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Summary Report of Peer Review

(Provisional Translation)

Place of Review: Headquarters Representative's Office, Yokohama District
Ishikawajima-Harima Heavy Industries, Co., Ltd.
(Yokohama-shi, Kanagawa Prefecture)

Date of Review: October 30 to November 1, 2002

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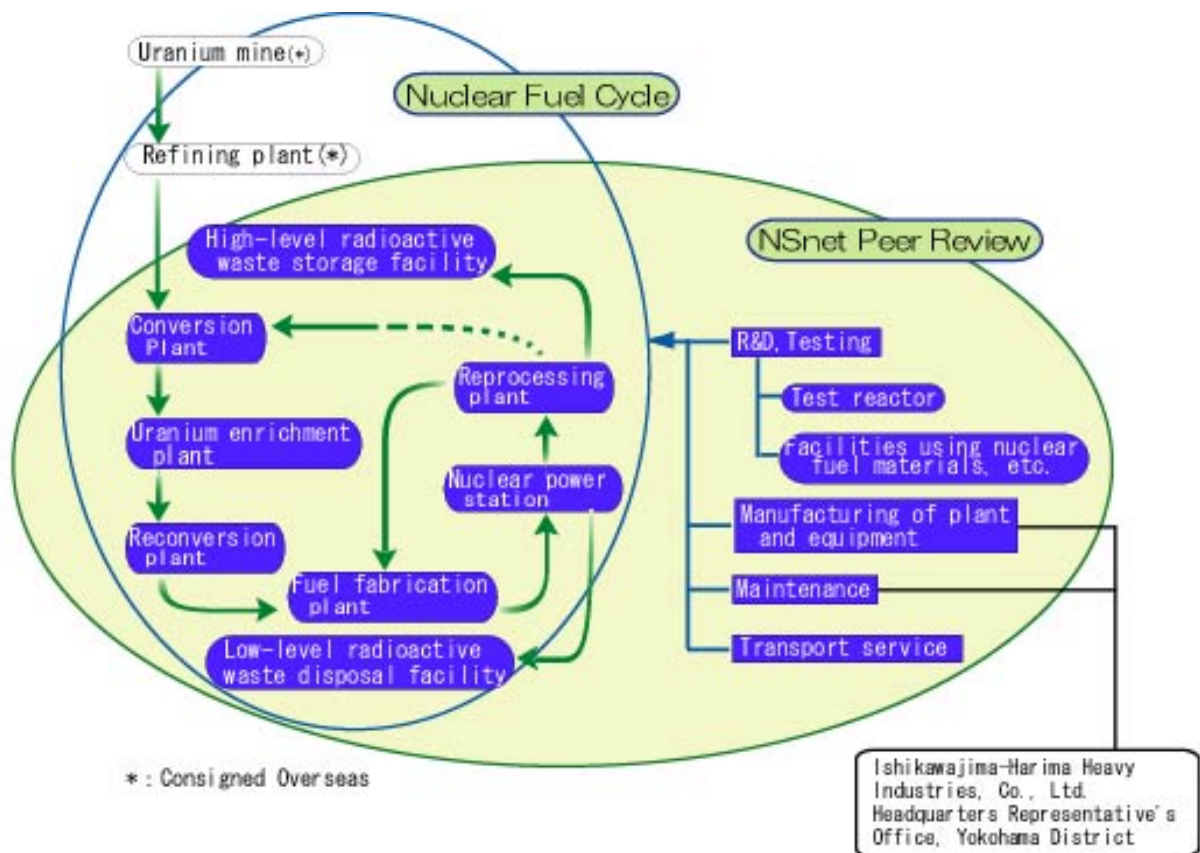
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1. Objectives

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 about the horizontal progress of good practices as well as subjects that have been singled out.

2. Summary of Facility Operations



Hitachi Administrative Division(Nuclear Systems Division), Hitachi, Ltd. in the nuclear fuel cycle

Since Ishikawajima-Harima Heavy Industries, Co., Ltd. entered the nuclear business at 1955, it has been involved in the design, fabrication, installation and maintenance of a large number of components for Boiling Water Reactors (BWRs). The major components are 24 units of Reactor Pressure Vessels (two of which are under fabrication) (as of the end of October 2002), Primary Containment Vessels and reactor piping systems. Using fabrication technology for these components, the company is also fabricated the components for new types of reactors such as Fast Breeder Reactors and High-Temperature Gas-Cooled Reactors. These are fabricated at the YOKOHAMA No.1 Works, which was built as a specialized plant for nuclear power components. Since 1978, the company has been working in the nuclear fuel cycle field, mainly

designing and constructing facilities in High Active Liquid Waste Vitrification Facility and Vitrified Package Storage Facility. Presently, the company is engaged in the back end field of spent fuel storage and radioactive waste disposal including high level waste.

