

KINS
KOREA INSTITUTE OF NUCLEAR SAFETY

 **KINS**
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KOREA INSTITUTE OF NUCLEAR SAFETY - in the forefront of the nuclear safety regulation

The Korea Institute of Nuclear Safety(KINS) was founded through a special legislation by the National Assembly in 1990 with a specific mission to develop and implement nuclear safety regulation.

The ultimate goal of nuclear safety regulation is to protect the public health, safety, and the environment from the radiation hazards that might be accompanied with the production and utilization of nuclear energy. KINS is entrusted as a technical expert organization by the Ministry of Education, Science and Technology(MEST), the regulatory authority, to perform various regulatory activities such as safety reviews and inspections, development of regulatory standards, and to monitor the environmental radiations across the Korean peninsula, etc.

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KINS PLEDGES

The KINS mission is to develop and implement nuclear safety regulation with an aim to protect public health, safety and the environment from radiation hazards that might be accompanied with the production and use of nuclear energy.

In order to fulfill the mission faithfully, KINS staff pledges the following:

- KINS carries out the regulatory duties objectively with fairness, keeping itself independent from any stakeholders in nuclear energy field.
- KINS provides the public with the regulatory as well as licensing information, except those classified as propriety, faithfully to build the public confidence in nuclear safety regulation.
- KINS applies well established, global safety standards in its regulatory reviews and inspections, and continuously improves its technical capabilities. And its decisions shall be made clear and not be unduly delayed.
- KINS pursues effectiveness and efficiency in regulation.
- KINS endeavors to promote nuclear safety culture in the nuclear industry and among the individuals involved to place the foremost priority on safety.
- KINS recognizes that nuclear safety is a matter of international concern so as to promote a close cooperation with international bodies and regulatory organizations in other countries.

A Message from the President of KINS



Nuclear energy has been playing a vital role as an electricity producer worldwide so far. Recently, the global situation has become more favorable for nuclear expansion beyond the current base of nuclear power and the role of nuclear energy is expected to be further strengthened as an affordable, economically efficient, and environment-friendly energy source in the future.

As a result of the implementation of intensive promotion plan of the nuclear energy industry from the 1970s, Korea now has 20 nuclear power plants in operation, and will construct 8 more units of NPPs by 2015. Very recently, the Korean government fixed its Basic National Energy Plan which will expand nuclear power in generating electricity. The installation capacity of nuclear power will be increased up to 41% from the present 26%, which means 11 NPPs will be newly constructed by 2030.

In addition, for non-power application of nuclear energy, medical, academic, and industrial fields exceeds 3480 in the number of licensed organizations to use radiation sources in Korea. It is apparent that the number of organizations using radiation and radioisotopes will be increasing further as the quality of life improves.

In the use of nuclear energy, however, nothing can take precedence over the assurance of nuclear safety. For the purpose of securing nuclear safety, Korea Institute of Nuclear Safety(KINS) was established as an independent regulatory organization in 1990 to support the Ministry of Education, Science and Technology (MEST), which has the regulatory authority in licensing and regulation of nuclear facilities and related activities, and to protect public health and national environment from the radiation hazards.

To cope with the challenges posed by the nuclear power expansion, KINS is now implementing a wide variety of regulatory programs for the rationalization of regulation, and plans to introduce innovative safety management systems for the improvement of nuclear safety.

Another important area with regard to the regulatory services that KINS provides is the communication with the public. KINS has made the information on nuclear safety and regulation more easily accessible to the public through the Nuclear Safety Information Center, and will provide the public with more opportunities to participate in the process of nuclear regulation in order to build public confidence in the regulatory body.

Furthermore, by taking part in the global trend of assuring the nuclear safety, KINS is in cooperation not only with the international organizations such as IAEA and OECD/NEA, but also with the regulatory organizations of other countries by way of expert and information exchange and joint research. The establishment of "International Nuclear Safety School" within KINS is one of our major efforts for that purpose. The effort of KINS to participate in the formation of global safety regime will be continued and strengthened further.

Faced with this changing environment, KINS, as a watchman of guarding the nuclear safety, will make an utmost effort to perform our mission not only of accomplishing the nuclear safety in Korea, but also of contributing to the global nuclear safety.

Thank you.

Choul Ho Yun
President

KINS as a Nuclear Safety Watchdog

Nuclear safety regulation refers to review and inspection of safety of nuclear facilities and related activities to protect the public health and safety, and the environment.

By developing legal frameworks and standards

- KINS provides the safety requirements and guidelines for nuclear power plants and radiation facilities.

In the process of licensing

- KINS reviews and inspects the safety of the design, construction, and operation of nuclear facilities.

As for the facilities in operation

- KINS reviews and inspects the facilities to assure safe operation.

Brief History

- **December 21, 1981** The Nuclear Safety Center was established as a department within the Korea Atomic Energy Research Institute (KAERI)
- **June 3, 1987** The Nuclear Safety Center became a semi-independent organization affiliated to KAERI
- **February 14, 1990** KINS was established as an independent, stand-alone organization under the “Korea Institute of Nuclear Safety Act”

MISSION

Nuclear safety regulation (Safety review and inspection)

- Nuclear power plants
- Research reactors
- Radiation sources and nuclear materials
- Nuclear fuel cycle facilities

Environmental radiation monitoring

Radiation protection and emergency preparedness

- Security and physical protection

Development of regulatory infrastructure

- Regulatory policies
- Safety standards
- Regulatory technologies

Management of nuclear safety information

Management of license examinations

Education and Training: International Nuclear Safety School



Nuclear safety review based on objectivity and fairness



Protection of public health and safety, and the environment from potential radiation hazards accompanied with the utilization of nuclear energy



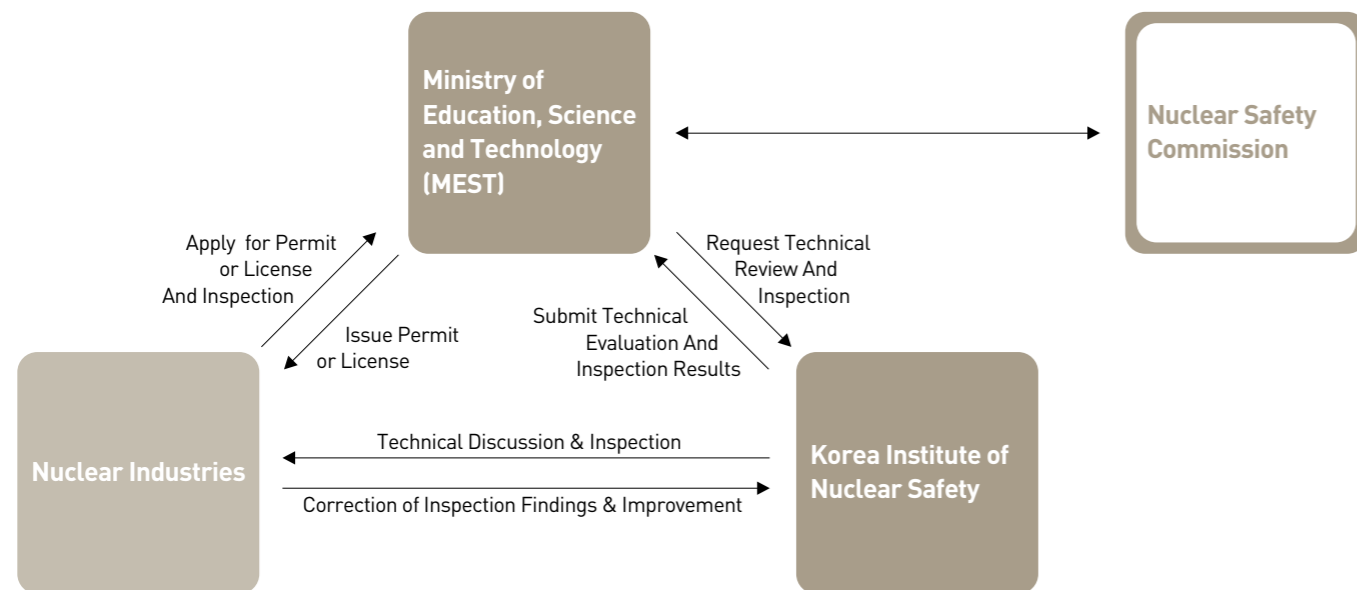
Nuclear Facilities subject to regulation

