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Summary Report of Peer Review

(Provisional Translation)

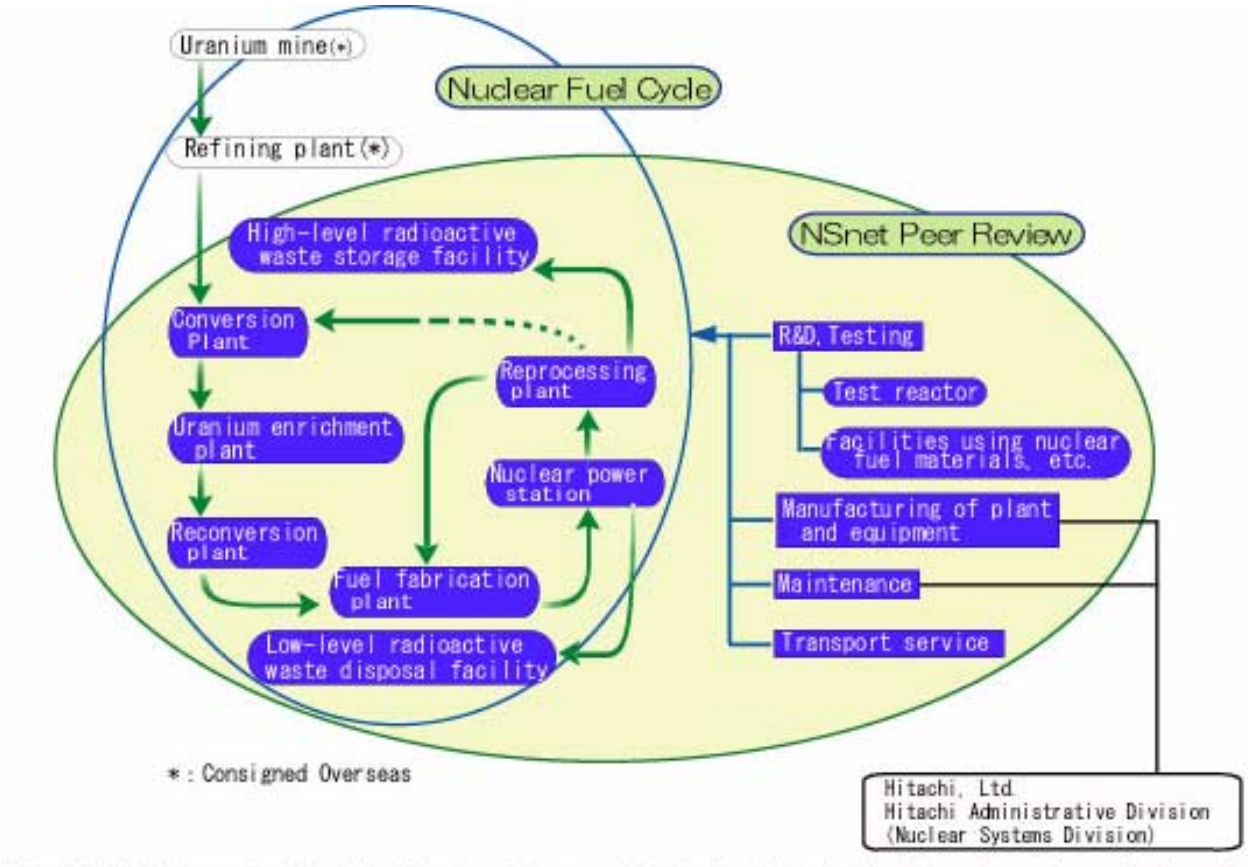
Place of Review:	Hitachi Administrative Division (Nuclear Systems Division), Hitachi, Ltd. (Hitachi-shi, Ibaraki Prefecture)
Date of Review:	July 24-26, 2002
Publisher:	Nuclear Safety Network

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 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

At Hitachi Ltd. (hereafter referred to as “Hitachi”), since the development of nuclear power started in 1954, the development, design, manufacture, inspection, installation, operational support, and after-service of a number of boiling water reactors (BWRs) and advanced boiling water reactors (ABWRs) have been undertaken, while technological development and system design and manufacture have been performed in the areas of new-types of reactors and nuclear fuel cycle. The Nuclear Systems Division plays a central

roll in Hitachi's nuclear businesses in cooperation with other divisions.

