the number of licensed facilities for the use of RIs(Radioactive Isotopes) and RGs(Radiation Generators) becomes 1662, to which the recent annual increase of more than 10% has been contributed (Figure 1), [Cho, 1999]. Applications of radiation emitted from RIs and generated from RGs have become more common and widespread. They have been used in a variety of fields, such as diagnostic radiography and therapeutic applications for the treatment of cancer, food sterilization, nondestructive testing(NDT) by industrial radiographers, level, thickness, moisture and hazardous materials content gauging tools, and research purposes in the laboratories In these areas, 15,925 persons are registered as radiation workers in 2000. The contribution of these industries to the GDP is found to be 2.37% [MOST, 2001].

and a site for radioactive waste repository.

There have been two major governmental attempts to designate the centralized low-level radioactive waste repository. Those attempts faced huge public protests and consequently frustrated; these were times for Korean nuclear society to recognize public perceptions on nuclear matters.

The difficulties in the acquisition of nuclear facility site, reveals that seventeen operating and three constructing NPPs are concentrated in four sites and eight planned NPPs are to be located near the existing sites. The current policy on radioactive waste management is to keep waste in respective NPP sites until a centralized waste repository is established albeit the temporal capacity for low-level radioactive wastes in NPP sites goes to the saturation. Thus, the only alternative on radioactive wastes,



Year	1962	1990	1995	1996	1997	1998	1999	Aug. 2000
Total No. of Licenses	2	698	1,064	1,175	1,375	1,394	1,570	1,662

Fig. 1. Licensing Status of RI/RG Users.

III. Public Percepions On Radiological Risks

The stepping stone for the development and expansion of atomic energy and radiation application industries is the public acceptance and social risk perception about radiation. The Korean government and utilities have experienced difficulties in acquiring NPP sites for the time being, is to rely on volume reduction techniques such as super compaction or vitrification.

Meanwhile, the Korea Gallup Corporation's survey sponsored by KEPCO (Korea Electric Power Corporation) shows that 91.4% of the general public are affirmative to necessity of atomic energy uses. This figure reflects a little increase compared with 85.5% of the previous

investigation in 1993. The sample size for that survey is randomly chosen 1,524 persons. As to the most available energy source at present and in near future, 45.3% of sampled person chose the atomic energy and 24.3% solar and wind energy. Interestingly, it is revealed that well-educated people prefer the atomic energy as practically available energy source. (Table 2) [Seok, 1999]

However, negative recognition of environmental aspects of atomic energy and the public concerns for NPP safety are also increasing; The survey results on the order of energy sources that pollutes environments was coal (56.4%), petroleum (16.0%) and atomic Energy (15.9%) in 1993 but coal (49.6%) atomic energy (22.6%), and petroleum (18.8%) in 1997. In a survey carried out in 1993, the general public considered the economics of atomic energy uses more important that NPP safety. That attitude was reversed in 1997 survey. Moreover, the public seem to give more credit to the information from anti-nuke NGOs[Seok, 1999].

The Korea Data Network Corporation investigated the perception of high school students and teachers in 1998. They distributed the questionnaire to 1,215 high school students and 416 teachers. The corporation separately surveyed the perception of 200 students and 115 teachers who participated NPP visit programme. According to the survey, 66.2% of students and 58.5% teachers chose solar energy as energy source to replace imported energy whereas

Table 2. Korea Gallup Corp. Survey Results on Public Perception (1993, 1997).

