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Summary Report of Peer Review

(Provisional Translation)

Place of Review:	**Shimane Nuclear Power Station, THE CHUGOKU ELECTRIC POWER CO., INC. (Kashima-cho, Yatsuka-gun, Shimane-prefecture)**
Date of Review:	**October 16-19, 2001**
Publisher:	**Nuclear Safety Network**

Contents

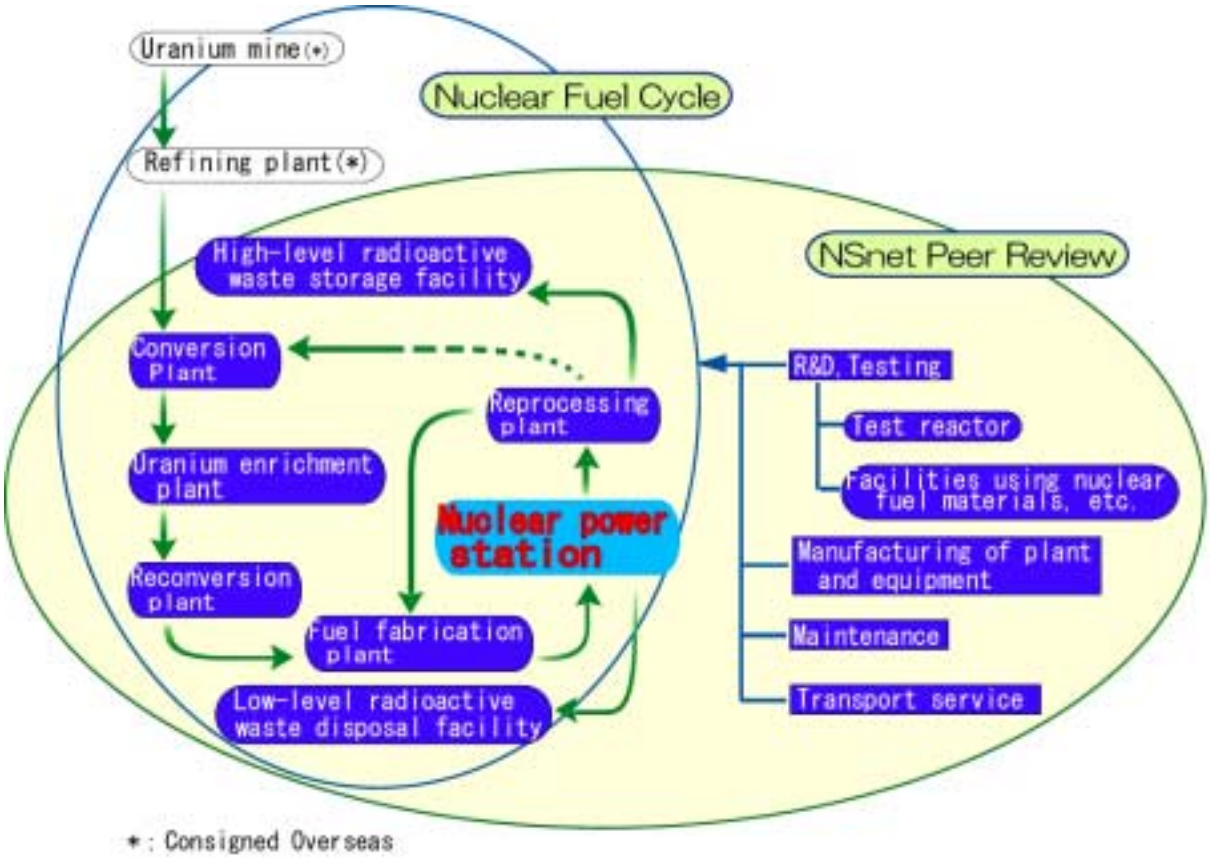
1. Objectives

The purpose of the NSnet peer review (hereafter referred to as “review”) is to achieve an improvement in the “safety culture” of the entire nuclear power industry by sending review teams of member specialists to member facilities, where they conduct reciprocal evaluations on common nuclear safety subjects among members and share mutual knowledge of good practices as well as subjects that have been singled out for improvement.