Headquarters Representative's Office, Yokohama District, which was subjected to the review, is the core of the nuclear business of the Ishikawajima-Harima Heavy Industries, Co., Ltd.

3. Points of Review

Among the activities carried out at the Office (nuclear related divisions) (hereafter referred to as the "Office"), the review concentrated on activities related to nuclear safety carried out in the stages of design and manufacture, with the aim of demonstrating functions required from the perspective of nuclear safety in the machinery, equipment and systems that are designed and manufactured.

The review was divided into four sections: (1) Organization/Administration, (2) Education/Training, (3) Design/Manufacture, and (4) Handling of important issues. It was carried out with a focus on the nuclear industry's best practices.

Of these, the reviews were carried out with a focus on, (1) in Organization/Administration, "composition of organization and system of responsibility" and "activities related to fostering a nuclear safety culture and improving morale", (2) in Education/Training, "education and training planning", (3) in Design/Manufacture, "manuals and observance of the manuals," "design management," and "manufacture planning and management", and (4) in Handling of important issues, "cooperative activities related to safety with cooperating companies" and "incorporating examples of problems related to design and manufacture."

In addition, following the voluntary inspection data manipulation problem that occurred at nuclear power stations belonging to Tokyo Electric Power Co., Ltd. (hereafter referred to as the "TEPCO Problem"), the review also focused on ethics, communications, and data handling.

4. Period and Outline of Review

(1) Date

October 30(Wed.) to November 1(Fri.), 2002

(2) Formation of Review Teams

A group: The Kansai Electric Power Co. Inc., Sumitomo Metal Mining Co. Ltd.

B group: Mitsui Engineering & Shipbuilding Co. Ltd., NSnet Office

Coordinators: NSnet Office

(3) Fields of Responsibility

A group: Organization/Administration, Education/Training, Handling of important issues

(Cooperative relationships with quality assurance)

B group: Design/Manufacture, Handling of important issues (Excluding cooperative relationships with quality assurance)

(4) Facilities to be reviewed

The target of this review is the safety promotion activities involving design and fabrication in the nuclear related groups in the Energy System Division, Headquarters Representative's Office, Yokohama District, Ishikawajima-Harima Heavy Industries Co., Ltd.

5. Schedule of Review

The review was carried out over a three-day period for each field according to the schedule shown below.

		A Group	B Group		
10/2 (Wed.)	A M	Opening (Greetings, Members Introduction, explanation of plant facilities, work summary, etc.)			
		1. Organization/ Administration	- Effective organization and management - Safety culture [Document Examination]	3. Design/ Manufacture	- Design management - Manufacturing management [Document Examination]
	P M	4. Handling of important issues	- Quality assurance [Document Examination]	3. Design/ Manufacture	- Production-related sections [Field Observation]
		1. Organization/ Administration	< Director > < Manager class > [Interviews]	4. Handling of important issues	- Nuclear safety - Incorporation of examples of problems [Document Examination]
10/3 (Thu.)	A M	2. Education/ Training	- Qualification certification - Planning and implementation - Technical and skill dissemination [Document Examination]	3. Design/ Manufacture 4. Handling of important issues	< Manager class > < Responsible persons > [Interviews]
			- Training facilities [Field Observation]	4. Handling of important issues	- Sections at which human error prevention measure are taken [Field Observation]
	P M	Verification of Facts		Verification of Facts	
10/4 (Fri.)	A M	Verification of Facts			
		Closing			

6. Methods and Items of Review

6.1 Methods of Review

The review looked at activities related to nuclear safety at the Office, and extracted good practices and suggestions for improvement through the following field observations, indicated document examinations, and discussions and interviews based on the same.

In addition, communication about nuclear safety culture took place during the review process, including exchanges of opinions based on the provision of information deemed valuable from the review teams.

6.1.1 Execution of Review

(1) Field observations

For the field observations, direct observations of how actual activities are implemented for the items confirmed in the interviews and documents were conducted with investigations based on the experience and knowledge of the reviewers.