Questionnaire	Response of General Public
1. Attitude to Atomic Energy	Affirmative (91.4%) in 1997 Affirmative (85.5%) in 1993
2-1. Most Available Energy in Near Future	Atomic Energy (45.2%), Solar and Wind Energy (23.4%)
2-2. Academic Career Distribution of Q. 2-1	Graduation of University (53.7%), High School (24.3%), Middle School (38.6%), Elementary School (37.1%)
3. Pollution Energy Source	Coal (49.6%), Atomic Energy (22.6%), Petroleum (18.8%) in 1997 Coal (56.4%), Petroleum (18.8%), Atomic Energy(15.9%) in 1993
4. Important Factors in atomic Energy Uses	Safety (65.6%), Environmental Pollution (20.2%), Economics (7.5%)
5. Safe or Not Safety is Atomic Energy?	Safe (38.6%), Not Safe (45.4%) in 1997 Safe (34.4%), Not Safe (41.2%) in 1993
6. Why Not Safe? (Multiple Selection)	Radioactive Wastes (67.6%), Unexpected Accident (67.1%) Possibility of Radioactive Material Release (61.1%), in 1997 Radioactive Wastes (63.7%), Possibility of Radioactive Material Release (62.1%), Unexpected Accident (53.9%) in 1993
7. Information Sources (Multiple Selection)	Television (89.4%), Newspapers (57.0%), Radio (19.0%), School (10.6%)
8. Reliable Information Source on Atomic Energy (Multiple Selection)	NGOs (43.0%), Television (26.9%), Newspaper (16.9%), School (16.8%)
9. Major Concern about Atomic Energy	NPP Safety (40.9%), How to Dispose Radioactive Wastes (34.9%)
10. General Feeling about Atomic Energy	Bright/Dark (67.6%/31.1%), Clean/Dirty (79.6%/18.6%), Strong/Weak (94.6%/4.5%), Progressive/Degenerative (91.5%/7.7%)

52.5% of students and 49.5% who joined the NPP visit programme chose the atomic energy. This means that, in general, students and teachers do not recognize that even the state of the art of the solar energy technology is not a viable alternative for nationwide electric supply. Conversely, that result also means that the NPP visit programme is an effective way to promote atomic energy. (Table 3) The NPP visit programme includes the explanation on the principles of atomic energy generation, on characteristics of α, β, γ radiation, on multiple barriers to prevent and to mitigate the accidents, and emergency preparedness of NPP.

Table 3. Korea Data Network Corp. Survey Results on Students and Teachers (1998)

Questionnaire	Response of Students	Response of Teachers
1. Necessity to Develop Energy Source to Replace Imported Energy (Mainly Petroleum)	Yes (70.1%)	Yes (74.8%)
2. Energy Source to Replace Imported Energies	Solar Energy (66.2%), Atomic Energy (15.5%)	Solar Energy (58.5%), Atomic Energy (24.1%)
	Atomic Energy (52.5%)*	Atomic Energy (49.5%)*
3-1. Increase/Decrease of Atomic Energy Uses	Increase (53.4%), Decrease (13.3%)	Increase (34.1%), Decrease (21.5%)
3-2 Why to Increase	Lack of Coals and Petroleum, Increase of Electric Demand, Economics of Atomic Energy	
3-3 Why to Decrease	Environmental Pollution (58.5%) No Reliable Safety Measures (48.4%), Replaceable by New Energy (28.7%)	No Reliable Safety Measures (48.4%), Environmental Pollution (58.5%), Replaceable by New Energy (28.7%)
4. Choice of Source for the Environment and Electricity Supply	Solar Energy (57.9%) Atomic Energy (17.9%)	Solar Energy (41.9%), Atomic Energy (31.3%)
	Atomic Energy(56.0%)*	Atomic Energy (67.8%)*
5. What Do You Know about Atomic Energy (Multiple Selection)	Environmental Effect of Atomic Energy (51.5%), Necessity of Atomic Power Generation (46.3), Economics of Atomic Energy (44.0%), Energy Status of Korea (37.8)	
6. Which Do You Want to Know More about Atomic Energy (Multiple Selection)	Environmental Effect of Atomic Energy (57.9%), How to Manage Radioactive Waste (57.9%), Technical level of Korea Concerning Atomic Energy (45.3%), Energy Status of Korea (42.4%)	How to Manage Radioactive Waste (67.1%), nvironmental Effect of Atomic Energy (65.4%), Safety of NPPs (65.1%) Radiation Protection in NPPs (42.8%), Technical level of Korea Concerning Atomic Energy (39.4%)
7-1 Information Sources (Multiple Selection)	School (61.3%) Television (56.0%) Newspaper (36.8%)	Newspapers (63.2%) Books (38.2%) Television (31.6%)
7-2 Affirmative/Negative Information	School (47.9%/20.2%) Television (38.5%/53.1%) Newspapers (?/40.7%)	Newspapers (28.6%/46.4%) Television (19.2%/36.3%)

