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Summary Report of Peer Review

(Provisional Translation)

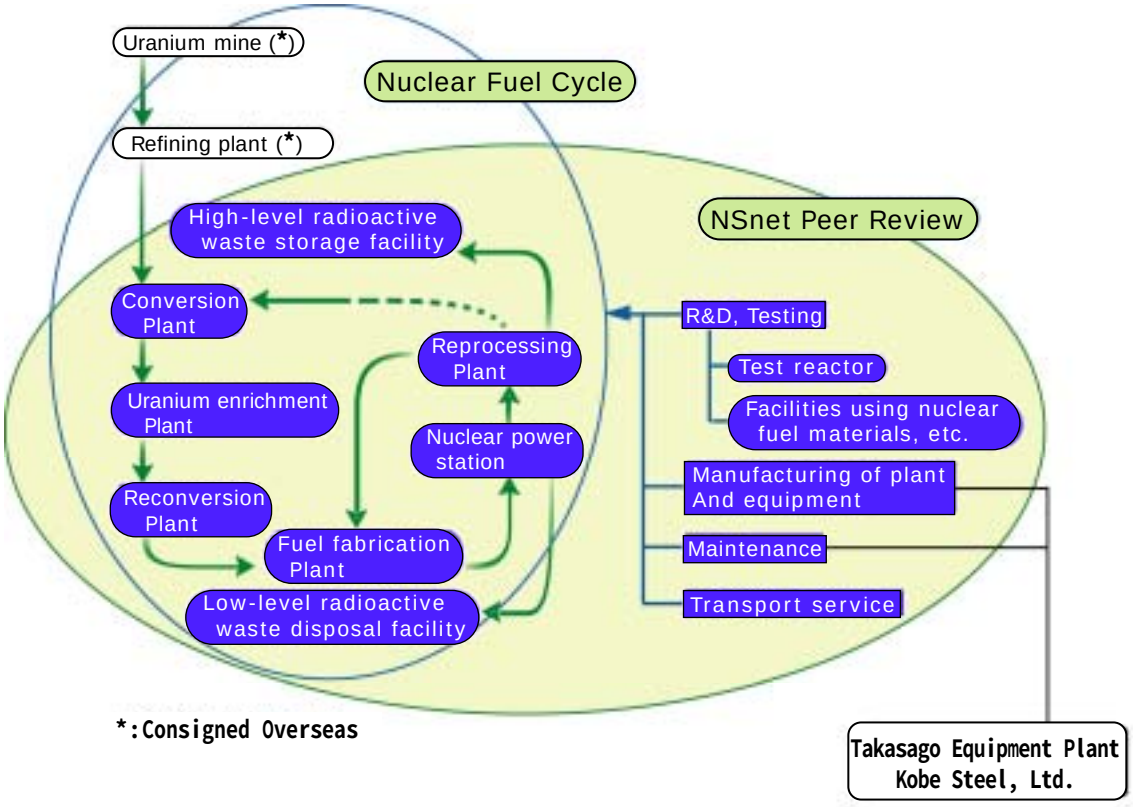
Place of Review:	Takasago Equipment Plant Kobe Steel, Ltd. (Takasago-city, Hyogo Prefecture)
Date of Review:	June 17 to 19, 2003
Publisher:	Nuclear Safety Network

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



Takasago Equipment Plant, Kobe Steel, Ltd. in the nuclear fuel cycle

Kobe Steel Ltd. (hereafter referred to as “KSL”) focuses mainly on steel, but is a diversified steel manufacturer operating a wide range of businesses, such as welding, aluminum & copper, urban environment & engineering, machinery, and real estate. Among them, its nuclear-related business began with research into zircaloy in 1960. Presently, KSL is engaged in research and development, plant construction, after-care services, and so forth, covering such major business areas as transport and storage containers (hereafter referred to

as "casks[i]"), fuel channels (channel boxes[ii]), reprocessing equipment and plants, and the fabrication of nuclear materials. Takasago Works (hereafter referred to as the "Works") manufactures a diverse range of products ranging from cast steel to titanium, iron powder, and machinery. In connection with nuclear power, the Works also manufactures casks, fuel channels (channel boxes), and nuclear materials.