Organizations and facilities involved in generating or using nuclear energy and radiation sources

Type	Installations	Owner and Operator
Nuclear power plant	20 plants in operation, 6 plants under construction	Korea Hydro and Nuclear Power Company(KHNP)
Nuclear fuel cycle facility	Fuel fabrication facilities	Korea Nuclear Fuel Company
	Research facilities for irradiated nuclear materials	Korea Atomic Energy Research Institute
	Spent fuel processing facilities for research	Korea Atomic Energy Research Institute
Nuclear reactor for research and training	HANARO and related facilities (Irradiated material examination facility and radioisotope production facility)	Korea Atomic Energy Research Institute
	TRIGA Mark II, III(decommissioned)	Korea Atomic Energy Research Institute
	Nuclear reactor for educational use (AGN-201)	KyungHee University
Facility using radioisotopes	About 3,480 organizations	Organizations in medical, industrial and academic fields
Others	20 organizations	NPP equipment and component manufactures NDE companies

(As of December, 2007)

Working Mechanism of Nuclear Safety Regulation



Basic Approach Towards Nuclear Safety

KINS performs safety reviews and inspections not only to implement the regulation required by law but also to guide the nuclear industry to build the public trust in nuclear energy based on its safety performance. To this end, KINS carries out various regulatory activities applying global standards, while developing effective and efficient regulatory system and techniques.



Implementation of effective and efficient safety regulation

- Upgrading and updating of safety standards and regulatory requirements
- Assurance of comprehensive safety in nuclear facilities
- Development and implementation of risk-informed and performance based regulation

Reinforcement of radiation safety management

- Improvement of regulatory policy and frameworks for radiation protection.
- Strengthening of environmental radiation monitoring and emergency response system.
- Improvement of regulatory effectiveness and efficiency for the regulation of radiation sources.

Compliance with the international standards

- Korea's regulatory policies are regularly revised to meet international standards.
- International agreements such as the Convention on Nuclear Safety are respected and implemented.
- International co-operations to exchange regulatory information, experience and new development are actively promoted.



SAFETY REGULATION

Regulatory Process for Nuclear Power Plants

Early Site Approval

KINS reviews the Site Survey Report, the detailed Geological Report and the Radiological Environmental Report submitted by the licensee.



Construction Permit

KINS reviews the Radiological Environmental Report, the Preliminary Safety Analysis Report (PSAR) and the Quality Assurance Program.



Pre-Operational Inspection

During the construction stage, KINS conducts inspection to confirm that the construction and the performance of the nuclear facility meet the safety requirements specified in relevant technical standards.



Operating License

KINS reviews the Final Safety Analysis Report (FSAR), the Quality Assurance Program, the Technical Specifications for Operation and the Radiological Emergency Plan.



Periodical Inspection

KINS conducts the periodical inspection to ensure that the performance of the nuclear facility is maintained in the state as passed during the pre-operational inspection.

Review of License Amendment

KINS reviews the license amendment request, submitted by the licensee, to make the changes or modifications to the Construction Permit (CP) or the Operating License (OL).



Safety Review

Any organization or individual intending to construct and to operate a nuclear power plant or a nuclear facility using radioactive materials should obtain an approval or a license from the regulatory authority. To be licensed, the applicant should submit an application to the regulatory authority for the review of its compliance with the relevant safety standards and regulatory requirements stipulated in the Atomic Energy Act. High level of expertise is required to verify whether the applicant complies with the relevant regulatory codes and standards. In some cases, actual tests or calculations are performed to verify the applicant's qualification.

Review for Early Site Approval

An application for early site approval is aimed at authorization of limited construction work on a proposed site before the construction permit is issued, if the applicant wishes. The objective of the safety review is to evaluate the adequacy of a proposed site and the radiological impact on the environment surrounding the proposed nuclear installation.



Review for Construction Permit (CP)

The review for a CP is conducted to confirm that the site and the preliminary design of the nuclear installation are in conformity with the relevant regulatory requirements and technical guidelines. It includes reviews of the principle and concept of reactor facility design, the implementation of the regulatory criteria, the evaluation of the environmental impacts resulting from the construction, and a proposal for minimizing those impacts.



Review for Operating License (OL)

The review for an OL is conducted to confirm that the final design of the nuclear installation is in conformity with the relevant regulatory requirements and technical guidelines and that the nuclear installation may continue to operate safely throughout its lifetime.

Safety Review of Nuclear Facilities in Operation

When changes or modifications are to be made to the nuclear facilities during the operation by the licensee, it is necessary to obtain approval from the MEST for an amendment to the OL. The process to get the approval for an amendment to the OL is the same as the application for an OL; KINS performs a technical review and reports to the MEST on the results, and the MEST issues an authorization to the licensee based on KINS' evaluation.



Facilities Subject to Safety Review

- Nuclear power plants
- Research reactors
- Nuclear fuel cycle facilities
- Radioactive waste management facilities
- Facilities using radioisotopes and radiation generators

Safety Review Areas

- Adequacy of the site
- Design safety of the nuclear components, equipment, systems and structure
- Safety features
- Operational safety of the nuclear facility
- Emergency response capabilities
- Radiological Environmental impacts

Safety Inspection

Regulatory inspections are conducted to examine whether the licensed nuclear installations such as nuclear power plants and fuel cycle facilities meet the regulatory requirements specified in the relevant technical standards and whether the performance of the facilities are maintained in the state as approved or licensed.



Pre-operational Inspection

During the construction stage, the nuclear facility shall be subject to the pre-operational inspection to prove that the construction and functional tests of the facility meet the safety requirements specified in the relevant technical standards. If the applicant passes all the pre-operational inspections, then the Operating License is officially issued by the MEST.

Periodical Inspection

The licensee shall be subject to the regulatory periodical inspection which is conducted on a regular basis, generally during licensee's refueling outage. This inspection should confirm that the nuclear facility in operation is maintaining its functions, operational capabilities, and safety levels as approved in the Operating License, and that the performance of the reactor facility, designed to withstand the pressure, radiation and other operating environments, is actually maintained in the state as passed during the pre-operational inspection. Only when the licensee passes the inspection, the government approves the restart of the facility.

Quality Assurance Inspection

The QA inspection is carried out to ensure that all quality assurance activities of the licensee are implemented in accordance with the approved quality assurance program. This inspection is carried out according to the inspection plan of regulatory authorities.