* : Response from students and teachers who have ever participated in NPP visit programme

From table 2 and table 3 (questions 1 and 2 in table 2, question 3-1 in table 3), it could be viewed that the Korean attitude to atomic energy is still affirmative rather than negative. However, according to another survey on 215 the school education related persons, namely officials in Ministry of Education, researchersand writers of elementary school textbooks and editors of textbook publishing company, most of the sampled persons admit the necessity of atomic energy uses but lots of the sampled persons strongly oppose the construction of NPPs nearby their hometown. This, so-called NIMBY (Not In My Back Yard) conception is considered to be prevalent among the general public.

Radiation applications in industrial areas such as NDT, thickness and level gauging are rarely recognized to the public, and thus are usually out of the public concerns. Medical uses of radiation are popular in Korea such as X-ray, CT (Computerized Tomography), PET (Positron Emission Tomography), γ-Knife, BNCT (Boron Neutron Capture Therapy), etc. In spite of the awareness of radiation and/or RI uses, the patients seem to be willing to accept the net benefit of radiation therapy and therapeutics.

Thus, most of the efforts to enhance the public acceptance in Korea are focused on the radiation education concerned with acquiring new NPP or radioactive waste repository sites.

IV. Korean Efforts To Enhance Public Acceptance

To enhance the public acceptance, a comprehensive programme that includes education, cultural activities, publications, broadcasting is being carried out. The programme can be categorized into 3 parts, depending the targeting group : All the public, Local residents living in the vicinity of the NPPs, and The next generation. These activities are mainly presided by the KNEF (Korea Nuclear Energy Foundation) of atomic energy utility side[knef, 2002].

IV. A. Efforts Targeting All Koreans

Media

The mass media, mainly television and newspapers, provide information to the public and lead the public opinion. The scientific knowledge and information on atomic energy are offered through the reliable mass media channels. Special articles on atomic energy are reported by joint campaigns with major newspapers and columns written by atomic energy specialists are planned. In collaboration with broadcasting companies, issues on energy and the environment are analyzed and broadcasted, providing the public with in-depth and useful information. When innovations in the field of atomic energy at home and abroad or new pending issues on atomic energy arise, the atomic energy specialists cover those reports, thereby satisfying the public's right to know.

The Nuclear Energy Report is published and distributed, which analyzes and comments on atomic energy-related articles in the media to help the public have realistic and unbiased views on atomic energy.

Publication

Various publications are made considering the readers' age, scholastic attainments, and gender. A notable magazine called Nuclear Culture is published monthly, which deals with both cultural aspect and atomic energy promotion reflecting the synergy effects between atomic energy and cultural life. Books related to the atomic energy and the environment are

regularly published and disseminated to the bookstores, libraries and schools across the country. Moreover, a wide range of promotional materials ranging from cartoons, juvenile stories, pamphlets, a nuclear diary, handbooks, to video materials is produced to make atomic energy easily understandable to the people of various backgrounds regardless of their backgrounds. These materials not only educate people on the positive benefits of atomic energy, but are also useful for school education.

Advertisement

An advertising motif has been used to inform people in a user friendly manner of the fact that atomic energy is an essential part of our everyday lives. Those advertisements convey their messages not only through the mass media such as television, radio, newspapers and magazines, but also through wide color electric signboards and outdoor billboards at public places such as airports, bus terminals, railway stations and subway stations.

In addition, campaigns are continuously staged for promoting atomic energy and for dealing with the issues concerned with the environmental soundness and energy security, through joint efforts with the media, which greatly contribute to raising public awareness on energy issues.

Cyber Promotion

The use of computers and the internet has greatly influenced on Koreans daily lives. In order to respond to the internet users and provide swift and accurate information, the utility side and regulatory side run their homepages offering comprehensive information and materials on atomic energy and radiation application. The Web homepages also gather opinions of Netizens (Internet Citizens) through its bulletins and cyber discussion room, while promptly satisfying the curiosity of Netizens on atomic energy and radiation application through Question and Answer segment. The utility side's homepage also hold a nuclear energy quiz contest and flash contest to raise the interest of Netizens and induce their participation.