With regard to main equipment including casks, in particular, Takasago Equipment Plant of the Works (hereafter referred to as "Takasago Equipment Plant") is engaged in manufacturing design, materials procurement, manufacturing, and inspection based on the clients' or its own basic designs.

At the Works, the Steel Casting & Forging Division started up in 1953. In 1959, the plants for the Titanium and Machinery Division were completed. In 1968, a part of the plant for nuclear equipment and pressure vessels was completed, and this was the base of the Takasago Equipment Plant. In 1993, moreover, the integrated machinery plant was completed. The Works has come to the present status by successively expanding its capacity, mainly owing to relocating other operations of KSL. More than 3,000 people, including those from cooperating companies, work at the Works, which is the second largest operation after the neighboring Kakogawa Works of KSL. The Works is also related to many businesses across the company and is positioned as a core operation of KSL.

Takasago Equipment Plant, since it started manufacturing plant equipment for oil refineries for instance in 1968, succeeded for the first time in the domestic production of fuel channels (channel boxes) in 1971. In 1981, it shipped TN12 casks. Since then, it has expanded its business and presently includes various types of transport and storage casks in the area of nuclear power, LNG vaporizing and liquefaction facilities, and aeronautics & space testing facilities. Approximately 300 personnel are assigned to the Plant.

3. Points of Review

3.1 Target of review

The target of this review is the safety promotion activities involving design and fabrication of casks at Takasago Equipment Plant.

3.2 Points of Review

Among the nuclear related activities carried out at Takasago Equipment Plant, the review concentrated on activities related to nuclear safety carried out in the stages of design and

fabrication of casks, with the aim of demonstrating functions required from the perspective of nuclear safety (including related occupational safety) in the machinery, equipment and systems that are designed and fabricated.

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 "specific activities related to fostering a nuclear safety culture and improving morale", (2) in Education/Training, "Certification of Qualification", "education and training planning" including technical and skill dissemination, (3) in Design/Manufacture, "management regulations and the observance of these regulations," "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 data falsification problem regarding neutron shielding materials (resins) for spent fuel transport containers in 1998 (hereafter referred to as the "Data Falsification Problem" and the "problem of voluntary inspection data falsification at a nuclear power station" and the "problem involving leakage test of reactor containment vessel" discovered in 2002 (hereafter referred to as the Voluntary Inspection Data Falsification Problem, etc.", the review also paid attention to ethics, communications, and data handling.

4. Period and Outline of Review

(1) Date

June 17(Tue.) to 19(Thu.), 2003

(2) Formation of Review Teams

A group: Japan Nuclear Fuel Limited, Japan Nuclear Cycle Development Institute

B group: Nippon Nuclear Fuel Development Co., Ltd., NSnet Office

Coordinators: NSnet Office

(3) Fields of Responsibility

A group: Organization/Administration, Education/Training

B group: Design/Manufacture, Handling of important

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><td colspan="2"></td><td colspan="2">A Group</td><td colspan="2">B Group</td></tr>
<tr><td rowspan="6">6/17
(Tue.)</td><td rowspan="2">A
M</td><td colspan="4">Opening (Greetings, Members Introduction, explanation of plant facilities, work summary, etc.)</td></tr>
<tr><td rowspan="2">1. Organization/
Administration</td><td>< Plant Manager >
[Interviews]</td><td rowspan="2">3. Design/
Manufacture</td><td>- Design management
[Document Examination</td></tr>
<tr><td>- Effective organization and management
[Document Examination</td><td>- Manufacturing management
[Document Examination</td></tr>
<tr><td rowspan="3">P
M</td><td>2.Education/
Training</td><td>- Training facilities
[Field Observation]</td><td rowspan="2">3. Design/
Manufacture
4. Handling of important issues</td><td rowspan="2">- Manufacturing Section
[Field Observation]</td></tr>
<tr><td rowspan="2">1. Organization/
Administration</td><td rowspan="2">- Safety culture
[Document Examination]</td></tr>
<tr><td>4. Handling of important issues</td><td>- Nuclear safety
[Document Examination]</td></tr>
<tr><td rowspan="4">6/18
(Wed.)</td><td rowspan="3">A
M</td><td>2.Education/
Training</td><td>- Qualification certification
- Planning and implementation
[Document Examination]</td><td rowspan="2">3. Design/
Manufacture
4. Handling of important issues</td><td>< Manager class >
< Responsible persons>
[Interviews]</td></tr>
<tr><td>1. Organization/
Administration</td><td>< Manager class >
[Interviews]</td><td rowspan="2">4. Handling of important issues</td><td rowspan="2">-Reflecting Nonconformities
[Document Examination]</td></tr>
<tr><td>1. Organization/
Administration
2.Education/
Training</td><td>< Responsible persons>
[Interviews]</td></tr>
<tr><td>P
M</td><td colspan="2">Verification of Facts</td><td colspan="2">Verification of Facts</td></tr>
<tr><td rowspan="2">6/19
(Thu.)</td><td rowspan="2">A
M</td><td colspan="4">Verification of Facts</td></tr>
<tr><td colspan="4">Closing</td></tr>
</table>

