Attachment

Reports on the reflection of the changes in the connection method of the drain pipe in Isolation Condenser in Unit 1at Fukushima Daiichi Nuclear Power Station to the re-circulating system

Tokyo Electric Power Company

1. Reason we changed the method of connecting drain pipes

We examined the applications for the reactor establishment permit and the construction plan permit, and related drawings as well as conducted the hearing investigation to relevant people. However, we couldn't find the reason the connection method of the drain pipes of the isolation condenser ("IC") was changed.

The following is the consideration of the design change estimated by us.

(1) Location of IC in the building

Figure 1 shows the location of IC to be installed appeared in the application for the reactor establishment permit. Regarding Unit 1, Fukushima Daiichi Nuclear Power Station, 2 ICs are located on the same side against the reactor.

On the other hand, Primary Loop Recirculation System ("PLR System") A and B are located diagonally at the both sides of the reactor. When drain pipes of IC were connected to PLR System, it might be possible that it was decided to connect drain pipes to the nearer PLR system to reduce the loss of the pressure in the pipes and to reduce the pressure boundary of the primary coolant.

(2) Reduction of the leakage potentials at PLR System Pipes

To PLR System pump suction piles, Shut Down cooling System ("SHC System") are connected as well as IC system pipes.

Increasing the number of connection points to PLR System pipes leads to higher leakage potentials, it might be possible that it was decided that SHC System piles should be connected to PLR System A pump suction pipes, and that regarding IC it should be connected to PLR System B after A and B are merged together.

Please note that whether the IC System can be activated or not depends on the operation of the isolation valves which are active component, therefore taking into consideration of the

possibility that a valve in one system fails to work, valves in the systems A and B are designed independently to secure the reliability.

On the other hand, drains are static equipments and therefore the possibility of being fractured is very low. If they are fractured, it will lead to the loss of coolant accident ("LOCA") since they are connected to PLR System B pump suction pipes, however, in this case Emergency Core Cooling System are activated, therefore we don't rely on the function of IC Systems.

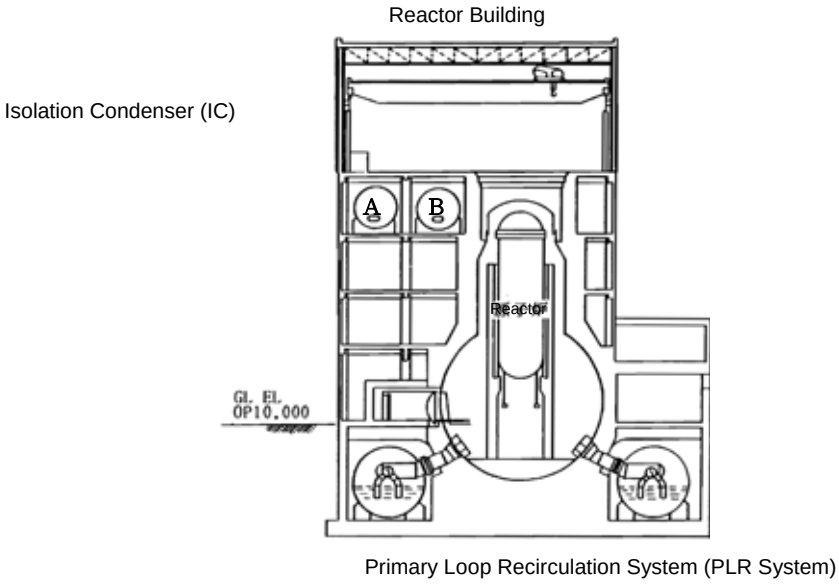

Figure 1 Location of IC in Unit 1, Fukushima Daiichi (overview)

2. Reason why the changes in the connection methods of drain pipe haven't been reflected

In 1991, according to the instruction of the Agency of Natural Resources and Energy of the (former) Ministry of International Trade and Industry, we surveyed thoroughly for the lacks of information of the alterations made in the actual facilities after the permit application for the installation of the reactor (according to the detailed designs), which were supposed to be updated to cover the required items listed in the appendix 8 and in the reference chart contained in the text of application form for establishment permit of reactor. However, the changes in the connection methods of drain pipe were overlooked. The inconsistency was still not realized in 1993 at the time of application for alteration of establishment permit of reactor, which was the first application as Fukushima Daiichi Nuclear Power Station, and remains up to the present date.

The (former) Ministry of International Trade and Industry admits that the inconsistency

between the description in the appendix of the application form for establishment permit of the reactor and the actual facilities is not regarded as breach of any law.

The details are stated as follows in chronological order.

① October, 1991

The Agency of Natural Resources and Energy of the (former) Ministry of International Trade and Industry required submitting descriptions of the inconsistency between the statements made in the text of application form for establishment permit of reactor, the reference figure contained in the text, and appendix 8, and the actual status of the facilities.