Operations undertaken by the Nuclear Systems Division are carried out mainly at Hitachi Administrative Division, except for after-service provided at construction sites and facilities in operation, such as nuclear power stations and reprocessing facilities, and businesses conducted by the Nuclear Headquarters at the main office of Hitachi (Ochanomizu, Tokyo). Hitachi Administrative Division (hereafter referred to as "HAD") is Hitachi's birthplace. At present, as an aggregation of multiple divisions, it has five factories that manufacture various products: "Kaigan Factory," "Yamate Factory," "Rinkai Factory," "Futo Factory," and "Materials Product Division." Equipment peculiar to nuclear power, such as core shrouds and control rod drives, are manufactured at "Rinkai Factory." As of the end of March 2002, HAD had approximately 5,000 personnel, 9% of which belongs to administrative departments, 84% to product departments, and 7% to others. The Nuclear Systems Division accounts for 44% of the total sales.

3. Points of Review

Among the activities carried out at the Shipyard, the review concentrated on activities related to nuclear safety carried out at the stages of design and manufacture, with the aim of demonstrating functions required from the perspective of nuclear safety in the designed and manufactured machinery, equipment and systems.

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 nuclear industry best practice.

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

4. Period and Outline of Review

(1) Date

July 24 (Wed.) to July 26 (Fri.), 2002

(2) Formation of Review Teams

A group: The Japan Atomic Power Co., Ltd.; Hitachi Zosen Co.

B group: Central Research Institute of Electric Power Industry; NSnet Office

Coordinators: NSnet Office

(3) Fields of Responsibility

A group: Organization/Administration, Education/Training, Handling of important issues（coordination with cooperating companies, quality assurance）

B group: Design/Manufacture, Handling of important issues（excluding coordination with cooperating companies, quality assurance）

(4) Facilities to be reviewed

Based on "3. Points of Review," as activities concerning nuclear safety at HAD, safety promotion activities carried out by the Nuclear Systems Division of HAD (hereafter referred to as "NSD/HAD" when it is particularly necessary to specify the facilities reviewed) engaging in design, manufacture, and related businesses were subjected to the review. Of the five factories owned by HAD (see "2. Summary of Facility Operations"), Rinkai Factory, which is central to the manufacture of nuclear power plant equipment, was subjected to the review.