2. Summary of Facility Operations

(1) Subject Operation (Facility Classification)

Shimane Nuclear Power Station, The Chugoku Electric Power Co., Inc. (Nuclear Power Station)



The position of "NUCLEAR POWER STATION" in the nuclear fuel cycle

(2) Outline of the Operation

The Chugoku Electric Power Co., Inc. supplies electricity to five prefectures (Hiroshima, Okayama, Yamaguchi, Shimane, and Tottori) of the Chugoku District and parts of Hyogo, Kagawa, and Ehime Prefectures. The company is striving to supply environmentally friendly, high quality electric power to realize its corporate policy “ENERGIA” (a new, bright society filled with warm vitality brought by energy). The company’s total power generation in FY 2000 was 44.9 billion kWh and its total power generation capacity was 12,188 MW as of the end of September 2001.

Shimane Nuclear Power Station (hereafter referred to as the “Station”), which

was subjected to the review, is the company's only nuclear power station, accounting for 10% of its total power generation capacity and supplying 15% of the power demand (actual records in 2001). The site is located in the northern part of Kashima-cho at the center of Shimane Peninsula, north of Matsue-shi, facing the Sea of Japan (site area: approximately 1.7 million m^2. The site was constructed as the fifth nuclear power station site in Japan, in which two boiling water reactors (BWRs) are in operation (See the table).

As the first reactor domestically manufactured in collaboration with domestic nuclear system manufacturers, Unit 1 has been experiencing favorable operation since its commercial operation started in March 1974. It has one of the longest histories of hours of operation in Japan. Unit 2, which employs an advanced containment vessel, automatic refueling, high speed drive of control rods, etc., has been experiencing high performance as represented by its cumulative capacity factor of 85.7% (as of the end of September 2001) since its commercial operation started in February 1989. The Station's total power generation reached 150 billion kWh in December 2000.

[In Operation]

Unit	Electric Output (MW)	Reactor Type	Commercial Operation Started	Cumulative Performance (As of the end of September 2001)		
				Power Generated (billion kWh)	Hours of Operation	Capacity Factor[1] (%)
1	460	BWR	March 1974	79.8	176,345	71.9
2	820	BWR	February 1989	77.8	95,539	85.7
Total	1,280	-	-	157.6	271,884	78.1

Comprehensive preventive maintenance, such as replacing shrouds[2] during the annual inspection in FY 2000, has been carried out for Unit 1. In addition, construction is under way to increase the storage capacity of the Unit 2 fuel pool and install a miscellaneous solid waste treatment system, in which a high frequency melting furnace[3] reduces the volume of waste. These efforts to improve the safety and reliability of the station have been made steadily.

The company is also planning to construct Unit 3 equipped with an advanced boiling water reactor (ABWR) incorporating the latest technologies as an important power source by the early 2010's (See the table).

[Construction Plan]

Unit	Electric Output (MW)	Reactor Type	Commercial Operation Scheduled to Start	Construction Scheduled to Start	Application for Permit to Modify the Installation
3	1,373	Advanced BWR	(March 2010)	(March 2003)	October 4, 2000

The number of employees at the Station is 338 (as of October 10, 2001). There are 12 people on the management staff, including Superintendent of the Station (hereafter referred to as "Superintendent"), 102 in the Operation Section (90 of whom are working in six groups in three shifts on an around-the-clock basis), 99 in the Maintenance Section, 67 in the Technical Support Section (core and fuel control,

radiation control, training and education), 58 in the General Affairs and other sections. In addition, approximately 600 employees from cooperating companies are stationed at the Station to support the operation, maintenance, etc. of the plant.

3. Points of Review

The NSnet was established following the first criticality accident that ever occurred in Japan at the conversion test building (fuel processing facilities) of JCO on September 30, 1999 (hereafter referred to as the "JCO accident"). The NSnet peer review on operations that have nuclear fuel facilities, including fuel-processing facilities, has focused on "the prevention of fatal accidents, such as critical accidents." In this review, in view of the recent trends in nuclear safety and accident prevention, we focused on the following five basic points in terms of both technical and social safety:

(1) Foundation for ensuring nuclear safety (including communication with cooperating companies)
(2) Relationship with the community (improving anti-disaster measures)
(3) Incorporating operating experience into the improvement of safety
(4) Reflecting on and addressing lessons from the JCO accident
(5) Recent issues concerning LWRs

Review items were decided and compared with the best practices in the nuclear industry by classifying individual elements of the above five viewpoints into the following six categories: ① organization/administration, ② emergency measures, ③ education/training, ④ operation/maintenance, ⑤ radiation protection, and ⑥ addressing important issues.