(2) Document examinations

For the document examination, the review was conducted through requesting necessary relevant documents based on explanations regarding related documents for each review item. Following the plant and field observation, documents related to the observation were required, and more detailed investigations were carried out.

(3) Interviews

Interviews based on the following objectives were conducted with the Deputy Division Director in charge of nuclear business, managers and responsible persons.

- (a) Examining the level of the effort and awareness about the fostering of the safety culture including nuclear safety measures
- (b) Gathering additional information not confirmed in the documentation
- (c) Questions and answers including those arising from document examination
- (d) Evaluating the level of understanding about the determined items and the responsibilities imposed on each member
- (e) Evaluating whether the determined rules are being implemented or whether they are merely carried out in name only.

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 Office's practices with the best in the nuclear industry, suggestions to improve and enhance 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

The Field observations and confirmations, document examinations, and interviews were carried out based on the review items shown below. The results were evaluated and organized in the Itemized Results, and those were summarized as the Main Conclusions.

Section 1: Organization/Administration

Investigations were conducted from the perspective of whether organizational composition and accountability are clear, whether targets have been established related to guaranteeing nuclear safety, and whether activities are being conducted involving the fostering of safety culture and the improvement of morale (for example, ethics-related programs, systems and culture in which internal opinions are heard and accepted with sincerity).

Review items

- (1) Effective organizational and management
 - a. Organizational composition and responsibility system (including personnel)
 - b. Organizational policies and targets
 - c. Leadership of managers
- (2) Activities involving the fostering of safety culture and improving morale
 - a. Concrete activities related to fostering safety culture
 - b. Concrete activities related to improving morale
 - c. Activities for creating harmony with local communities

Section 2: Education/Training

Investigations were conducted from the perspective of whether, for technicians and engineers involved in design and manufacture, a qualification certification system was established and operational, and whether skill improvement, nuclear-safety-related education and training, and technical and skill dissemination were being conducted appropriately.

Review items

- (1) Qualification certification
 - a. Qualification certification system and qualification standards
- (2) Planning and carrying out education and training
- (3) Technical and skill dissemination

Section 3: Design/Manufacture

Investigations were conducted from the perspective of whether personnel and work environments were guaranteed for nuclear power related design and manufacture, whether design and manufacturing manuals were being observed, and whether the various types of design and manufacturing management were being carried out properly.

Review items

- (1) Effective design management
 - a. Design organization

- b. Design manuals and observance of these manuals
- c. Design management
- (2) Effective manufacturing management
 - a. Manufacturing organization
 - b. Manufacturing manuals and observance of these manuals
 - c. Equipment maintenance
 - d. Manufacturing planning and management

Section 4: Handling of important issues

Investigations, as efforts related to important issues of nuclear safety, were conducted on cooperative activities related to safety with cooperating companies, quality assurance, prevention of human error, and activities for the prevention of problem recurrence.

Review items

IV-1 Efforts toward nuclear safety

- (1) Cooperative activities related to safety with cooperating companies
 - a. Appropriate communication with cooperating companies (relating to the promotion and improvement of safety culture)
 - b. Evaluation of cooperating companies
 - c. Education for cooperating companies
- (2) Quality assurance
 - a. Establishing a quality assurance system
 - b. Effective auditing system
 - c. Handling of the data falsification issue and JCO accidentⁱ
- (3) Efforts to improve reliability of nuclear facilities
- (4) Contribution to safe operations of nuclear facilities
- (5) Efforts related to product safety
- (6) Labor safety (including radiation management)

IV-2 Incorporation of examples of problems related to design and manufacture

- (1) Problem-prevention activities
 - a. Activities for the prevention of human error
 - b. Activities to prevent the recurrence of problems

7. Main Conclusions

In summing up this review of the Office, we have not found any item in the nuclear safety field that would lead to a serious accident unless immediate remedies were taken.

At the office, it was confirmed that all employees, including those from cooperating

companies are making efforts to ensure technology, quality, reliability, and safety through various activities mentioned in individual sections with the divisions' basic and quality policies based on the managerial philosophy of the entire company ("Contribute to the development of society with technology" and "Personnel is the greatest and the only asset").

These efforts are represented by the policy that ensuring nuclear safety at a plant manufacturer is management giving the highest priority to quality. These efforts are also appreciated by external organizations of quality assurance systems because the Office has attained high quality assurance/quality control levels by actively carrying out quality assurance and quality control activities and obtained ISO 9001ⁱⁱ and won the Deming Award as well as being the first to obtain the ASMEⁱⁱⁱ-N/NPT stamps in Japan.