Daily Inspection by Resident Inspectors

At nuclear power plants in operation:

- To confirm whether the nuclear power plant is operated in compliance with the technical specifications
- To check and ensure that the safety related functional tests and repairs are carried out in accordance with technical standards



- To investigate any abnormal occurrences such as incidents and accidents and to report to the MEST and KINS

At nuclear power plants under construction:

- To check and ensure that the construction of structures, equipments and components meet the design criteria and the safety requirements specified in the relevant technical standards



Facilities Subject to Inspection

- Nuclear power plants
- Research reactors
- Nuclear Fuel cycle facilities
- Radioactive waste management facilities
- Facilities using radioisotopes and radiation generators

Categories of Safety Inspection

- Pre-operational inspection
- Periodical inspection
- Manufacturing inspection
- Quality Assurance Inspection
- Radioisotopes and nuclear material transportation inspection
- Radioactive waste management inspection

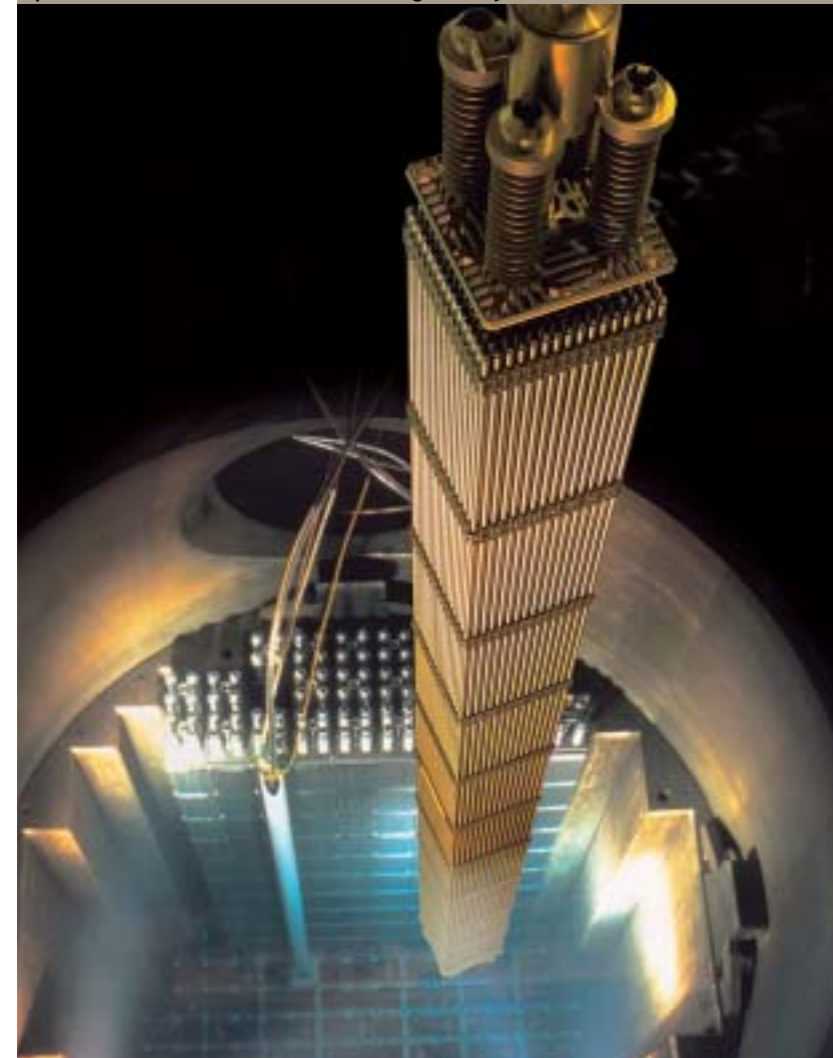


SAFETY EVALUATION

Evaluation of the safety level of a nuclear facility is carried out when an applicant applies for a license(CP or OL). The evaluation is carried out by reviewing and assessing the adequacy of the site, the soundness of safety systems and components, the safety performance and measures against the potential radiation hazards, and the safety of waste disposal systems. The assessments are based on the safety analysis report submitted by the applicant.

Safety Assessment on Reactor Core and Safety Analysis

The adequacy of the design is assessed by safety review for fuel integrity, core performance, the performance of ECCS (Emergency Core Cooling System) and containment, safety analysis of design basis accidents and severe accident. KINS confirms that a nuclear facility is constructed and operated in accordance with the regulatory codes and standards.



Assessment on the Integrity of Nuclear Fuel

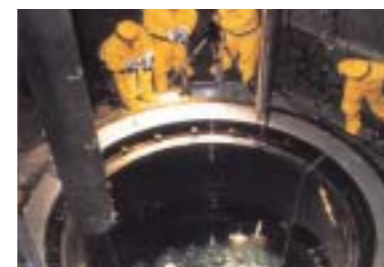
The design criteria of nuclear fuel and core performance under normal operation and the adequacy of newly designed fuel are reviewed based on the topical report submitted by the applicant.

Assessment on the Core Performance

To confirm the safety of initial and reload core in terms of nuclear, mechanical and thermal hydraulic safety, KINS reviews the reload safety evaluation report and nuclear physics test results.

Assessment on Accident Analysis

KINS confirms that the performance of Reactor Protection System and Engineered Safety Features meet the acceptance criteria for the design basis accidents under the anticipated operational occurrences and accidents. Also, plant specific probabilistic safety assessment results, and the prevention and mitigation strategy for severe accidents are assessed.



Safety Assessment on Sites and Structural Systems

The adequacy of nuclear facility sites and the structural safety of safety-related structures at the stages of design, construction and operation are confirmed through safety review and inspection.

Site Safety Assessment

The adequacy of nuclear facility sites and the stability of structural foundations are assessed through the safety review of geologic and seismic characteristics, geography, meteorologic and hydrologic features, and geotechnical engineering characteristics of the sites.

Structural Safety Assessment

Assessment is made on safety related structures including reactor containment to confirm that they are designed, constructed, and operated in accordance with the relevant codes and standards. Periodic inspection is performed to confirm that their structural integrity is maintained appropriately.

Seismic Safety Assessment

Assessment is made on nuclear facilities to confirm that they are seismically designed and qualified in accordance with the relevant codes and standards. KINS also monitors and analyzes earthquake events at nuclear power plant (NPP) sites by operating a seismic monitoring network for NPP sites in order to evaluate the safety of nuclear facilities in the event of an earthquake.



Safety Assessment on System Performance

For the operational safety of nuclear facilities, KINS reviews and inspects the thermal-hydraulics, in-service testing, and system reliability-related aspects of the design and the performance of reactor components and systems, especially reactor coolant system, safety related auxiliary system and power conversion system.



Thermal hydraulic Assessment

KINS reviews and evaluates the functional performance requirements, the design and operation of reactor coolant system, safety related auxiliary system and power conversion system under steady state and transient conditions, from the viewpoint of heat removal capability, overpressure protection and fluid structure interaction.

System Reliability Assessment

KINS performs the reliability analyses and evaluations based on operating experience to assess the design validity, the recovery capability from abnormal events, and the adequacy of surveillance interval and allowed outage time to assess the operability of safety related system. In addition, key inspection items for field inspection are selected and inspection interval for safety related systems are determined.

Performance Assessment

KINS verifies functional performance of safety related components, especially pumps, valves, and heat exchangers. Also, the functional performance requirements during pre-operational inspections and periodic inspections are confirmed.



Safety Assessment on Mechanical Equipment and Materials

For the safety class equipment of the nuclear power plants including reactor pressure vessel, reactor internals, pressurizer, steam generator, reactor coolant pump, reactor coolant system piping, and other safety class piping, their design conformity and structural integrity are assessed and evaluated. The manufacturing, field installation and assembly of the major equipments are reviewed, and made sure that the relevant codes and standards and requirements are satisfied. The aging management programs are evaluated to assure the aging of the major equipment does not compromise the safety of the nuclear power plants.

Assessment of Design Adequacy of Mechanical Components

The design adequacy of the major components is assessed by evaluating the stress analysis, fatigue analysis, fracture analysis, and dynamic analysis in order to assure their structural integrity during operation. The adequacy of materials used for the major components is also reviewed.

Aging Assessment of Mechanical Components and Systems

The aging mechanisms in mechanical components and systems and their associated impacts on the safety are reviewed and checked to confirm that the safety is not compromised by aging progress. The aging management programs for major equipments are reviewed to evaluate whether they are properly managed by reflecting the operational experiences and research results.