(1) *Foundation for ensuring nuclear safety (including communication with cooperating companies):* Safety culture should be fostered to establish effective organization. Sufficient education and training should be provided to operators and maintenance personnel. Effective documentation of operation and maintenance administration should be promoted and complied with. Appropriate communication with cooperating companies should be ensured. Radioactive waste treatment and radiation protection should be conducted appropriately.

(2) *Relationship with the community (improving anti-disaster measures):* Emergency measures should be implemented without fail. Efforts should be made to coexist (in a state of symbiosis) with the community and to promote the safety of nuclear energy through disclosure and public acceptance activities.

(3) *Incorporating operating experience into the improvement of safety:* Problems that occurred at nuclear power generation facilities in the past had been incorporated into the subject facilities in an appropriate manner to facilitate the improvement of equipment and operating methods.

(4) *Reflecting on and addressing lessons from the JCO accident:* Critical safety control[4] at new fuel storage warehouses, fuel pools, etc. should be thoroughly ensured. In-core fuel management has been carried out appropriately to ensure neutronics safety[5]. Activities should be promoted to foster and improve the nuclear safety culture in view of the factors that caused the JCO accident.

(5) *Recent issues concerning LWRs:* Quality control should be enhanced to prevent the problem of data manipulation in inspections of piping welds, spent fuel

transportation containers, and MOX fuel[6]. Activities should be promoted to develop measures to prevent human error and ensure safety during reactor shutdown.

4. Period and Outline of Review

(1) Date

October 16 (Tuesday) to October 19 (Friday), 2001

(2) Formation of Review Teams

1st group: Sumitomo Metal Mining Co., Ltd.; Chubu Electric Power Company, Inc.

2nd group: Kyushu Electric Power Company, Inc.; JGC Corporation

3rd group: Nuclear Fuel Industries, Ltd.; NSnet Office

Coordinators: NSnet Office

(3) Fields of Responsibility

1st group: Organization/administration, emergency measures, education/training

2nd group: Operation/maintenance

3rd group: Radiation protection, Addressing important issues

(4) Facilities to be Reviewed

The review was conducted at the whole of Shimane Nuclear Power Station including “Operation and Maintenance Training Center.”

5. Schedule of Review

The review was carried out over a four-day period by the respective groups according to the schedule shown below.