② Around October-December, 1991

We distilled the inconsistencies ("inconsistency") comparing the text of application form for reactor establishment permit, the reference figure contained in the text, and appendix 8, and the descriptions in the establishment plan permit application form.

We implemented the distillation regarding IC of Unit 1 at Fukushima Daiichi Nuclear Power Station and listed the contents as shown in Table 1 and 2.

Table 1 Inconsistency of the specifications of IC of Unit 1, Fukushima Daiichi (text of the application for reactor establishment permit)

	Description in the text (As at 1991)	Actual facilities (Construction plan permit)	Notes
Effective water capacity of tank	Approx. 100 m^3/tank	106 m^3	Due to progress of the detailed design

Table 2 Inconsistency of the specifications of IC of Unit 1, Fukushima Daiichi (Appendix 8 of the application for reactor establishment permit)

	Description in the appendix 8 (As of 2005)	Actual facilities (Construction plan permit, etc.)	Notes
Steam flow rate	100.7 T/h	100.6 T/hr	Due to progress of the detailed design
Steam temperature	285 ℃	285.6 ℃	
Condensate outlet pressure	70.2 kg/cm^2g	70.3 kg/cm^2g	
Condensate outlet temperature	285 ℃	285.6 ℃	
Condenser body maximum pressure	1.1 kg/cm^2g	1.125 kg/cm^2g	

Maximum evaporative rate	68,040 kg/hr	67,880 kg/H	
Heat-transfer capacity	36.3×10^6 kcal/hr	36.19×10^6 kcal/H	
Effective water capacity of tank	105 m^3	106 m^3	

But the connection method of the drainpipe to PLR System was absent from the extraction because it was just the description on the drawing.

③December, 1991

From the Agency for Natural Resources and Energy, the (former) Ministry of International Trade and Industry, it was insisted that there is no problem on the mismatch among the reference figure of the application for reactor establishment permit, description in the appendix 8 and actual facilities legally, but from the view point of PA (Public Acceptance), regarding the application for reactor alteration permit in the future, it is preferable to reflect actual facility at the point of application to the reference figure as well as the description in the appendix 8 regardless of the contents of the application.

Also it is indicated that the value described in the construction plan approval (value of actual facility) shall be rounded off in accordance with the significant figure of the value of the application for reactor establishment permit

④April, 1993

After December 1991, we applied for first reactor alteration permit on Fukushima Daiichi. Reasons for the change were following 4 items.

A. To install spent fuel dry-type storage facility from Unit 4-6
B. To install common spent fuel pool for Unit 1-6
C. To install spent fuel transportation cask storage area for Unit 1-6
D. To set up the common diesel generators of Unit 1 & 2, Unit 3 & 4 and Unit 5 & 6 as the dedicated diesel generators for Unit 1,3 and 5 respectively, and install an additional diesel generator for Unit 2,4 and 6 respectively.

In this application, we reflected real facilities including the contents which were not related to A to D mentioned above about a figure of text reference and the mention content of appendix 8 in conformity with a thought of ③ mentioned above.

In this way, we changed mentions more than 100 points for Unit 1.

About IC, we changed the descriiption of appendix 8 according to next Table 3 based on contents picked out by Table 2.

Table 3 The change for specifications of IC at Fukushima Daiichi Unit 1 (Application for reactor establishment permit, appendix 8)

	＜before a change＞ The mention of Appendix 8 （At the time of 1991）	The real facilities （Construction plan permit etc.）	＜After a change＞ The mention of Appendix 8 （At the time of 1993）
Steam flow rate	100.7 T/h	100.6 T/hr	100.6 t/h
Steam temperature	285 ℃	285.6 ℃	286 ℃
Condensate outlet pressure	70.2 kg/cm^{2}g	70.3 kg/cm^{2}g	70.3 kg/cm^{2}g
Condensate outlet temperature	285 ℃	285.6 ℃	286 ℃
Condenser body maximum pressure	1.1 kg/cm^{2}g	1.125 kg/cm^{2}g	1.1 kg/cm^{2}g
Maximum evaporation rate	68,040 kg/hr	67,880 kg/H	67,880 kg/h
Heat-transfer capacity	36.3×10^6 kcal/hr	36.19×10^6 kcal/H	36.2×10^6 kcal/h
Effective water capacity of tank	105 m^3	106 m^3	106 m^3

As we mentioned in ③, we did not change the significant figure of data. Therefore, about the "Steam temperature" "Condensate outlet temperature" "Condenser body maximum pressure" "Heat transfer capacity", we rounded them off. As a result, "Condenser body maximum pressure" stayed same even after the change.
And about the point that the connection method to PLR System of the drain pipe differed, it was not extracted as of 1991, we did not notice at this time either and have not changed.

⑤After 1994
According to the reactor establishment and alteration permit (permit at March 1994) of ④, we recognize that all the reflection of the real facilities was over at that time.
Thereafter, we have not applied and reported the reactor establishment and alteration permit for IC and the construction plan permit, and we did not modify the description in the appendix of the reactor establishment permit.