Safety Assessment on Pressure Retaining Components

Safety of the pressure retaining components is assessed during manufacturing, installation, and repair processes to assure that the applicable codes and standards are satisfied. As a part of the safety assessment of the pressure retaining components, the various non-destructive examination methods are applied in pre- and in-service inspections and their results are reviewed.



Safety Assessment on Instrumentation and Control(I&C) and Electrical Power Systems

The assessment on the I&C and electrical power systems is to ensure that the systems are designed, installed and operated in compliance with codes and standards. The areas of main regulatory review on I&C and electrical power system are as follows: instrumentation and signal processing system; a protection system that promptly shutdowns the reactor and activates the safety systems whenever an accident occurs; safety information systems and data communication systems that provide critical information to the operator; emergency electric power supply system that provides essential electricity to parts that are directly related to safety; and the man-machine interface systems.



Safety Assessment on Instrumentation and Control Systems

The instrumentation and signal processing circuit, logic circuit and other installments are reviewed to ensure that they satisfy the principle of redundancy, diversity and independency that are required.

Safety Assessment on the Electrical Power Systems

The normal electrical power supply system, the emergency electrical power supply system and uninterruptible electrical power supply system are checked to ensure the compliance with the required redundancy, independency and testability.

Safety Assessment on Man-Machine Systems

The man-machine interface systems are reviewed to make sure that the human factors are taken into account with minimum possible human errors.



Safety Assessment on Radiation, Radioactive Wastes, and Radiological Environment

KINS reviews and inspects the safety on radiation, radioactive wastes, and radiological environment to protect the workers, the general public, and the environment from the potential hazards that may be generated by the development and the use of nuclear energy.

Protection of Radiation Worker

KINS performs periodic monitoring by the national laws and the international codes and standards to oversee the changes in radiation levels and the adequacy of radiation protection activities for the protection of the general public and the environment from possible hazard. Also, it has been implemented not only to ensure the radiation workers' safety, but also to encourage continuous improvement of the radiation protection system of domestic nuclear installation.

Safety on the Radioactive Waste Management

KINS evaluates that the function, design, and management of radioactive waste facilities meet the related laws and applied codes and standards through the clear regulatory activity on the operating or planning radioactive waste management facilities.

Establishment of the "Waste Comprehensive Information Database (WACID)"

The WACID, a national level comprehensive database system on radioactive wastes, has been established in order to manage every information related to the safety management of various and massive radioactive waste sources from nuclear installations in a systematic manner. The WACID has 8 sub-modules consisted of solid radioactive waste, liquid effluent, gaseous effluent, spent fuel, RI waste, decommissioning waste, disposal and others.

The WACID system will play a great role to direct the radioactive waste policy by the government, to promote R&D activities, upgrade the domestic level of safe management of radioactive waste, and finally obtain the public acceptance on nuclear energy by disclosing essential information to the general public.





NUCLEAR SAFETY ASSURANCE

NUCLEAR SAFETY REGULATION

Establishment of Nuclear Safety Information Systems

- Establishment of an information system for nuclear safety regulation
- Provision of information on safety regulations

Research on Nuclear Safety Regulation

- Development of safety standards and requirements
- Improvement of technologies for timely regulation
- Resolution of safety issues and development of safety confirmation technologies
- Establishment of policies on a reasonable and efficient safety regulation system

Legislation of Safety Standards

- Enactment and amendment of the Atomic Energy Law
- Legislation and revision of regulatory guidelines and technical standards

Research on Optimization of the Nuclear Regulatory Safety System

- Research on reasonable and optimum safety regulatory system
- Research on establishing a comprehensive technology system for nuclear safety

Research on Safety Regulation of Nuclear Facilities

- Research on regulatory requirements and safety issues of nuclear facilities
- Research on techniques and methods to verify safety

Research on Radiation Safety Regulation

- Research on safety requirements for radiation protection and radioactive waste management
- Research on emergency preparedness and environmental radiation
- Research on safety evaluation of radiation sources

RESEARCH ON SAFETY REGULATION

Development of Nuclear Safety Regulation Technologies

To assure nuclear safety, licensing system, safety standards, and regulations for safe operation of nuclear installations should be established, and safety confirmation for the design, construction, and operation of nuclear installations be carried out through licensing, regulatory inspections, and various safety evaluations. By taking necessary regulatory actions to resolve safety issues in a timely manner, KINS secures nuclear safety and leads the public to have confidence in nuclear energy. Armed with superior expertise and essential regulatory technologies, KINS promotes and carries out various research projects aimed at coming up with the latest technologies, or establishing regulatory policies, guidelines, and technologies.

Development of e-FAST



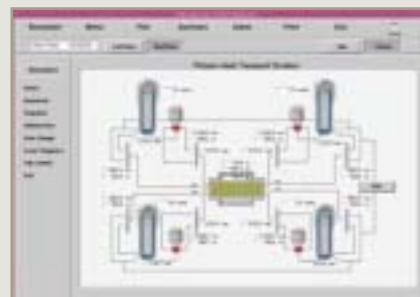
KSNP
(OPR-1000)

electronic Functional Analysis and Simulation Tool

NPA (Nuclear Plant Analyzer)
developed by KINS



Westinghouse
(650MWe)



CANDU
(650MWe)



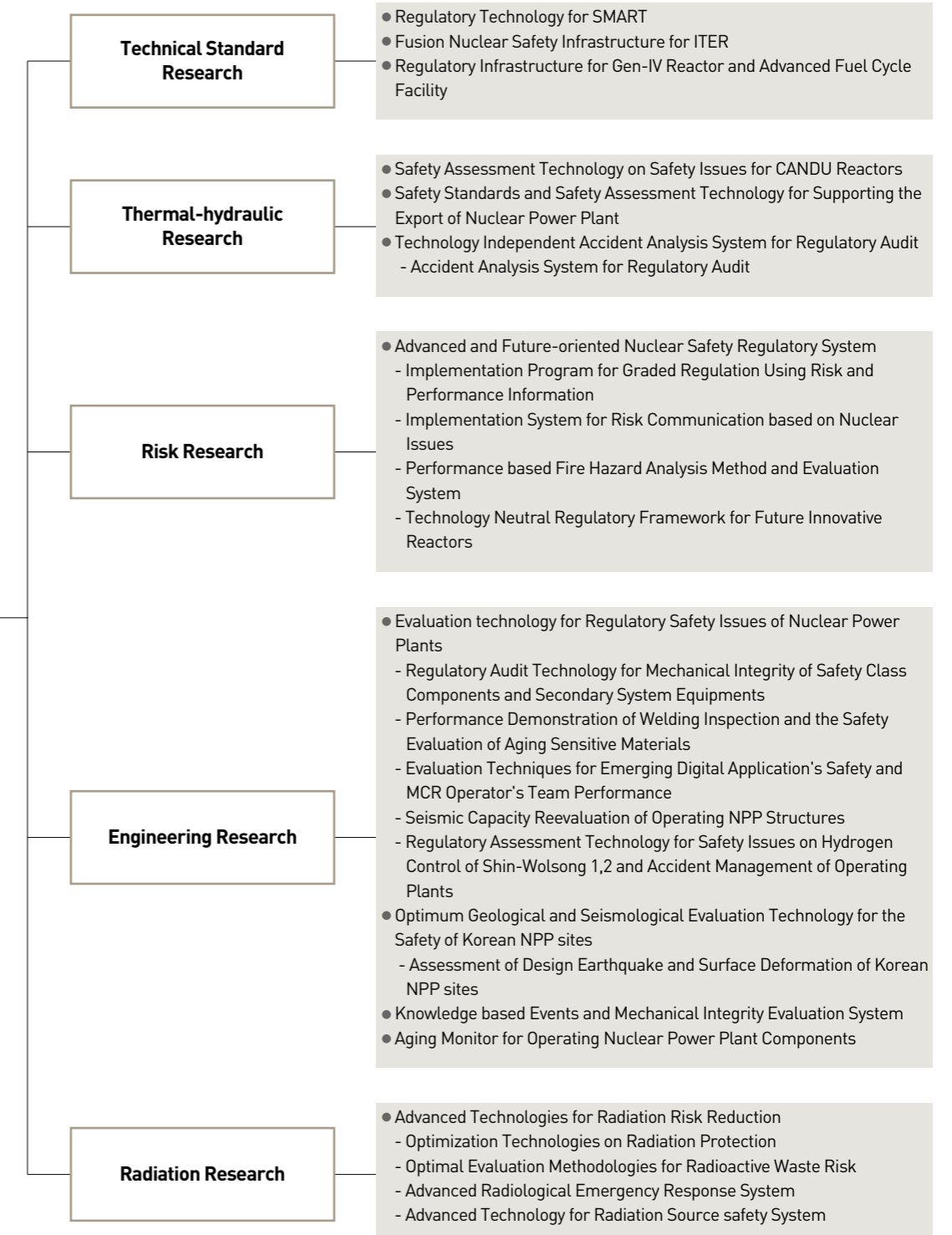
Westinghouse
(950MWe)