<table>
<tr><th colspan="2"></th><th>1st Group</th><th>2nd Group</th><th>3rd Group</th></tr>
<tr><td rowspan="6">Oct. 16 (Tue.)</td><td rowspan="3">AM</td><td colspan="3">Opening (Greetings, Introductory outline of the Station, etc.)</td></tr>
<tr><td colspan="3">Plant Tour [Main control room]</td></tr>
<tr><td>Document examination
(1. Organization/administration)</td><td>Document examination
(4.1 Operation administration)</td><td>Document examination
(5. Radiation protection)</td></tr>
<tr><td rowspan="3">PM</td><td>Document examination
(1. Organization/administration)</td><td rowspan="2">Document examination
(4.1 Operation administration)</td><td>Document examination
(5. Radiation protection)</td></tr>
<tr><td rowspan="2">Field observation
[New fuel acceptance inspection]
[Emergency equipment in radiation controlled areas]
[Main control room]</td><td rowspan="2">Field observation
[Drum yard, Site bunker pool, etc.]</td></tr>
<tr><td>Field observation
[Main control room]</td></tr>
<tr><td rowspan="6">Oct. 17 (Wed.)</td><td rowspan="3">AM</td><td>Document examination
(1. Organization/administration)</td><td>Interview
[Managers]
[Operators]</td><td rowspan="3">Document examination
(6.1 Neutronics safety)</td></tr>
<tr><td>Interview
[Managers]
[Responsible personnel]</td><td rowspan="2">Document examination
(4.2 Maintenance administration)</td></tr>
<tr><td>Document examination
(2. Emergency measures)</td></tr>
<tr><td rowspan="3">PM</td><td colspan="3">Presentation of the useful examples of safety and health activities in the section of building materials
[by a reviewer from Sumitomo Metal Mining Co., Ltd.]</td></tr>
<tr><td>Interview
[Superintendent]</td><td rowspan="2">Document examination
(4.2 Maintenance administration)</td><td>Document examination
(6.2 Reflecting on past problematic events)</td></tr>
<tr><td>Document examination
(2. Emergency measures)</td><td rowspan="3">Field observation
[Main control room, Reactor building, Radioactive waste building]</td></tr>
<tr><td>Field observation
[Emergency Operation Room]</td><td rowspan="2">Field observation
[Turbine building, Main control room (Observing the status of taking over shift operation)]</td></tr>
<tr><td>Interview
[Responsible personnel]</td></tr>
<tr><td rowspan="5">Oct. 18 (Thu.)</td><td rowspan="4">AM</td><td>Document examination
(3. Education/training)</td><td>Document examination
(4.3 Activities to improve safety and reliability)</td><td>Interview
[Responsible personnel]</td></tr>
<tr><td>Field observation
[Operation and Maintenance Training Center]</td><td rowspan="2">Interview
[Managers]
[Maintenance personnel]</td><td rowspan="3">Document examination
(6.2 Reflecting on past problematic events)</td></tr>
<tr><td rowspan="2">Interview
[Responsible personnel]</td></tr>
<tr><td>Document examination
(4.3 Activities to improve safety and reliability)</td></tr>
<tr><td>PM</td><td>Verification of Fact</td><td>Verification of Fact</td><td>Verification of Fact</td></tr>
<tr><td rowspan="2">Oct. 19 (Fri.)</td><td rowspan="2">AM</td><td colspan="3">Verification of Fact (review team, host)</td></tr>
<tr><td colspan="3">Closing (Explanation results, etc.)</td></tr>
</table>

6. Methods and Items of Review

6.1 Review Methods

The review was conducted on activities for the promotion of improvement of safety in the Station. In the review, an investigation was conducted through observation of the site where the activities are practiced, verification of the documents presented by the Station, and discussion based on the documents and interviews with the employees. Then, the results were evaluated to select good practices and items to be improved.

Additionally, in the process of review, the review team timely introduced useful instances regarding the status of safety activities and their contribution to improving safety, thereby promoting nuclear safety cultural exchange. These include activities to promote safe breathing[7] and to establish pointing and designating at the companies to which the reviewers belong.

6.1.1 Review Procedures

(1) Field Observations

Direct observation was made with regard to actual activities on the spot compared with the items confirmed through document examinations and interviews. Findings were compared with reviewers' knowledge and experience.

(2) Document Examination

With regard to each review item, documents were examined while receiving explanations of them and requesting relevant documents as the need arose. An in-depth examination was conducted, asking for relevant documents after observing field facilities and activities.

(3) Interviews

Interviews were conducted with respect to the Superintendent, managers, operators, maintenance personnel, etc. with the following objectives:

a Understanding the attitude and awareness toward nuclear safety
b Gaining additional information that cannot be verified through documents
c Questions and answers on problems identified during document examination
d Grasping the degree of understanding of determined items and responsibilities imposed on each individual
e Understanding the compliance status of determined items and whether such items have become dead letters

6.1.2 Standpoint for selecting Good Practices and Suggestions for Improvement

(1) Good Practices

"Information on good practices incorporating appropriate, effective, and unique methods into activities to ensure safety should be widely distributed to the members of the NSnet and the nuclear industry".

(2) Suggestions for Improvement

"After comparing the station's practices with the best in the nuclear industry, suggestions for improving and enhancing safety activities should be implemented

so as to achieve the highest level of nuclear safety."

Even if current activities are equal to or higher than general standards in the nuclear industry, there is still room for improvement.

6.2 Items of Review

Field observations, document examinations, and interviews were conducted based on the review items identified in "3. Points of Review." Results were evaluated and itemized. They were then summarized in "7. Main Conclusions."

Section 1: Organization/Administration

To ensure nuclear safety, the review was conducted to check whether the necessary personnel are assigned to ensure safe operation, whether "safety culture" that always prioritizes safety is fully recognized, whether effective communication with cooperating companies is maintained, and whether public acceptance activities for the community are promoted through disclosure, etc.