Besides, a web magazine called 'Scent of life' is published every month that uses high-tech moving image techniques and offers interesting and useful stories to win the interest of new generation readers. Some topics treated in the magazine as of June 2002 are 'Movie and Atomic Energy: Great flight', 'Recycled Objects of Craftwork', 'Visiting a Historical Region', and 'Children Living with Their Grand Mother', etc.

Exhibitions

Exhibitions are held to facilitate people's experiences of atomic energy in everyday life without visiting nuclear related facilities. Major exhibition facilities include the Nuclear Center at the National Seoul Science Museum and the Electric Energy Pavilion of the Expo Science Park in Daejeon.

They comprise of atomic energy related models, experimental devices, graphic panels, information search section and other exhibits for hands on experience, offering a good learning venue not only for students but also for adults. The exhibition facilities are also fully utilized as cultural spaces as they run a youth science class and display prize winning artistic works. In addition to such permanent exhibition halls, the utility side also participates in various exhibitions on energy and the environment with its mobile exhibits comprising atomic energy models and panels, in a practical way engaging in atomic energy promotion services.

Seoul 서울	11.5	Gangnung 강릉	12.5	Baeknyoung 백령도	7.8
Daejeon 대전	12.9	Chuncheon 춘천	13.9	Seosan 서산	13.6
Gunsan 군산	14.0	Kori 고리	9.4	Jeonju 전주	12.2
Gwanju 광주	12.7	Yonggwang 영광	12.4	Mokpo 목포	12.6
Jeju	8.2	Ulchin 울진	15.4	Seoguipo 서귀포	8.6
Busan 제주	9.0	Wolsong 월성	10.5	Jinju 진주	11.0
Daegu 대구	11.0	Incheon 인천	13.7	Ulsan울산	12.9
Andong 안동	11.4	Suwon 수원	13.8	Ulnungdo 울릉도	11.4

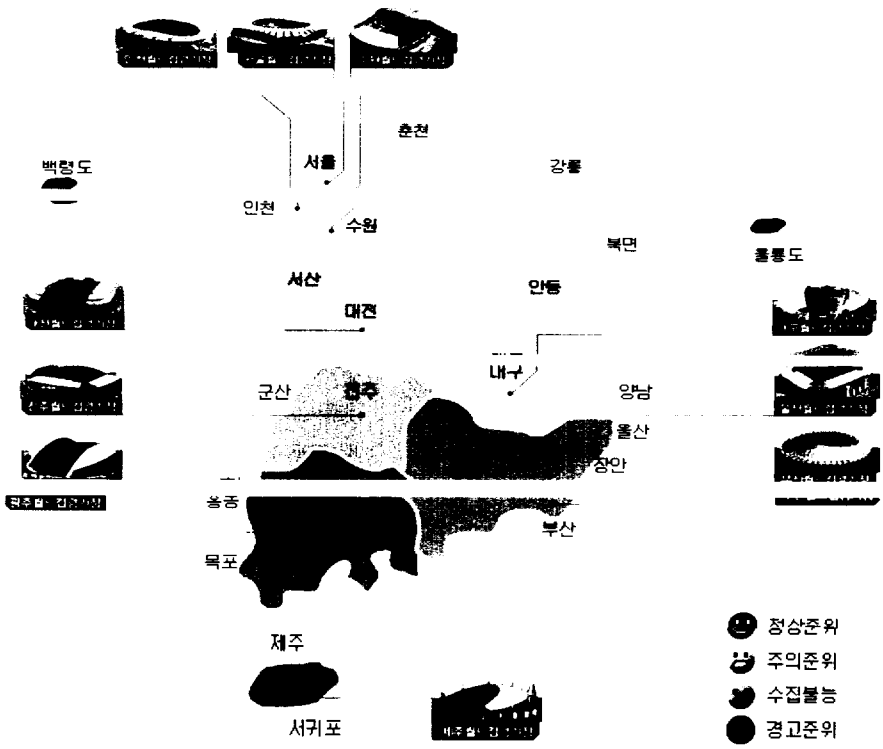


Fig. 3. Internet Screen of IERNet at 12:15 in 8 June 2002. (IERNet data are displayed basically in Korean. Table under picture is manipulated in English to make it easy to match regions in picture with dose rates. Normal range in Korea is from 5 μR/h to 30 R/h)