To address TEPCO issues, the Office immediately established a committee to consider malpractice prevention systems, such as developing corporate ethics programs and an environment in which ethics is respected.

It is expected that the Office will continue voluntary efforts to further improve safety culture, rather than being satisfied with the current status quo.

In addition, it is expected that the results from the review will be disseminated not only throughout the Office but also to the cooperating companies.

In this review, we have found some good practices that should be introduced not only to other NSnet members, but also widely to the nuclear industry. The good practices are described below.

- Nipping potential nonconformity in the bud

As an example of focusing on quality, "Quality HIYARI-HATTO" is practiced. Problems discovered before they become matters of nonconformity are processed the corrective action in a preventive action. They aim to achieve higher quality levels by nipping potential nonconformity in the bud.

- Technology dissemination through expert lists

A list of technical experts and candidate successors in the design, manufacturing, and quality control division has been made, so that experts can consciously disseminate technical know-how to their successors. Although this list of experts is presently intended for technical staff, it is expected that the list will expand to include technicians in the manufacturing division.

- Human error prevention and efficient design verification by promoting computerized design

Three dimensional CAD^{iv} (INPULS) and nuclear information control system (N-BOCS) have been established to conduct design tasks efficiently. Establishing a common database and systems and computerized design systems, such as CAD, helps prevent human errors, such as erroneous board cutting^v, interference between equipment and piping, and equipment

incompatibility. In addition, efficient design verification and remote control safety is ensured by applying the remote control simulation system (REMASS).

- Thoroughly ensuring product quality.

In procuring important parts prior to production, personnel from the design, quality control, quality assurance, and procurement departments go to cooperating companies to have “just-before-production meetings” to confirm the following, thereby ensuring quality through thorough communication with cooperating companies

- Whether final design data has been accurately communicated to the production site,
- Whether there is any problem in production, including vague ones,
- Whether measures to cope with past problems have certainly been incorporated

- Safety activities using risk assessment methods on the field.

Risk assessment methods are widely incorporated into field work (annual inspection work and newly constructed plants) and on a plant-wide basis to reduce risky and hazardous factors in advance. These methods are being utilized to complement system, respond with the personnel system, identify disastrous factors, and take safety measures as the need arises with regard to field work. They are also being utilized to prevent process-specific disasters and reduce risky and hazardous factors in the plants.

The following represent proposals toward the further improvement of the Office’s safety activities.

- Considering measures to prevent data manipulation based on extensive research, such as case studies.

When considering measures to prevent data manipulation, efforts are being made to prevent data manipulation by eliminating “ambiguity” in the internal standards. However, since various data manipulation methods can be assumed, it is desirable to consider prevention measures after conducting extensive research by collecting instances of manipulation that have occurred both domestically and overseas.

- Exchanging information concerning ethics with cooperating companies.

When data problems occur at other companies, the instances and recurrence prevention measures are communicated to cooperating companies. In the future, however, it is desirable to incorporate mutual ethics information exchange with cooperating companies into the ongoing development of ethics programs.

- Ideas to prevent trouble prevention activities from fading.

In the event of nonconformity, recurrence prevention activities are carried out pursuant to

regulations. When countermeasures have been completed, they are disseminated to all companies to ensure prevention of the recurrence. Instances are made known using diagrams.

On the other hand, although past instances are checked as the need arises when starting designing a new project, it is desirable to disseminate countermeasures by introducing past instances as part of routine activities to prevent preventive activities from fading.

Other details concerning this report may be found on the Japanese website.

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- ⁱ JCO accident: The accident that occurred at JCO Tokai Plant on September 30, 1999.
 - ⁱⁱ ISO9001: An ISO standard prescribing the requirements for quality management systems, which was prescribed by the International Organization for Standardization (ISO). This standard is designed to check whether an organization is equipped with a quality management system necessary for continually supplying products and service that meet customer's requirements, legal and public regulatory requirements, and whether the implementation of such system is appropriate.
 - ⁱⁱⁱ ASME: American Society of Mechanical Engineers
 - ^{iv} 3 Dimension-Computer Aided Design: Computer-aided design, such as three-dimensional images.
 - ^v Erroneous board cutting: At the first step of manufacturing, the materials (board) is erroneously cut due to an error in the cutting instructions.