5. Schedule of Review

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

<table>
<tr><th colspan="2"></th><th colspan="2">A Group</th><th colspan="2">B Group</th></tr>
<tr><td rowspan="8">7/24
(Wed.)</td><td rowspan="4">A
M</td><td colspan="4">Opening (Greetings, Members Introduction, explanation of plant facilities, work summary, etc.)</td></tr>
<tr><td>1. Organization/
Administration</td><td>- Effective organization and management
[Document Examination]</td><td rowspan="2">3. Design/
Manufacture</td><td>- Effective design management
[Document Examination]</td></tr>
<tr><td>4. Handling of important issues</td><td>- Quality assurance
[Document Examination]</td><td>- Effective manufacturing management
[Document Examination]</td></tr>
<tr><td rowspan="4">P
M</td><td>1. Organization/
Administration</td><td>- Fostering a nuclear safety culture and improving morale
[Document Examination]</td><td>3. Design/
Manufacture</td><td>- Effective manufacturing management
[Document Examination]</td></tr>
<tr><td>4. Handling of important issues</td><td>- Coordination with cooperating companies
[Document Examination]</td><td rowspan="3">4. Handling of important issues</td><td>- Incorporation of examples of problems
- Efforts toward nuclear safety
[Document Examination]</td></tr>
<tr><td rowspan="2">1. Organization/
Administration</td><td>< Director >
[Interviews]</td><td>< Manager class >
[Interviews]</td></tr>
<tr><td>< Manager class >
[Interviews]</td></tr>
<tr><td rowspan="5">7/25
(Thu.)</td><td rowspan="4">A
M</td><td>1. Organization/
Administration</td><td>< Responsible persons >
[Interviews]</td><td>3. Design/
Manufacture</td><td>- Manufacturing plant
[Field Observation]</td></tr>
<tr><td rowspan="2">2.Education/
Training</td><td>- Qualification certification
- Planning and implementation (including technical and skill dissemination)
[Document Examination]</td><td>4. Handling of important issues</td><td>- Labor safety (radiation management)
- Problem prevention
[Field Observation]</td></tr>
<tr><td>- Brush-up room
- BWR Preventive Maintenance Technical Center
[Field Observation]</td><td rowspan="2">3. Design/
Manufacture</td><td>< Manager class >
[Interviews]</td></tr>
<tr><td>P
M</td><td colspan="2">Verification of Facts</td><td>< Responsible persons >
[Interviews]</td></tr>
<tr><td colspan="2">Verification of Facts</td><td colspan="2">Verification of Facts</td></tr>
<tr><td>7/26
(Fri.)</td><td>A
M</td><td colspan="4">Verification of Facts</td></tr>
<tr><td colspan="2">Closing</td><td colspan="2"></td></tr>
</table>

6. Methods and Items of Review

6.1 Methods of Review

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

In addition, in the review process, communication about nuclear safety culture took place, including exchanges of opinion 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 experiences 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 done.

(3) Interviews

Interviews based on the following objectives were conducted with the director, 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 ones arising from document examination

(d) Evaluating the level of understanding about the determined items and the responsibility 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 Standing point to select 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 NSD/HAD 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.

<u>Section 1: Organization/Administration</u>

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.

Review items

(1) Effective organizational and management

a. Organizational composition and responsibility system

b. Organizational policies and targets

c. Leadership of managers

d. Creation of a quality assurance system

(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 unity with local communities

<u>Section 2: Education/Training</u>

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 of education and training

a. Planning of education and training

b. Carrying out of education and training (including Technical and skill dissemination)

Section 3: Design/Manufacture

Investigations were conducted from the perspective of whether organization, period 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.

(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 were conducted on, as efforts related to important issues of nuclear safety, 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

b. Evaluation of cooperating companies

(2) Quality assurance

a. Effective auditing system

b. Handling of data falsification issue and JCO accident

(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 NSD/HAD, we have not found any item in the nuclear safety field that would lead to a serious accident unless immediate remedies were taken.

It was confirmed that Hitachi's corporate codes of conduct have been established and followed by all employees over a long history, promoting Hitachi's foundation spirits, "Harmony," "Pioneering spirit," and "Sincerity," and conducts based on laws and rightful corporate ethics. In particular, the "Basic concept of gleaning" and "Gleaning spirit," which serves as a foundation for promoting safety culture, incorporates new experiences and the details are included in a number of books and textbooks for reliability education. Based on this constant evolution, continuous activities to promote safety culture are being carried out by, for example, establishing the "Day of basics and the right path," without wearing the above-mentioned concept thin.

It was also confirmed that the top management is taking the initiative in continuing these activities. Business activities are being promoted by the united efforts of employees under the strong initiative of the top management, such as practicing two-way communication via direct conversation between the Division Director and employees.

In terms of education, OJT[i] is considered important, which, in particular, produces good educational effects for young engineers by participating in coping with problems, such as investigating the causes and examining measures to prevent recurrence, and experiencing on-site activities when problems occur. In addition, to accumulate and disseminate skills, the system of engineering masters and instructors has been established to instruct employees and raise their commitment toward improving their skills.

Information necessary for carrying out business activities, such as problem instances and design control, is utilized by all employees via the information systems sufficiently utilizing IT[ii] technology, greatly contributing to the accuracy and quickness of business activities.

It is expected that NSD/HAD will continue its voluntary efforts with the aim of further improving safety culture, rather than being satisfied with the current status.