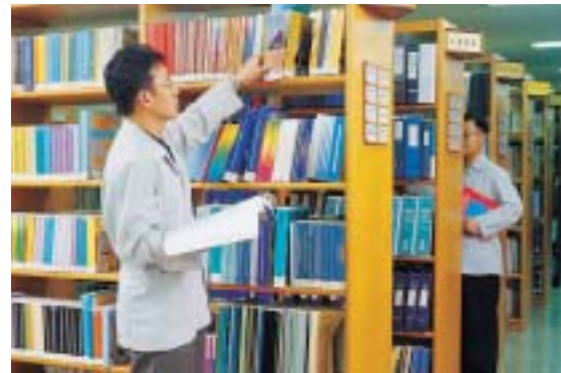


FRAMATOME
(950MWe)

STRUCTURE OF THE REGULATORY TECHNOLOGY RESEARCH

- Establishment of regulatory standards in line with international standards
- Assurance of professional expertise for internationally competitive regulatory technology





Development of Technical Standards

The development of technical standards is one of the major regulatory activities of KINS, along with safety reviews and safety inspections. The development of these standards enables KINS to carry out safety reviews and inspections objectively and coherently. Moreover, these standards provide KINS with the technical details necessary for reasonable and efficient regulation, and lead KINS to comply with international standards.

LEGAL SYSTEM FOR NUCLEAR SAFETY REGULATION

Licensing & Technical Standards

- Atomic Energy Act
- Enforcement Decree of the Act (Presidential Decree)
- Enforcement Regulation of the Act (Ordinance of the MEST)
- Notices by the MEST

License Requirements

Safety Analysis Report, Quality Assurance Program, Technical Requirements, and Additional Administrative Requirements

Regulatory Guidelines

Safety Regulation Guidelines : Review Guidelines, Inspection Guidelines, Technical Guidelines

Industrial Codes & Standards

- KEPIC Codes
- ASME Codes
- Korean Industrial Standards
- IEEE Technical Standards
- ACI Technical Standards
- ASTM Technical Standards



Establishment of a Database for Nuclear Safety Regulation

KINS collects, establishes, and manages a database on all information on regulatory activities including technical standards developments, radioactive environment assessment, and safety inspection on nuclear power plants in both operation and construction. Equipped with the database, information management system, and computer networks and distribution systems, KINS' regulatory activities can be carried out effectively and efficiently.

Management of Nuclear Safety Information and Data

- Collection of domestic and foreign nuclear safety related publications, reports, documents issued by major institutions, and papers on technological standards.
- Establishment of infrastructure of digital library and transformation of major data into digital ones.

Operation of Computer Servers and Networks

- Operation of various computers serves to support safety regulation activities
- Operation of computer networks to distribute information

Operation of Information Distribution Systems

- Promotion of active usage of electronic approval systems, e-bulletin boards, and e-mail.
- Taking the first step to establish a 'paperless office' in line with the 'e-government project.'

Operation of Regulatory Activities System

The regulatory activities system is composed of the following systems:

- Disqualified Inspection Items Management System
- NEED (Nuclear Event Evaluation Database System)
- RASIS (Radiation Safety Information System)
- IERNet (Integrated Environmental Radiation Monitoring Network)
- SPI (Safety Performance Indicator)

Nuclear Safety Information Center

The Nuclear Safety Information Center respects the public's right to know about nuclear safety, and therefore provides the information on domestic nuclear facilities and safety regulation just as it is. All information and data are systematically managed, allowing the public access via the Internet. Everything you want to know about nuclear safety information can be obtained by just a simple click.



Management of Nuclear Safety Information

Collection of information on nuclear safety

- Documents regarding the commission activities, inspections and reviews of nuclear power plants, accidents, and failures are collected and stored.

Analysis of information on nuclear safety

- Information and data regarding the operation of nuclear power plants, accidents, failures, and environmental radiation are analyzed.

Processing and storing of safety information

- Safety information is being processed and stored as information database and the input of information management system.

Disclosure of information on nuclear safety

- Information on nuclear safety is made public.



International Joint Research

International organizations such as the IAEA and OECD/NEA identify current issues or upcoming challenges and, accordingly, encourage member countries to share technologies and solutions. KINS is actively taking part in joint research projects in various ways by paying its share of research costs and sending experts. KINS' efforts and participation in international projects are as follows:

- KINS established a regulatory regime that reflects the obligations stated by international conventions such as the Nuclear Safety Convention.
- By exchanging opinions through bilateral cooperation with US, China, Canada, France, etc., KINS has been maintaining close relationship with those countries on joint research projects and reaches a basic consensus on issues of importance.
- KINS conducts joint research projects with its foreign counterparts including USNRC, Battelle, and IRSN.
- KINS takes part in multilateral research projects by participating in the working level groups at international organizations such as the IAEA and OECD/NEA.





MANAGEMENT OF RADIATION SAFETY

When using nuclear energy, radiation is inevitably generated. But the radiation dose more than a certain level can pose a threat to human health and the environment, and this is why radiation protection activities are necessary to prevent or minimize the damages.

KINS keeps a watchful eye on radiation sources by reviewing and inspecting the handling of radiation sources at nuclear and radiation facilities, monitoring the environmental radiation, with an emergency response program on full alert at all times to cope with radiation accidents.



Nuclear Emergency Preparedness

Potential hazards incurred by accidents of nuclear facilities can not be disregarded. Emergency preparedness and response system is in place to cope with these possibilities. The measures include the real time computerized system, technical support, and emergency drills.

Status Analysis of Nuclear Power Plants

A specialized communication system between the nuclear power plants and KINS is installed. It keeps track of how the plants are operated and is used as inputs for general safety regulation activities. Meanwhile, in case of an accident, the safety status of power plant operation is analyzed and immediately supplied to the AtomCARE system to take appropriate measures.