IERNet (Integrated Environmental Radioactivity Monitoring Network) System

The regulatory side of Korea set up the IERNet system to monitor nationwide environmental radiation level in 1996. The IERNet system links the central monitoring station located in KINS (Korea Institute of Nuclear Safety) to 17 local monitoring stations located at ten large population cities, four NPP plants, two remote islands and a military base. Under the environmental radioactivity monitoring programme, IERNet measures the radioactivity in airborne dust, farm products, soil, drinking water, and background radiation levels throughout the nation, and IERNet sponsors an annual national and international inter-comparison program to improve and standardize the environmental radioactivity measurement techniques. In 1997, it was introduced to inform the public of environmental radiation monitoring results through the internet. Nowadays, every Netizen can identify the ambient dose rate of his/ her region by the internet on the real time basis. Data of ambient dose rate are renewed in every 15 minutes[IERNet, 2002]. IERNet system has ability to earlydetect the abnormal radiation level in the nationwide environment. To acquire more precise data, it is scheduled to build new 19 local monitoring stations in 2002.

IV. B. Efforts Targeting Local Residents

Cultural Development

Various cultural programmes are held to encourage cultural activities of the local residents living in the vicinity of NPPs. Music concerts, plays and musicals are planed and organized to help local residents enjoy their cultural activities. Middle and high school students are invited to participate in literary writing contests, sketch contests and the "My Town Exploration Camping" to promote the balanced development of their emotions and physical strength and raises their affinity for their towns.

In addition, "Beach Song Contest" is held jointly with local broadcasting companies in four nuclear power plant areas every summer. The contest is attended by representatives of the atomic energy industry and local residents and has emerged as the "festival of unity."

Utilities support the Nuclear Culture Development Associations, bodies of local residents in respective nuclear power plant areas, thereby helping it further prosper and contribute to the community.

Local Support

Local communities in the vicinity of NPPs are actively supported in their effort to further develop their own lifestyles and traditional culture. Major traditional festivals supported by the utilities. In addition, the utilities participate in a variety of local events, featuring their own social, geological and cultural characteristics, helping them preserve and maintain these time-honored traditional cultural events.

Dried corbina fish of Yonggwang; Songi mushroom; king-sized crabs of Ulchin; Gijang seaweed of Kori; and pears of Seosaeng are local specialties well known to the Korean people. The utilities host the "Local Specialty Festival for Nuclear Power Plant Areas" to further promote those local specialties to the general public and contribute to local economic development.

Seeing Is Believing

Tour programme of NPPs is planned and offered to help people better understand nuclear power generation's principles, showing how necessary and economical it actually is. They are also shown how environment-friendly it is

in the context of local communities by experiencing real NPPs for themselves. The tour program has proved to be a very effective tool for promoting atomic energy, not only among local residents in the vicinity of power plants but also among the people from various walks of life.

In order to disseminate accurate knowledge on atomic energy, diverse opportunities for social education have been developed such as opening nuclear energy education classes in social education institutes, training centers for public employees and various social organizations, and dispatching specialized instructors to those venues. In addition, seminars, discussion sessions and symposiums are held to exchange various ideas on atomic energy and to look for reasonable solutions through dialogue and discussions

IV. C. Efforts Targeting Students and Teachers

Education for Next Generation

The importance of next generation having a correct understanding of nuclear energy cannot be overemphasized. To this end, lots of activities are planed and offered such as visiting programme around nuclear power plant facilities, dispatching instructors to schools and organizing seminars on nuclear energy for students, parents and teachers.

In order to help the next generation develop an interest in atomic energy, writing, essay, slogan and poster contests on atomic energy for young people are held, while organizing the youth nuclear energy camp during school vacations, greatly contributing to their balanced emotional and physical development and fostering their talents. Education and training courses on atomic energy are opened for teachers to help them in their teaching and guiding activities.

