Attachment

Measures to Prevent Reoccurrence of Problems in relation to Check Plans in which the Equipment Check Period has been Exceeded and the Results of Investigation of Check Records at Hamaoka Nuclear Power Station (Overview)

Chubu Electric Power has discovered that the check period was exceeded in the case of some equipment in Hamaoka Nuclear Power Station Reactors No. 3 and 4 which is subject to periodic licensee's inspections. Based on instructions from the Nuclear and Industrial Safety Agency, as outlined below we have examined other equipment not subject to periodic licensee's inspections, clarified the causes of the situation described above and studied measures to prevent its reoccurrence, and examined problems in relation to procedure and measures to improve these problems.

◆Instruction from the Nuclear and Industrial Safety Agency (1)

Investigate Check Plans that did not conform to check periods and check results for equipment not subject to periodic licensee's inspections in Hamaoka Nuclear Power Station Reactors No. 3, 4 and 5, and for equipment in the decommissioned reactors, Reactors No. 1 and 2.

Scope of the investigation

Equipment on which we perform voluntary inspections formed the subject of this investigation.

During periodic licensee's inspections, equipment which performs safety functions is subjected to a variety of procedures including dismantling and inspection and test operation in order to verify its soundness.
During voluntary inspections, in addition to adjusting the degree of opening of equipment that is subject to periodic licensee's inspections and conducting visual inspections, we perform disassembly inspections of equipment that does not perform safety functions.

■The relationship between the scope of periodic licensee's inspection and voluntary inspections

Voluntary inspection

•Facility compressed air system •Generators
•Transformers •Electric meters •Valves etc.

Periodic licensee's inspection

•Vessels (reactor pressure vessel, etc.) •Pipes
•Pumps (reactor recirculation pumps, etc.)
•Valves (main valves of residual heat removal system, etc.)
•Steam turbines •Electric meters (residual heat removal system, etc.) etc.

Periodic inspection

Equipment that is particularly important to safety
"Stop," "Cool," "Close" functions etc.

Ex.: Electric meters

Type of inspection	Item
Voluntary inspection *2	•Calibration tests •Replacement of consumables

Ex.: Valves

Type of inspection	Item
Voluntary inspection *2	•Adjustment of degree of opening •External visual inspection
Periodic licensee's inspection *1	•Disassembly inspection •Check for leaks following disassembly inspections

*1 Inspection results reported on October 12, 2010.
*2 The subject of this investigation.

■ Numbers of equipment subject to inspection at Hamaoka

	Numbers of equipment (Number subject to periodic licensee's inspection)
Reactor No. 1	Approx. 3,000*3 (Not subject due to decommissioning)
Reactor No. 2	Approx. 4,000*3 (Not subject due to decommissioning)
Reactor No. 3	Approx. 85,000 (Approx. 45,000)
Reactor No. 4	Approx. 76,000 (Approx. 45,000)
Reactor No. 5	Approx. 66,000 (Approx. 37,000)

*3 Reactors No. 1 and 2 are being decommissioned; equipment related to the reactor facilities that is necessary to maintain its functions was examined.

Investigation results

The investigation showed that, as in the case of the equipment subject to periodic licensee's inspections, the check period had been exceeded for some equipment. The cause of this problem was the same as the cause determined in the investigation of the equipment subject to periodic licensee's inspections.

(1) Equipment for which the check period was exceeded due to errors in input of the check date, etc.

At present, 77 pieces of equipment have been identified as having exceeded their check period due to errors in input to the check plan control table (input mistakes and omissions in recording equipment numbers).
The results of this investigation and the previous investigation show that 104 pieces of equipment (46 in Reactor No. 3 and 58 in Reactor No. 4) fall into this category.
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Equipment for which the check period was exceeded due to input errors (Number)

	Reactor No.1	Reactor No.2	Reactor No.3	Reactor No.4	Reactor No.5	Total
Equipment subject to periodic licensee's inspections	—	—	16	11	0	27
Equipment not subject to periodic licensee's inspections	0	0	30	47	0	77

* In addition to the equipment listed in the table above, a total of 19 pieces of equipment subject to periodic licensee's inspections (19 in Reactor No. 3, 0 in Reactors No. 4 and 5) and 92 pieces of equipment not subject to periodic licensee's inspections (0 in Reactors No. 1 and 2, 77 in Reactor No. 3, 12 in Reactor No. 4 and 3 in Reactor No. 5) have been identified as having exceeded their check periods in the past. Disassembly inspections and other procedures have already been performed on these pieces of equipment in previous periodic inspections.

(2) Results of investigation of evaluations for extension of check date

At present, 394 pieces of equipment have been identified as having exceeded their check period following evaluations in relation to extension of their check date. In most cases, the evaluation records were not preserved.
The results of the present and previous investigations show that a total of 437 pieces of equipment fall into this category (2 in Reactor No. 1, 4 in Reactor No. 2, 169 in Reactor No. 3 and 262 in Reactor No. 4).