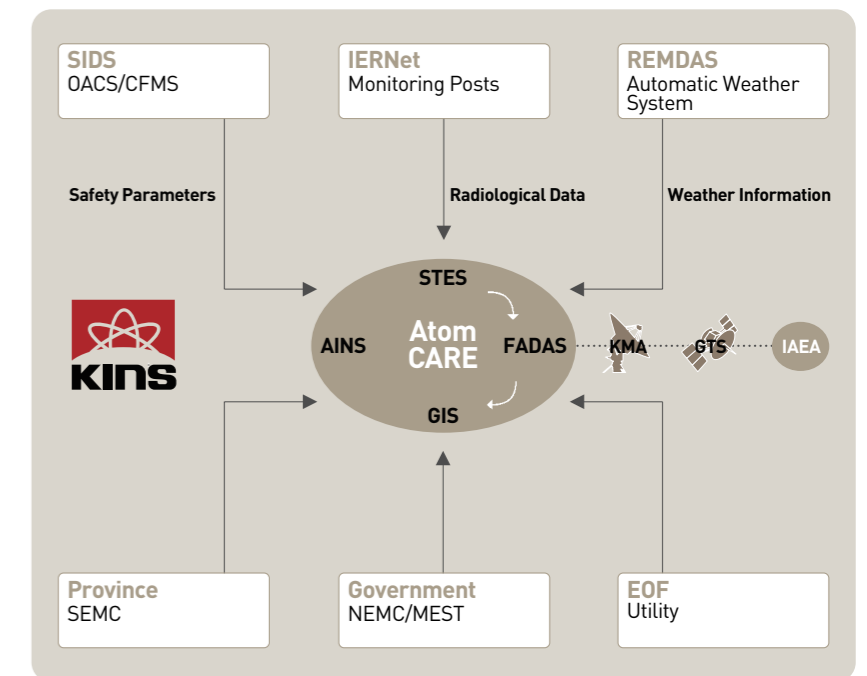
Technical Support for Radiological Emergency Preparedness

When an accident in a nuclear facility leads to actual or possible release of radioactive materials, emergency measures are taken promptly to minimize radiation exposure to radiation workers and the general public near the plant site. Radiological Technical Advisory Center at KINS headquarters is also established under the National Civil Defense Program and makes full use of its resident technical advisory team and on-the-spot technical advisory team.



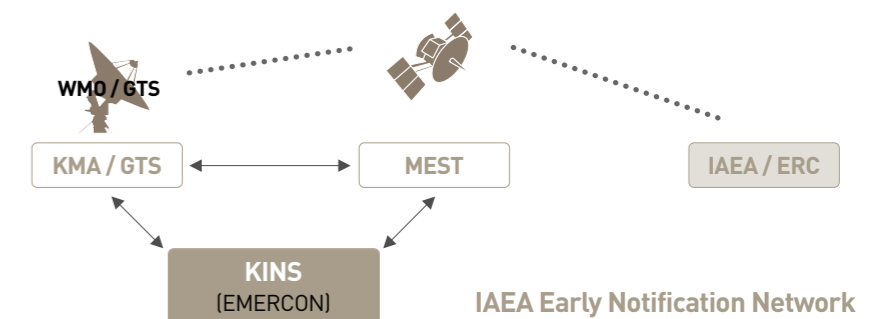
The AtomCARE System

The AtomCARE system is a computerized system that immediately identifies the safety status of a power plant operation in case of an abnormal radiological event and predicts the radiological effects and the affected areas by released radioactive materials, and finally recommends necessary protective actions and counter measures for the general public.



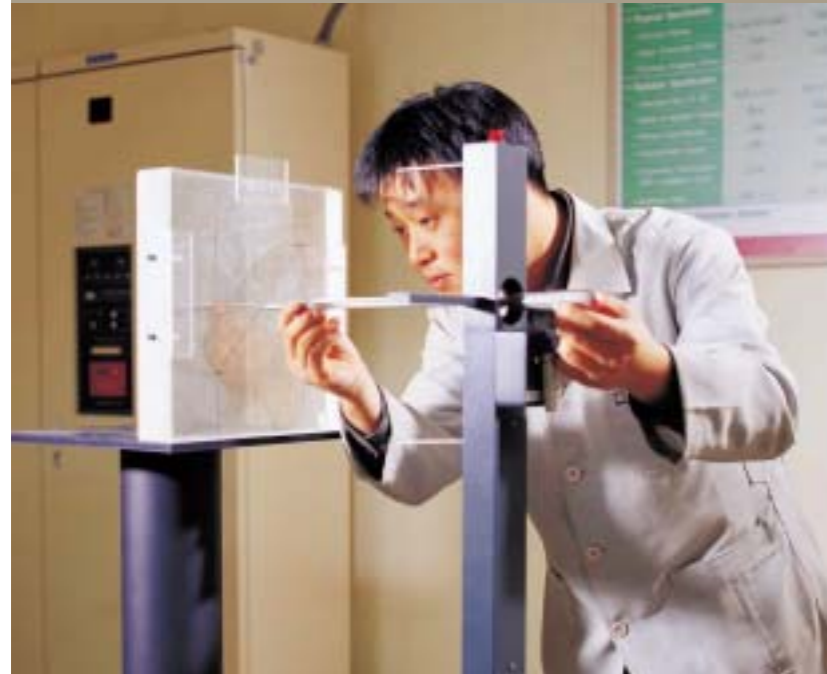
Radiological Emergency Drills

In order to test the comprehensive capability in coping with emergencies, joint emergency drills organized by all domestic institutions in the emergency response field are carried out at nuclear power plant sites. Meanwhile, globally, KINS has continuously participated in emergency communication drills with the IAEA and the US NRC based on the agreement.



Radiation Protection

The goal of radiation protection is achieved when the radiation exposures to the workers and the public are restricted below the dose limits and are kept as low as reasonably achievable. To ensure that the radiation exposures to the workers and the public are properly monitored and controlled, the regulatory system is in place to check the quality of dosimetry service. KINS is also equipped with the information system of occupational exposure.



Establishment and Operation of the "Korea Information System on Occupational Exposure (KISOE)"

In preparation for an expanded usage of radiation and an increase in the number of radiation workers in Korea, the KISOE, as a national base system, has been established. The system focuses on the control of radiation exposure and analyzes the radiation dose trends on a national scale. The system also shares information on radiation exposure with its overseas counterparts and ultimately aims to produce and provide information on the health effects of radiation.

Evaluation of the Radiation Dosimetry Processor

Registration is required to any service that processes personal dosimeters used to monitor individual occupational radiation exposure. KINS reviews and inspects the quality assurance program and consistency of quality for dosimetry service system and implements performance test to the system. When dosimeters are lost or readings are otherwise not available, KINS, by the use of the committee on occupational dose assessment, determines assignment dose to the individual dose record. Such activities are necessary for quantitative assessment of occupational radiation doses in Korea. A standard dosimetry calibration laboratory was established and has been operating to maintain the national traceability system in the radiation dosimetry fields. The calibration laboratory is accredited by KOLAS (Korea Laboratory Accreditation Scheme) for compliance with the general requirements of ISO/IEC 17025. KINS has become a unique national institution with the authority and reliability for the entire process of radiation safety regulation.



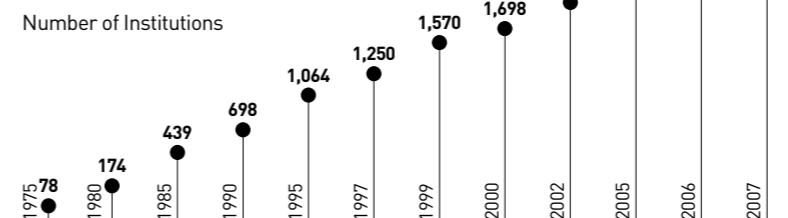
Safety Regulation on Radiation Sources

As manufacturing process and quality management have recently been automated through industrial development, the use of up-to-date equipment in medical fields has expanded more widely and genetic engineering and biotechnology dramatically developed. The number of institutions using radioisotopes and radiation generators is on the increase from 70 in 1974 to about 3,480 as of December, 2007. The safety regulations for the use of radiation sources performed by KINS include the safety reviews for licensing, reviews for approval of radiation equipment design, safety inspections for facility, transportation, packaging and manufacturing radiation equipment.