In order to foster talented students in the atomic energy field, the utilities offer scholarships to university students majoring in the field, and host nuclear energy workshops and lectures for them, engendering a sense of pride as people majoring in atomic energy.

School Curriculum

On the long-term basis, it is tried to incorporate and update the in-depth study of atomic energy and radiation to the textbook. Especially, some contents concerned with atomic energy and radiation physics were added or revised through the 7^{th} national curriculum revision programme that was applied from 2000 school curriculum. It is believed that the essential change of the viewpoint on atomic energy and radiation would be possible through the education of young generation.

At present, the objectives of atomic energy and radiation related education until the graduation of high school are as follows [Seok, 2001].

1. In knowledge aspect (K); To understand the principles of atomic power generation, to understand the influence of nuclear power generation to the economy and environment, and to understand the characteristics of various energy sources and application regions of radiation
2. In search aspect (S); To be able to solve reasonably atomic energy and radiation-related problems
3. In attitude aspect (A); To recognize the necessity of atomic energy, and to foster scientific attitude about atomic energy and radiation-related problems

Atomic energy and radiation education are dealt with in various subjects such as 'Physics',

Table 4. Subjects Related to Atomic Energy and Radiation

Schools	Subjects Related to Atomic Energy and Radiation
Elementary School (6years)	Society 1·2·3, Living Guide, Maps
Middle School (3 years)	Environment, Korean Language, Society, Ethics, History, Industry 1·2·3, Science 1·2·3, Maps
High School (3 years)	Industrial Chemistry, Physics, Chemistry, Industrial Mechanics, Geology, Introduction to Industry, Politics, Ethics, Power Generation, General Electricity, Food, Biology, Fishery, Environment Technology, Society, Physics Experiment, History of Science, Literature, Writing, Geography, Society & Culture, Narration, Industry, Technology, Geology 1 2, Biology 1·2, Physics 1·2, Chemistry 1·2, Maps, etc.

'Chemistry', and 'Industrial Technology', etc. Even, subject 'Ethics' deals with the activities of Korea Energy Development Organization (KEDO) in relation to the reunification of Korea. (Table 4) Recently, "Instruction Book for Teachers in Nuclear Education" was published in 2000, which contains lots of examples of radiation education applicable to almost every subject [Chung, 1998]

Research into Education Curriculums

In order to help the next generation grow up with proper views on nuclear energy, the utility side has analyzed atomic energy and radiation aspects of the education curriculums, while forming the "next generation education consultative body" comprising experts from education circles and the atomic energy industry to systematically study and research nuclear energy education curriculums and methods.

In addition, it supports the "Nuclear Education Society," a gathering of teachers teaching science and environment, to facilitate the balanced inclusion of atomic energy in education.

To complement textbook-based school education and arouse the interest of students, the utilities have been focusing on developing and distributing education programs utilizing CD-roms and computer games, as well as education materials including various auxiliary learning materials.

V. Conclusions

The Korean status of atomic energy uses and radiation applications, which is in its rapid growth was reviewed and the public perceptions on them were analyzed. The survey results performed by Korea Gallup and Korea Data Network Corporation show still affirmative public attitude on the necessity of atomic energy uses, but they also show growing concerns about NPP safety and environmental sustainability and prevalent NIMBY attitudes.

The comprehensive public acceptance enhancement programme, covering education, NPP visit, scholarship, cultural festival, internet-based information system, etc., was introduced, which so far has too much focus on the NPP and/or radioactive waste repository site acquisition.

However, it is desirable to deliver correct information on the radiation itself in the light of rapid growth in the areas of the RI/RG

applications. The education on radiation itself not linked to power programme has been limited to student curriculums and radiation workers training in RI/RG applications.

Considering the increasing concerns on the safety of NPP operation, it should be strengthened to provide public with the information related NPP safety from regulatory side. For this, KINS and MOST(Ministry of Science and Technology) are developing the Safety Indicators, which denote the safety level of operating NPPs and are understandable to the general public.

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