The issue of data manipulation was examined in terms of quality control enhancement and morality improvement.

(Review Items)

(1) Effective organization management
   - a Clarifying the line-organization and the system of responsibility
   - b Setting up goals of the organization
   - c Leadership of the managers

(2) Activities to promote safety culture and improve morality
   - a Specific activities to promote "safety culture" (including communication with cooperating companies)
   - b Specific activities to improve morality
   - c Public acceptance activities for the community

(3) Quality control
   - a Effective audit system
   - b Preventing data manipulation
   - c Improving documents associated with the revision of technical specifications

Section 2: Emergency Measures

Considering the enforcement of the Special Measures Law for Nuclear Disaster in June 2000 (hereafter referred to as the "Nuclear Disaster Law"), the review was conducted to examine whether emergency plans and equipment are in place and whether training is carried out responsibly.

(Review Items)

(1) Emergency plans
   - a Drawing up emergency plans
   - b Improving emergency organizations (including notification and liaison systems)
   - c Developing emergency procedures
   - d Keeping employees well informed

(2) Inspection and maintenance of emergency facilities, equipment, and resources

(3) Implementation of emergency training (actual results)

Section 3: Education/Training

Based on the idea that improving technical skills and safety awareness among employees contributes to improving nuclear safety, the review was conducted to examine whether effective education and training systems, including the systems of cooperating companies, have been developed, whether credential certification systems have been introduced, and whether they have been implemented responsibly.

How the accumulation and transfer of technical know-how is incorporated into the education and training system was also included in the review items.

(Review Items)

(1) System of certificate qualifications (including voluntary efforts) and evaluation criteria

(1) Education and training plans and implementation

(2) Technical transfer

Section 4: Operation/Maintenance

The review was conducted to check whether high-level safety is ensured with regard to various items concerning operation and maintenance administration. The common issue of whether adequate organization, including those from cooperating companies, is formed (including the assignment of personnel) and whether documentation is facilitated and complied within the Operation and Maintenance Sections was examined.

In addition, the review focused on compliance with operating limits in the area of operation administration and functional classification of individual systems and equipment as well as corresponding maintenance and inspection in the area of maintenance administration.

Paying attention to shortened annual inspections, moreover, it was examined whether or not inspection periods are shortened in disregard of safety.

The Company's activities to improve safety and reliability were also reviewed. These include PSR[8] conducted at the Station and specific instances of the upgrading work on the major equipment.

(Review Items)

(1) Effective operation administration

a Operation organization

b Operation books and manuals, and compliance with them

c Design control (compliance with operating limits, etc.)

(2) Effective maintenance administration

a Maintenance organization

b Maintenance documents and procedures, and compliance with them

c Maintenance facilities and equipment (clarification of safety functional classification, etc.)

d Work plans and administration (shortening of the annual inspection period, etc.)

(3) Activities to improve the safety and reliability

a Periodic safety review (PSR), etc.

b Upgrading work on major equipment

Section 5: Radiation Protection

To ensure adequate dose control for employees based on the idea of ALARA[9], monitoring of the radiation dose inside and outside the controlled area, and treatment and reduction of radioactive waste, various measures and their implementation status were reviewed.

(Review Items)

(1) Dose control for radiation workers and ALARA plans
(2) Monitoring radiation dose in normal and accident situations
(3) Treatment and reduction of radioactive waste
    a Radioactive waste treatment
    b Reducing the generation of radioactive waste

Section 6: Addressing Important Issues

Each step of nuclear safety was examined from the acceptance of new fuel, fuel loading/operation/removal to spent fuel storage and transportation to extending criticality safety at nuclear fuel facilities to nuclear power stations. In addition, activities concerning risk evaluation were examined, such as periodic safety review (PSR) reports and accident management (AM)[10] measures.

The review also focused on the system and record reflecting problematic events that have occurred at domestic and overseas nuclear facilities in the past.