6. Methods and Items of Review

6.1 Methods of Review

The review looked at activities related to nuclear safety at Takasago Equipment Plant, 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 Plant Manager, 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 practices of Takasago Equipment Plant 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, suggestion is taken up in case 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
   b. Securing of appropriate personnel
   c. Organizational policies and targets
   d. 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
   a. Planning of education and training (Technical and skill dissemination)
   b. Carrying out education and training

Section 3: Design/Manufacture

Investigations were conducted from the perspective of whether personnel, time frames, and work environments were guaranteed for casks, whether design and manufacturing management regulations 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 management regulations and observance of these regulations
   c. Design management
(2) Effective manufacturing management
   a. Manufacturing organization
   b Manufacturing management regulations and observance of these regulations
   c. Equipment maintenance
   e. 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 program, prevention of human error, and activities to prevent reoccurrences of nonconformities.

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

(2) Quality assurance

a. Establishing a quality assurance system

b. Effective auditing system

c. Handling of the data falsification issue and so on

(3) Efforts related to product safety

(4) Labor safety (including radiation management)

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

(1) Nonconformities prevention activities

a. Activities for the prevention of human error

b. Activities for the prevention of Nonconformities reoccurring

7. Main Conclusions

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

Takasago Equipment Plant is actively carrying out quality assurance, labor safety, and QC circle[iii] activities. Through these activities, those concerned are united in striving to improve the quality assurance and labor safety of Takasago Equipment Plant, including nuclear-related departments, with the aim of improving customer satisfaction and achieving zero industrial accidents.

In view of the issue of falsification of cask-related data and voluntary inspection data at nuclear power stations, activities concerning ethics and compliance are being carried out earnestly, including the president's expression of his resolution to strengthening the compliance system, activities of the Legal Department of the head office, and QA[iv] meetings at the plant and Section meetings.

With regard to quality assurance, Takasago Equipment Plant has to date obtained and maintained ISO9001[v] and ASME[vi] S/U/U2 certificates, the level of which can be

appreciated.

In addition, Takasago Equipment Plant and cooperating companies are making concerted efforts to carry out safety activities through the “Council for Preventing Accidents in the Energy Manufacturing Section” with the aim of creating safe and healthy workplaces.

It is hoped that Takasago Equipment Plant will continue making more voluntary efforts aiming to further improve safety culture, rather than being satisfied with the current status.

It is also hoped that the fruitful results obtained in the review will be disseminated not only in Takasago Equipment Plant, but also to 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.

Strengthening the compliance system

The top management commitment to strengthening the compliance system is expressed in the form of a resolution on the public website.

In addition, the system for protecting whistleblowers is also laid down in the labor agreement. Direct consultation channels to the Legal Department through the Intranet and the like, and notification channels to external lawyers have also been established.

Effective skill dissemination using the “Knowledge and Skill Dissemination Program”

In the Manufacturing Section, experienced workers’ skills to be disseminated and young workers who should become the successors to such skills are listed together with job titles. Education is planned and implemented by clarifying the points of knowledge and skills to be disseminated and methods of dissemination. Moreover, the learning status is concretely grasped and is utilized for OJT[vii] based thereon.