It is also expected that the results obtained through the review will be disseminated to other divisions involving in the nuclear project system as well as 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.

- Leadership of the top management and two-way communication between the top management and employees

Resources are committed to disseminating policies and goals among all employees and, in particular, raising motivation toward business activities among young employees. As a distinctive example, the top management is taking the initiative in facilitating consciousness and business reforms. Two-way communication is practiced by organizing informal gatherings for young engineers which is attended by the Division Director in order to have face-to-face conversation with young employees. In addition, activities such as town meetings[iii] are held once a month for the top and various classes of management and responsible personnel to exchange opinions, thereby promoting information sharing and mutual understanding.

- Effective operation control by utilizing the BSC system and performance indexes

Recognizing that activities relating to nuclear safety are the basis of business management, effective operation control is in place. For example, various classes of managers are able to monitor at all times the status of performance indexes via the Balance Score Card (BSC)[iv] system, in which performance indexes regarding nuclear safety are included in BSCs of NSD.

In addition, the BSC system allows the entire Division to share information about the goals of NSD and various departments, and specific activity items and implementation plans to achieve such goals.

- Integrating information circulation and design control of the Design Department into IT

The Design Department and its sections are creating their own websites as a forum of information circulation in addition to explanatory meetings for business activity planning, in-group liaison meetings, and the operation of weekly business reports. These websites are utilized for sharing information by posting items to be adjusted at liaison meetings and clarifying the status of processing such items.

For design control in which various standards and know-how are incorporated, the provision of high design quality is realized by utilizing support tools for evaluating the validity of design and the nuclear technology knowledge database in which knowledge, experience, and know-how regarding routine activities are accumulated.

Moreover, the IT database is prevented from becoming obsolete by adding user-friendly functions as the need arises, thereby producing good effects in maintaining high attention from designers.

- Reconfirmation and establishment of safety work through public presentations

When an industrial accident has occurred at some other department of Hitachi, a demonstration is conducted simulating the actual instance as closely as possible to implant safety consciousness.

The following represent proposals toward the further improvement of NSD/HAD safety activities.

- Building a database of HIYARI-HATTO instances

HIYARI-HATTO instances that have occurred at HAD or related departments are summarized into one page per instance, made known by senior managers at morning assemblies, and posted at workplaces for dissemination. It is desirable, however, to build a database of HIYARI-HATTO instances to facilitate information sharing with other departments.

- Considering more effective placement of on-site notices

It was confirmed that various on-site activities are briskly carried out by positing various notices and slogans to raise quality and safety consciousness. It is desirable that on-site notices should be placed more effectively to further disseminating the purposes and for greater appeal.

- Further sharing information about improvement activities among groups

Diverse improvement activities regarding quality, environment, and safety are undertaken in the plant and the status of such activities can be made known via reporting meetings and in-house websites. On the other hand, it is relatively difficult to obtain such information on an on-site basis. It is, therefore, desirable to further promote information sharing using bulleting boards and so on.

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

[i] OJT: Abbreviation for on-the-job training. Training employees on-site in the process of carrying out their tasks. Also referred to as on-site training, on-site instruction, or on-the-job instruction.

[ii] IT: Information Technology

[iii] Town meetings: NSD operates a forum called “Town Meeting” as a place for discussing business issues and policies for solving them, as well as an educational opportunity through the exchange among various classes of managers and responsible personnel.

[iv] Balanced Score Card: A performance evaluation system to evaluate performance multi-dimensionally and quantitatively from the following four viewpoints: “financial perspective,” “customer’s perspective,” “internal business process perspective,” and “learning and growth perspective.” (Reference: [Origin of the name] Professor Kaplan, the advocate named “the performance evaluation system to evaluate performance multi-dimensionally and quantitatively" Balance Score Card, comparing management to the cockpit of an aircraft, because a pilot of an aircraft flies the airplane safely by accurately understanding information provided by instrumentation, such as fuel, speed, altitude, direction, current location, and destination.