Equipment for which the check date was exceeded following evaluations for extension of check date (Number)

	Reactor No.1	Reactor No.2	Reactor No.3	Reactor No.4	Reactor No.5	Total
Equipment subject to periodic licensee's inspections	—	—	8	35	0	43
Equipment not subject to periodic licensee's inspections	2	4	161	227	0	394

* In addition to the equipment listed in the table above, a total of 134*4 pieces of equipment subject to periodic licensee's inspections (105 in Reactor No. 3, 29*4 in Reactor No. 4, and 0 in Reactor No. 5) and a total of 730 pieces of equipment not subject to periodic licensee's inspections (39 in Reactor No. 1, 57 in Reactor No. 2, 416 in Reactor No. 3, 218 in Reactor No. 4, and 0 in Reactor No. 5) have been identified as having exceeded their check periods in the past. Of these, evaluation records were not preserved for 723 pieces of equipment. Disassembly inspections and other procedures have already been conducted on these pieces of equipment in previous periodic inspections.

*4 Correction of previously published material
In the attachment "Check Plan for Equipment past Its Check Period at Hamaoka Nuclear Power Station Reactors No. 3, 4 and 5 and Investigation of Check Record," published on October 12, 2010, we published the results of investigations of evaluations in relation to the extension of the check dates for equipment (number of pieces of equipment that had exceeded their check periods). Following the publication of this information, we determined that one more piece of equipment in Reactor No. 4 fell into this category.
We must therefore correct the previously published figures from a total of 133 pieces of equipment (28 in Reactor No. 4) to a total of 134 (29 in Reactor No. 4).

—Responses for equipment for which the check period was exceeded—

All of the pieces of equipment for which the check period was exceeded have been evaluated for soundness, and it has been judged possible to continue to use them without inspection until the upcoming periodic inspection.
As in the case of the equipment subject to periodic licensee's inspections, inspections will be carried out on these pieces of equipment at an early stage.

◆Instruction from the Nuclear and Industrial Safety Agency (2)

Determine the causes of occurrence of errors in input of check dates, and formulate measures to prevent reoccurrence.

The input errors concerned equipment which does not directly perform safety functions, mainly valves, electric meters and other pieces of equipment which are used in large numbers and for which changes are frequently input to the Check Plan Control Table. Because our new plant management system[*5] possesses a function that checks for input errors, further errors have not occurred to the data whose transition to the system was complete.

[*5] Chubu Electric Power is presently engaged in incorporating the Check Plan Control Table, which previously employed standard forms and general-purpose software program, in our plant management system (a computer-based system).

Input errors to the check plan control table: Problems and causes

- When the Check Plan Control Table was managed using standard forms and general-purpose software, omissions and errors occurred during the input of data concerning check dates to the Check Plan Control Table.
- When the lists of equipment contained in the check plans was input to the Check Plan Control Table (standard forms and general-purpose software), omissions occurred in the recoding of equipment numbers.

Measures to prevent reoccurrence

(1) Improvement of verification procedures for formulation and change of data on Check Plan Control Table

- We will work to transfer the Check Plan Control Table to the plant management system (which has a function enabling checks for input errors) as soon as possible in order to ensure integrated management.
- Until the transition to the plant management system is completed, while the system is still managed using general-purpose software, we will make every effort to prevent input errors, having third parties not involved in the duties verify any changes that are input.

(2) Improvement of check function of plant management system

- Because transferring between systems and entering changes in check dates involves manual procedures and verification, we have added a function that blocks input errors and a reminder function to the plant management system in order to improve system check functions.

◆Instruction from the Nuclear and Industrial Safety Agency (3)

Investigate the procedures that have been implemented to date when check dates have been extended, and identify any issues and problem points. Following this, formulate measures for improvement, including clarification of company rules, procedures to be followed when check dates are extended, procedures to be implemented in evaluations of soundness of equipment, etc.

Chubu Electric Power has established company rules based on safety regulations, stipulating precise methods for equipment maintenance management. These rules allow checks to be planned with the required check period being exceeded, based on an evaluation of the soundness of the equipment for the purpose of extension of the check date. The following problems existed in relation to the relevant procedures.

Problems in establishment of check dates and evaluations for extension of check dates

- The treatment of check periods as a requirement was unclear, for example in the case of the use of check dates for valves as criteria, and staff displayed insufficient awareness regarding check periods as a requirement.
- The company rules for procedures related to the extension of the check date and the evaluation of the soundness of equipment, in addition to the preservation of the evaluation records, contained unclear points.

Measures for improvement

(1) Improvement of rules concerning observation of check periods

- In order to clarify the treatment of check periods as a requirement, criteria for the establishment of check dates have been improved.
- In future, ensuring that check periods are observed will be set as a maintenance management target, and the level of achievement of this target will be periodically verified.
- In addition, checks will be planned in shorter periods than specified by the check plans, in order to provide a greater margin of safety.

(2) Establishment of framework for extension of check dates

- When it proves absolutely impossible to conduct an inspection within the check period, the equipment will be regarded as not conforming to requirements, and its soundness will be evaluated. In addition, precise methods for these evaluations have been clarified (procedures, items for evaluation, preservation of evaluation records, etc.).

Chubu Electric Power will continue, based on our quality management system, to improve maintenance management through the continuous optimization of check plans (details of equipment inspections and check periods), and to educate our employees in this area.
In addition, a thorough analysis of root causes will be undertaken in order to determine how the problems indicated above were able to continue to the present without being corrected by the system. Based on this analysis, further improvement measures will be formulated and appropriately implemented.