Quick supply of the latest information by controlling the electric document storage system of design documents

The latest information about design documents, such as revisions and modifications, is controlled in an electric document storage system, allowing quick distribution and simultaneous viewing by those concerned. This helps reduce mistakes associated with revisions and modifications, compared with paper-based document distribution thus making design activities more reliable.

Quick notification of serious complaints and the like to the top management via the “Shotgun Mail System”

When an event occurs, such as an extremely serious complaint to which response by the mass media is expected, it is necessary to communicate information to company executives accurately and quickly, as part of strengthening the compliance system including crisis management. In addition to the channel by which information is normally communicated to upper positions in successive stages, the “Shotgun Mail System” is in operation, which is a liaison system in which those who are at the level of the Section Manager can quickly report to the president via the Planning & Administration Department, for example.

Incorporating hands-on safety learning into safety capability improvement training

With the aim of raising awareness toward risks and eliminating unsafe activities by understanding the actual feeling of accidents, “hands-on safety learning” has been added to the “Stratified Safety Capability Training” of the Works. Safety education emphasizing awareness is implemented periodically based on instances of risk predictions and so forth experienced to date, producing certain effects.

The following represent proposals toward the further improvement of the safety activities of Takasago Equipment Plant.

Making the "wall newspaper" PUNPS easier to read

As an activity to promote safety culture, Takasago Equipment Plant as a whole publishes PUNPS (Power Up New Production System) in the form of "wall newspaper" several times a year to thoroughly inform the employees, including managers, of safety-related matters, future attitudes, and so forth.

However, it gives an impression of being a little serious or difficult reading because it contains so many characters. It is, therefore, desirable to make it easier to read by making effective use of photos and cartoons.

Drawing up more detailed education and training plans

An education and training plan per each Section is drawn up and implemented every year in accordance with the ISO CEP STANDARD [viii] (Training & Qualification Procedure).

At Sections like the Manufacturing Section that have many personnel, plans for group leaders and members are actually prepared, implemented, and grasped by the foremen. Specific plans for individual personnel cannot be specified in the above-mentioned education and training plans.

To have a good grasp of the current skill levels of individual personnel and items to be

included in future education and training, it is desirable to make it a rule to draw up education and training plans for individual personnel and control actual results.

Improving the method for indicating the emergency liaison system in terms of radiation safety control

The Plant has radiation sources, such as cobalt 60 for photographing RT[ix], and practices the safety control of radioactive isotopes by having entrance interlocks installed. Although administrative notices are put up, it is difficult to understand the liaison system in an unexpected situation, such as the occurrence of a fire. It is desirable to make normal, nighttime, and holiday liaison systems easy to understand by using flow charts and so forth, so that the person who detects such an incident can respond quickly.

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

[i] **Cask** : Used as a common name to refer to the transport and storage containers of radioactive materials

[ii] **Channel box** : A square tube covering a fuel assembly for boiling water reactors (BWRs). It has the function of securing the flow path of reactor coolant, guiding control rods, and fastening and protecting fuel rods.

[iii] **QC circle** : A workplace group formed for the purpose of quality control. It is an activity for on-site workers to voluntarily control overall production activities, including quality control, which is said to raise workers' will to work and help improve workplace morale and productivity. Presently, this method has been introduced to many sectors, such as sales and services, as well as manufacturing.

[iv] **QA** : Quality Assurance

[v] **ISO9001** : An international standard established by the International Organization for Standardization that prescribes requirements for quality management systems. It is a standard that checks if the organization concerned has a quality management system making it capable of continuously supplying products and services that meet the customers' requirements, legal and public regulatory requirements, and that it is implemented appropriately.

[vi] **ASME** : American Society of Mechanical Engineers. The S/U/U2 mentioned in the text above indicates stamp-types. The S stamp represents an ASME Sect. I boiler, the U stamp represents an ASME Sect. VIII Div. 1 pressure vessel, and the U2 stamp represents an ASME Sect. VIII Div. 2 pressure vessel.

[vii] **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.

[viii] **CEP STANDARD (standard procedures)** : Here standard for plant management, business, or work procedures are referred to as "CEP STANDARD."

[ix] **RT** : Radiographic Test, a type of non-destructive testing.