(Review Items)

(1) Activities for nuclear safety
    a New and spent fuel management
    b In-core fuel management
    c Shutdown safety measures
    d Activities concerning risk evaluation
(2) Reflecting on past problematic events
    a Modifying and improving systems and operating methods
    b Activities to prevent human errors
    c Emergency response
    d Measures to prevent fuel leakage and fuel integrity monitoring
    e Fire and explosion prevention

7. Main Conclusions

Summarizing the results from the review of Shimane Nuclear Power Station of The Chugoku Electric Power Co., Inc., no items were identified that may lead to the occurrence of serious accidents unless immediate improvement measures in terms of nuclear safety are taken. It was confirmed that at the Station, all the employees, including Superintendent and employees of cooperating companies, are unified as equal partners and are seriously and faithfully endeavoring to continue to enhance nuclear safety. It was also confirmed that the Station has achieved a culture in which barriers separating the Station and cooperating companies have been removed to facilitate vigorous information exchange, so that even problems that seem to be insignificant in terms of safety can be reported promptly.

At the Station, Units 1 and 2 started commercial operation in 1974 and 1989, respectively. Safe and stable operation is defined as the prime issue in its business

management policy. Priorities and indices have been identified to carry out operation and maintenance activities in a steady manner. Stable operation has been continuing without any unplanned outage since FY 1995.

The principle of "Field First" is upheld when carrying out various activities. Making decisions with courage to ensure quick response putting safety first and asking "why" at all times aiming to improve plant safety have been established as the "Safety action rules" thereby thoroughly ensuring employees' awareness of safe and stable operation. In addition, activities to prevent human errors are actively promoted as the activities for zero accidents as well as nuclear safety.

In the future, it is desirable for the Station to continue voluntary safety efforts, aiming to further improve its safety culture, rather than being satisfied with the current status.

It is also expected that the fruitful results from the review will be incorporated into activities at cooperating companies.

The following major good practices were identified during the review, which should be introduced extensively to other members of the NSnet and the nuclear industry:

- Cooperating companies' active involvement in ensuring safety through the improvement proposal system of the Safety Council

As one of the activities of the Safety Council organized by The Chugoku Electric Power Co., Inc. and cooperating companies, the work safety and working environment improvement proposal system is in place. This was institutionalized in July 2000. To date, approximately 220 proposals have been made from cooperating companies and 110 of them have been adopted as a result of examination. These have not only contributed to improving work safety, but also are expected to raise motivation for ensuring safety through active involvement of cooperating companies.

- Practical use of training simulator for abnormal condition of process and equipment

The training simulator installed at the Operation and Maintenance Center is designed to improve the ability to detect abnormal indications of systems at an early stage by bodily sensation of abnormal conditions. Training using the simulator is offered to all new employees of engineering departments and those who wish to take such training. The simulator has been utilized favorably.

- Thorough preparations and station-wide united work on shroud replacement

(1) The goal of zero accidents was achieved during the work because accurate and safe work were carried out owing to thorough advance preparations, such as mock-up[11] systems, the use of automatic remote welding systems, and heightened awareness and information sharing through daily meetings with cooperating companies. The work period was shortened by 20 days from the originally planned 350 days.

(2) Rather than reconciling to the originally planned value for total radiation exposure dose 12 man-Sv while endeavoring to improve field working environments, the value was changed to 9 man-Sv during the work when the effect of reducing radiation exposure was confirmed, which finally led to achieving a low value of 8.3 man-Sv.

- Identifying measures to prevent human errors through "Zero Accident Activities"

in which all personnel participate

In “Zero Accident Activities” carried out by individual sections, themes concerning safety and health are made monthly and HIYARI-HATTO instances (near miss situations) are reviewed by actively using videos and case studies, such as “Instances of Business Accidents,” “Cartoon Version of Instances of Contract Work Related Accidents,” and “Caution Report (CRIEPI).” These activities have been promoted with the participation of all personnel and have contributed to identifying human error related issues on a grass-roots level.

On the other hand, several suggestions were made to improve the safety culture of the Station. The major suggestions are as follows:

- Developing procedures for individual groups of the “Emergency Organization”

As emergency procedures, duties of individual groups of the Emergency Organization are described in the “Guidelines for Coping with Nuclear Disasters.” However, procedures corresponding with duties of individual groups have not been described. It is desirable to develop procedures for individual groups to allow them to definitively and quickly cope with emergencies.