Safety regulation on radiation sources is carried out in the following forms:

- Safety reviews and inspections of usage and sales of radioisotopes, large capacity accelerators, nuclear fusion facilities, and nuclear materials
- Design approval for radiation generating devices

NUMBER OF INSTITUTIONS USING RADIOISOTOPES AND RADIATION GENERATING DEVICES



Safety activities on the transportation of radioactive materials are carried out in the following forms:

- Design approval of special form radioactive materials and packages for radioactive materials
- Manufacturing inspection and in-service inspection for packaging
- Inspection on the safety of transportation of radioactive materials

Operation of the "Radiation Safety Information System (RASIS)"

The Radiation Safety Information System (RASIS) brings together the tasks of regulation authorities, related institutions and organizations using radioactive material, thereby contributing to active usage of radioactive material and ultimately boosting national competitiveness. The RASIS consists of the following four sub-systems: Information System on Regulatory Activities for Radioisotope responsible for the review and inspection of licensing; User Safety Management System, supporting safety management activities; Cyber Information System on Radiation Safety providing comprehensive information on radiation safety; and Life Cycle Management System for Radioisotopes and Radiation Generators.



Monitoring of Environmental Radiation

Ongoing monitoring and supervision of environmental radiation are carried out to protect the health and safety of the general public and conserve the natural environment. In particular, the areas surrounding nuclear facilities are under close watch to assess the environmental impact of radiation associated with the operation of nuclear power plants.



is operated and managed to keep an eye on environmental radiation across the nation.

- Baseline information on the level of environmental radiation is collected.
- Any abnormal radiation levels are detected in the earliest stages, while an emergency response system is established to lay out a contingency plan.
- Radioactivity analyses are carried out to guard against radioactive contamination of the seas surrounding the Korean peninsula.

Monitoring of Environmental Radiation in Areas Surrounding Nuclear Facilities

Plans have been established to monitor, investigate and analyze environmental radiation and radioactivity in areas surrounding nuclear facilities including nuclear power plants, research reactors and nuclear fuel cycle facilities.

- Changes and trends in concentration of radioactive materials in the surroundings are analyzed.
- When abnormalities in nuclear facilities occur and lead to leaks of radioactive materials, assessments are made on the consequences. Counter measures are then drafted according to the assessments.
- Radiation dose to near-by residents is measured and assessed.



Integrated Environmental Radiation Monitoring Network(IERNet) System

The IERNet system is being operated to enable the early detection of radioactive contamination in the environment resulting from nuclear or radiological accidents.

Now, the IERNet consists of a central Radiation Monitoring Station and 49 regional radiation monitoring stations and posts.

The IERNet has the function of real time on-line radiation monitoring and early warning system that provide the government and related organizations with timely information on any change in radiation levels and enable them to take appropriate countermeasure and to inform the public.

The Nationwide Network for Monitoring Environmental Radiation



Nationwide Monitoring of Environmental Radiation

Investigations and analyses are implemented to assess the environmental impact of radiation on our national territory and guard against possible unlicensed nuclear experiments or large scale nuclear hazards.

- A monitoring network led by KINS' Central Radiation Monitoring Station

INTERNATIONAL NUCLEAR SAFETY SCHOOL (INSS)



International Nuclear Safety School (INSS)

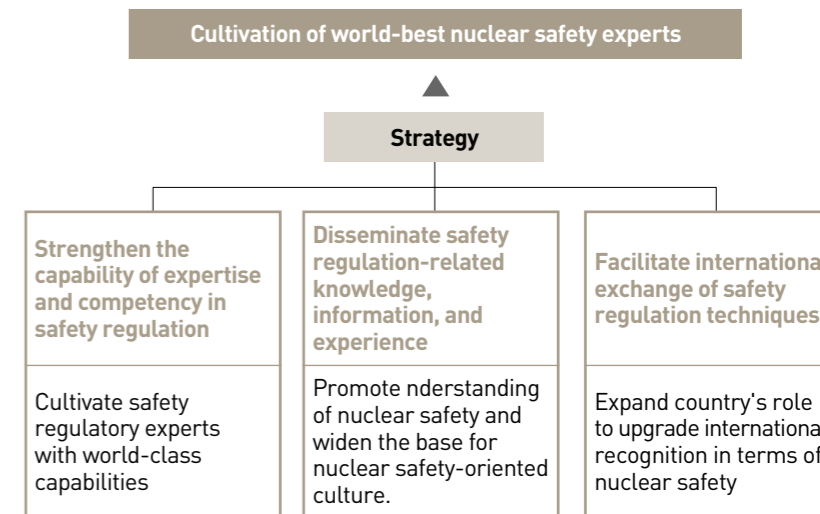
KINS established INSS to share the knowledge and experience on nuclear safety and regulation that it has accumulated for several decades.

INSS (total floor area of 2738.2m², one story basement, three-story tower) operates a variety of training programs including technical courses for in-house personnel and special courses for outside specialists. In addition, INSS is making vigorous efforts to enhance the Korean public's understanding of nuclear safety and to expand the base of a nuclear safety-oriented culture by offering hands-on safety training courses to the general public.

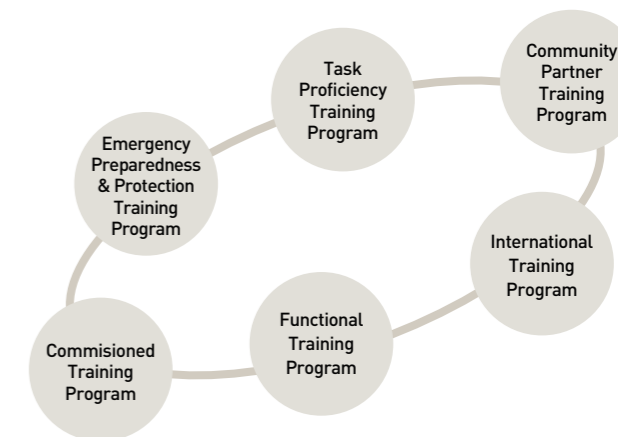
INSS also offers customized training courses designed for safety regulatory experts around the world including those in Asia, thereby making a major contribution to enhancing nuclear safety worldwide. At the same time, INSS is making ceaseless efforts to enhance KINS' international standing by facilitating international exchange of regulatory techniques.

In the future, INSS will emerge as a world's premier nuclear safety training center by expanding target trainee groups and courses offered, through stronger ties with industries, research institutes, and academia and through enhanced international cooperation, and the state-of-the-art training equipment and materials, while striving to secure a faculty of experts home and abroad.

Vision



Training Category and Structure



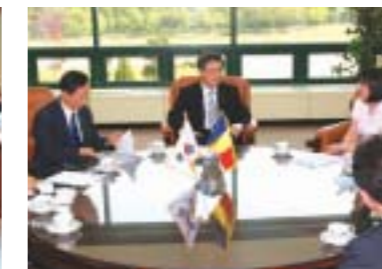
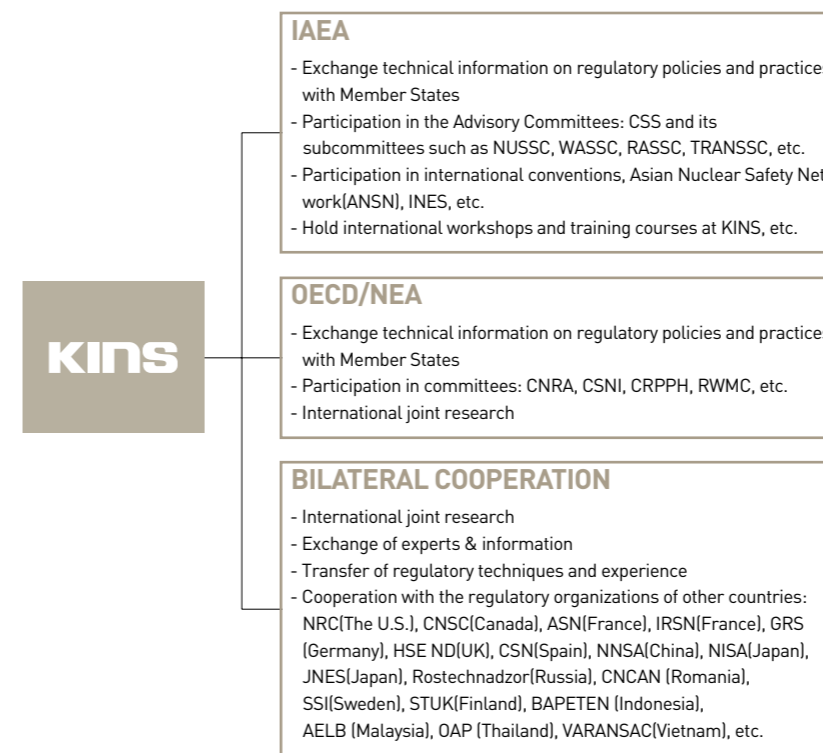
Training Courses by Category

