*Provisional Translation

TEPCO's Fukushima Daiichi NPS
Review Meeting on the Implementation Plan on Handling ALPS Treated Water
Minutes of the 4th meeting

Date: January 11, 2022 (Wednesday) 15:00-15:56
Location: Conference room B, C and D on the 13th floor of the Nuclear Regulation Authority

Participants:

The Secretariat of Nuclear Regulation Authority (S/NRA)

Shuichi Kaneko	Director General for Emergency Response
Jun Takeuchi	Director of the TEPCO's Fukushima Daiichi NPS Accident Measures Office
Tomoki Shibutani	Director for the TEPCO's Fukushima Daiichi NPS Accident Measures Office
Kohei Iwanaga	Director for the TEPCO's Fukushima Daiichi NPS Accident Measures Office
Hideaki Masaoka	Director for the TEPCO's Fukushima Daiichi NPS Accident Measures Office
Ayako Otsuji	Deputy Director of the TEPCO's Fukushima Daiichi NPS Accident Measures Office
Hiroyasu Chimi	Chief Safety Examiner of the TEPCO's Fukushima Daiichi NPS Accident Measures Office
Takuro Arai	Safety Examiner of the TEPCO's Fukushima Daiichi NPS Accident Measures Office
Hisakawa Shinon	Examiner of the TEPCO's Fukushima Daiichi NPS Accident Measures Office

Tokyo Electric Power Company Holdings, Inc. (TEPCO HD)

Junichi Matsumoto	General Manager of Project Management Office & Chief Officer for ALPS treated water Management, Fukushima Daiichi Decontamination and Decommissioning Engineering Company (Fukushima Daiichi D&D Engineering Company)
Gaku Sato	Midium and Long Term Planning Group Manager, Project Management Office, Fukushima Daiichi D&D Engineering Company
Tadashi Yamane	Mechanical Equipment for Treated Water Installation Project Group Manager, ALPS treated water program department, Fukushima Daiichi NPS, Fukushima Daiichi D&D Engineering Company
Kenro Furukawasono	Civil Equipment for Treated Water Installation Project Group Manager ALPS treated water program department, Fukushima Daiichi NPS, Fukushima Daiichi D&D Engineering Company

Hideo Kiyooka	Administration Group Radiation and Environmental Department Disaster Prevention and Radiation Center, Fukushima Daiichi NPS, Fukushima Daiichi D&D Engineering Company
Shimizu Kenji	General Manager, ALPS Treated Water Program Department, Fukushima Daiichi NPS, Fukushima Daiichi D&D Engineering Company
Tomomi Okamura	Disaster Prevention and Radiation Center, Fukushima Daiichi NPS, Fukushima Daiichi D&D Engineering Company

○Takeuchi (S/NRA):

Now the time has come to start. Today we will hold the fourth meeting of the Review Meeting on the Implementation Plan for the Disposal of ALPS Treated Water at the Fukushima Daiichi NPS, or Specified Nuclear Facility (SNF).

Today, Mr. Kaneko, Director General for Emergency Response will moderate the meeting, but as there is a slight delay due to other works, I, Takeuchi from TEPCO's Fukushima Daiichi Accident Response Office, will serve as moderator until he comes.

Thank you in advance.

Commissioner Ban is on the list of participants today distributed to you, but Mr. Ban will not be present today.

As usual, TEPCO Holdings Co., Ltd. has been invited to participate in, with Mr. Matsumoto, as a head, and other relevant members.

Thank you in advance.

Then, look into today's agenda.

I would like to ask TEPCO to explain the details that TEPCO is preparing regarding the installation of ocean discharge-related facilities for ALPS treated water today.

Then, as soon as possible, please explain the material 1 from TEPCO.

○Matsumoto (TEPCO HD):

I'm Matsumoto, TEPCO.

I look forward to working with you today.

Please see Material 1, written in the square enclosed in the Fourth Review Meeting for Handling ALPS Treated Water on the Right Shoulder.

At the third meeting of Review on the Implementation Plan for Handling ALPS Treated Water Discharge, which was held on December 24, as the NRA showed us the main issues related to the application content of the facilities for ALPS treated water discharge into the sea and we select two of them and explain them today.

The first point is regarding the overall policy, i.e., the positioning of the ALPS treated water discharge facilities in the whole process of the SNF and the role of the designated facilities which is expected to reduce the risks of the SNF as a whole.
The second point is the evaluation of the appropriateness of the design of facilities in the event of failure, namely item ⑥ among (1) discharge facilities, described in item 2-1 "the main points of review based on the Nuclear Reactor Regulation Act" of Material 1-2 at the 3rd meeting.
With regard to the second point, first of all, we would like to present TEPCO's views today, and based on that, we would like to proceed with the deliberations in the future.

Then go to page 2.
Of the overall policies, the NRA instructed us to explain the positioning of the ALPS treated water discharge facilities in the whole process of the SNF and the role of the designated facilities which is expected to reduce the risks of the SNF as a whole.
I would like to explain about this today.
Go to page 3.
With regard to the overall process and overall risk reduction of the SNF, TEPCO first aims to reduce and optimizes the risks of the SNF, i.e., the Fukushima Daiichi NPS, as a whole in accordance with the latest Mid-to Long-Term Roadmap.
With regard to this, we would like to show the processes and milestones for each theme, such as the removal of spent fuels and fuel debris, in order to reduce risks accordingly.
Second, it is necessary to proceed safely and steadily with the decommissioning works, such as the removal of fuel debris and spent fuels, which are the major risks at the SNF. For this purpose, we need to make effective use of resources, such as the personnel involved in decommissioning works and the premises of the Fukushima Daiichi NPS.
In particular, by installing the ALPS treated water discharge facilities and related facilities, we will be able to secure sites for the planned implementation of these decommissioning works by releasing ALPS treated water stored in tanks, thus contribute to the achievement of the Mid-to Long-Term Roadmap.
For reference, please see the slide on page 4.
This shows the plan for the use of the Fukushima Daiichi NPS site.
We have plotted structures on this map, including what we are planning to build at present.
Currently, we have such plans. In order to steadily proceed with decommissioning works, we need to construct facilities related to the removal of spent fuels and debris, which will be more risky than ALPS treated water, as indicated by the square at the right.
For example, in addition to the storage facilities for removed spent fuel and fuel debris, the maintenance facilities required to remove fuel debris will be needed in the future.