- Introducing certification systems for operators

Based on the confirmation of the “Operation Practice Pocketbook” in which education and training status is described, the Manager of the Operation Section decides the lineup of operators, checking qualification levels of individual operators based on the “Operation Control Guidelines.” However, no certification systems based on qualification levels are in place. It is desirable to introduce a certification system based on the “Operation Practice Pocketbook” to raise clear awareness as operators.

- Reviewing the textbook on criticality safety control in ways that are easy to understand for beginners

Although the textbook on criticality safety control deals with overall control, it is hard to understand for new employees and personnel who have insufficient experience in nuclear energy, in particular, fuel handling. It is desirable to revise the textbook using charts and graphs to make it easier to understand.

Itemized reports are published on the Japanese-language website.

[1] Capacity factor (%): [total power generation (kWh)] x 100 / [licensed output (kW) x total hours of operation (h)]

[2] Shroud: One of the core support structures of a boiling water reactor, which contains fuel assemblies and control rods that comprise the core. Core shroud. (Excerpted from "Nuclear Dictionary: The Nikkan Kogyo Shimbun Ltd.") A cylindrical stainless steal structure (partition) installed inside the reactor pressure vessel. When replaced, jet pumps, upper grid panels, and core support panels are also replaced.

[3] High frequency melting furnace: Equipment that melts miscellaneous incombustible radioactive waste, such as removed pipes and lagging materials, thereby reducing the volume of waste. The melting technology is the same as the principle of IH (induction heating) rice cookers and electromagnetic cookers used in ordinary households, in which a conductive container heats up because of its electrical resistance by running a high frequency current through it. This equipment is called a high frequency melting furnace because it melts waste inside the container.

[4] Critical safety control: To ensure safety so that fissile substances must not reach criticality and thereby cause critical accidents in facilities handling fissile substances, such as nuclear fuel fabrication plants and spent fuel reprocessing plants (excerpted from "Nuclear Dictionary: The Nikkan Kogyo Shimbun Ltd.")

[5] Neutronics safety: Referring to the safety of nuclear facilities in regards to nuclear accidents. A nuclear accident at a nuclear reactor means an accident in which reactivity increases sharply due to failure or breakdown of equipment that affects reactivity (e.g. reactivity control system), causing the thermal output of the reactor to increase rapidly, which in turn causes the fuel to overheat (excerpted from "Nuclear Dictionary: The Nikkan Kogyo Shimbun Ltd.")

[6] Mixed-Oxide Fuel: Nuclear fuel that contains fissile nuclides composed of two or more types of oxides. Generally, it refers to nuclear fuel mainly composed of uranium oxide and plutonium oxide (excerpted from "Nuclear Dictionary: The Nikkan Kogyo Shimbun Ltd.")

[7] Activities to promote safe breathing: Activities that encourage a series of actions to overcome mental vulnerability in emergencies, i.e. taking a deep breath prior to starting emergency work and then conducting verification work without fail, thereby preventing disasters (Sumitomo Metal Mining Co. Ltd.)

[8] PSR stands for Periodic Safety Review: In June 1992, the Ministry of International Trade and Industry (currently, the Ministry of Economy, Trade and Industry) requested power companies having nuclear power stations to conduct comprehensive reviews on the safety of nuclear power stations every ten years or so based on the latest technical knowledge and information with the aim of improving the safety of nuclear power stations in view of extended operation. In response to this, power companies have planned and conducted PSRs to voluntarily ensure safety. In a PSR, three activities are carried out: (1) comprehensive evaluation of operating experience, (2) incorporating the latest technical knowledge and information, and (3) PSA.

[9] ALARA stands for as low as reasonably achievable. It is the basic concept for conducting radiation protection recommended by the International Commission on Radiological Protection (ICRP).

[10] AM stands for Accident Management. Measures to be taken to mitigate the effect of severe accidents caused by an event exceeding the scope of design basis accident (events that may lead nuclear facilities to an abnormal status and are determined to be considered when evaluating the safety design of nuclear facilities) thereby causing significant damage to the reactor core (excerpted from "1998 Nuclear Safety White Paper").

[11] Mock-up: A full-size model that allows training and education under the same conditions as those of an actual system, which is helpful for prior confirmation and familiarization with details of work.