Category	Field	Training Course
Radiation Protection & Emergency Preparedness Training Program	Radiation protection	Radiation protection courses
	Radiological emergency preparedness	Radiological emergency preparedness courses
Regulatory Competency Training Program	Regulatory inspector	Nuclear regulatory inspector training (Basics)
		Specified inspector training by inspection area
	Technical training on regulatory practices	Courses on nuclear facilities and systems
		Advanced courses on regulatory practices
Community Partner Training Program	Safety management personnel training	Safety management personnel courses
	Hands-on nuclear safety learning	Hands-on nuclear safety learning courses
	Technical training on nuclear power plant system	Technical courses on nuclear power plant system
International Training Program	International regulatory expert training	Courses on general regulatory basics
		Customized professional training courses
		IAEA-hosted workshops
		Courses under IAEA extra-budgetary program
Functional Training Program	IT familiarization program	IT familiarization courses
	Language program	Language courses
	Functional training on regulatory support	Functional training for administrative personnel
Functional training for managerial personnel		
Commissioned training Program	Commissioned training	Commissioned courses



International Cooperation

With the introduction of the Nuclear Safety Convention and the Joint Convention on Safe Management of Spent Fuel and Radioactive Waste, KINS is cooperating on various fronts with international organizations and advanced countries. Such cooperation enables improvement of regulatory techniques to fit the nation's specific situations. By forging close ties with our Asian neighbors as well as other countries, KINS is playing a key role in international nuclear community.



License Examinations

To make sure nuclear energy and radioisotopes are safely used by qualified and licensed people only, Korea has put in place licensing systems for those who operate nuclear reactors or handle nuclear fuels and radioisotopes.

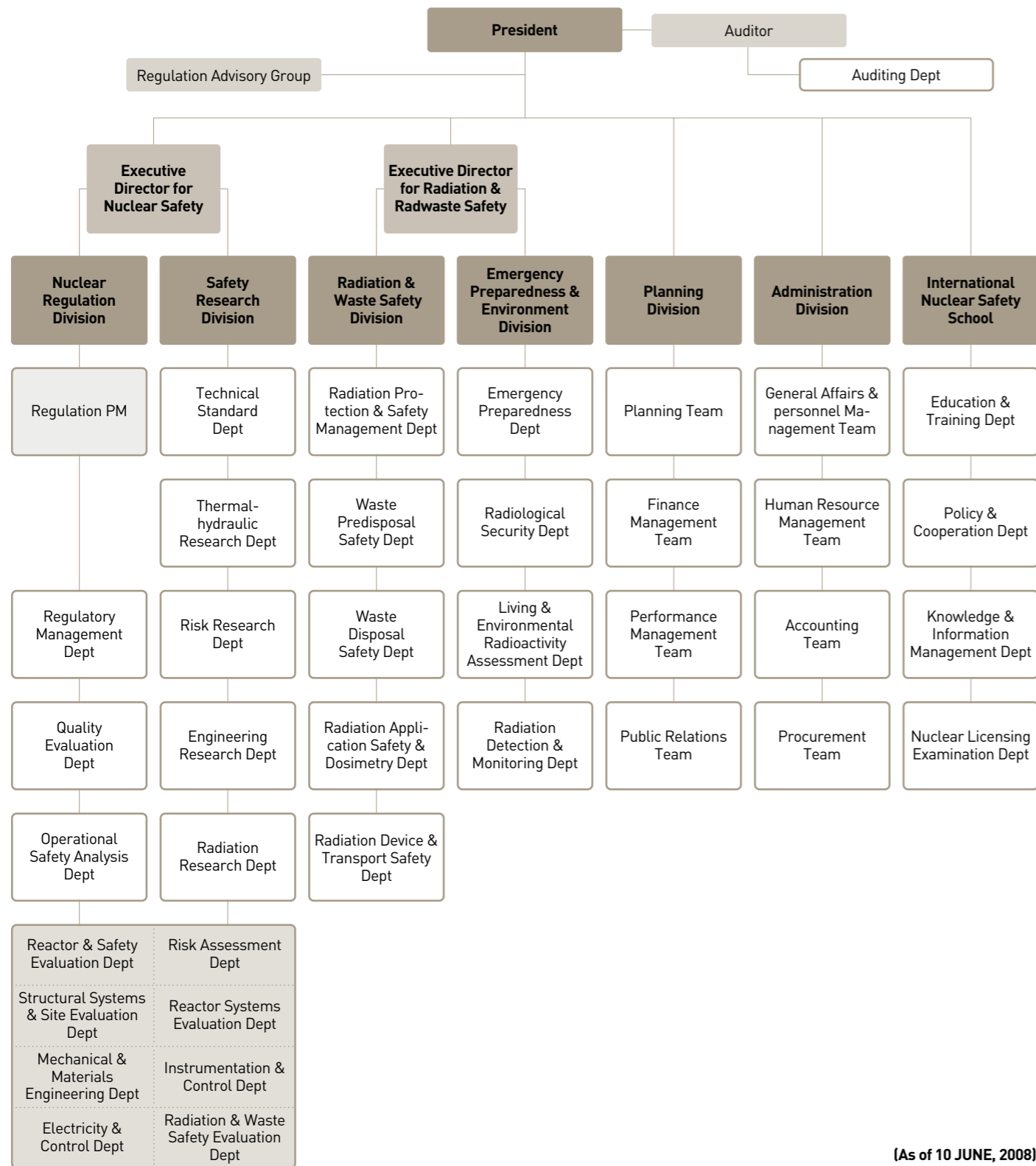
Along with the regulatory regime looking over the operation of nuclear facilities, the licensing system constitutes a big part of the government's efforts to ensure safe use of nuclear energy and radioisotopes.

KINS has administered the licensing exams that the Atomic Energy Act requires applicants to pass.

NUMBER OF LICENSEES (as of December, 2007)

License Name	Number of Licensees
License for senior reactor operator(SRO)	1,035
License for reactor operator(RO)	879
Supervisor License for the handling of nuclear fuel	46
General License for the handling of nuclear fuel	10
General license for the handling of radioisotopes	4,354
Special license for the handling of radioisotopes	818
Supervisor License for the handling of radioisotopes	740
Total	7,882

KINS Organization Chart



(As of 10 JUNE, 2008)

KINS -AN ORGANIZATION
 THAT WILL ALWAYS BE THERE
 FOR THE PUBLIC

KINS is standing firm for our environment to preserve
 its natural beauty, clean water, green forests
 and blue skies.

More than 380 KINS staff have committed themselves to serve as a
 watchdog, looking out for the interests of the Korean people and
 global citizens. Recognizing that a huge responsibility of ensuring nuclear
 safety is on their shoulders, KINS staff are carrying out objective and
 comprehensive regulatory activities in selection of the site for
 nuclear facilities, design, construction, operation and decommissioning
 of the nuclear power plants.