The legend on the right-hand side has shown these matters, but in addition to the ones for which plans have already been drawn up, we believe that it is necessary to construct such facilities as described in fiscal year 2024 and beyond.
Of course, there seems to be white spaces on the map of the site, but in addition to the facilities already being constructed here, we are considering the places such as slopes is inappropriate to construct the facilities from the viewpoint that the ground is not suitable for constructing the facilities.
Therefore, in order to construct a higher-risk facility in accordance with the legend on the right side of page 4, we would like to effectively utilize this premise by removing tanks that store ALPS treated water in a planned manner.
Please return to page 3. As is shown in the fourth item, tanks at the site that store ALPS treated water are continuously monitored for leakage and are appropriately monitored and maintained in preparation for future natural disasters. However, by installing ALPS treated water dilution and discharge facilities and its related facilities, we will be able to reduce the amount of ALPS treated water stored in the tanks, and we will be able to effectively utilize resources involved in the maintenance and management of the tanks for the work related to the reduction of higher risks, such as the removal of fuel debris and spent fuel.

Next see pages 5 and 6.
This is a simulation of how the allowance of tank capacity can be produced on the site when ALPS treated water is systematically discharged.
On page 5, simulations are carried out for the case where the total amount of tritium in the building is the largest, and on page 6 for the case where the total amount of tritium in the building is the smallest.
Both simulations are based on the policy that TEPCO does not release large amounts of ALPS treated water at any one time, and the simulation is that the ALPS treated water will be completely discharged just in 2051.
In this chart, the solid blue line indicates the stored water volume of ALPS treated water, and the dotted blue line indicates the total volume of the tanks that can store it.
Therefore, if we can reduce the reserved water volume systematically, we can dismantle the empty tanks and reduce the capacity of the tanks and accordingly use its open space effectively.
The simulation is conducted based on the total annual tritium release of 22 trillion Bq as stipulated in the government policy paper “Basic policy on handling of ALPS treated water at the TEPCO’s Fukushima Daiichi NPS”.

Then please see page 7.

We presented TEPCO's basic design and operation concepts in our overall policy.

Basically, in designing and operating the facilities for ALPS treated water discharge into the sea, based on the government's policy in April 2021, the government intends to consider the basic design and operation of the facilities to ensure that sum of notification concentration ratio of radioactive materials other than tritium contained in the discharged ALPS treated water is below 1 (one), second, dilute the discharged water with sea water until the tritium concentration is below 1500Bq/L, which is well below the notification concentration limit of 60,000 Bq/L, and third, ensure that the annual release of tritium is below 22 trillion Bq per year, which is the release control level of the Fukushima Daiichi NPS prior to the accident.

The annual release of tritium will be reviewed in accordance with the progress of the decommissioning process.

The second concept relates to component failures, etc.

We provide interlocks and emergency shut-off valves to prevent accidental release of ALPS treated water in an unintentional manner which is caused by human errors or component failures.

In addition, even if "unintended release of ALPS treated water into the sea" occurs, it is designed and operated in such a way that it is as extremely small as possible.

Third, we will take appropriate measures in response to natural disasters such as earthquakes and tsunami, taking into account the impact of these disasters and measures for other facilities and equipment at the Fukushima Daiichi Site.

Finally, in anticipation of facilities or component failures, we will take into account the redundancy in the design or securing spare parts in advance in terms of operation so that it can be restored immediately. In addition, we will make a long-term maintenance plan for the facilities and conduct periodic inspection and maintenance based on this plan.

Regarding the fourth item, in terms of the operation of the facilities, we believe that it is important to reduce the capacity of the tanks by stably releasing the ALPS treated water. Therefore, we have added it in the basic policy, namely basic design, and operation concepts.

Then see page 8.

This is the second major issue, described in item 2-1 “Regarding facilities for the discharge of ALPS treated water into the sea based on the Reactor Regulation Act” of Material 1-2 at the 3rd meeting, an evaluation on the appropriateness of the design of the facility in the event of a failure as indicated in ⑥.

This is written in the rectangular frame. In the event that an abnormal condition occurs due to a failure of the component when ALPS treated water is discharged into the sea, and ALPS treated water is discharged into the sea in an unintended manner (hereinafter referred to as "abnormal

event"), the facilities, systems and procedures required to deal with the said event should be explained, and the amount of discharge should be evaluated when these measures are taken.
In the above assessment, we have been instructed to select the most stringent abnormal event from the viewpoint of the amount of release of ALPS treated water, and to assume a single failure of the component so that the result becomes the most stringent in the analysis.

Today, I would like to explain our ideas and handling methods for abnormal events.
First, see page 9.
Regarding the scope of the appropriateness assessment of the design of the facilities in the event of a failure, we would like to examine the scope of downstream of the measurement/confirmation tank for which the application for amendment approval was filed.
In the measurement/confirmation facility (K4 tank group), the concentration of radioactive materials is appropriately measured before the diluted water is released. However, there are cases in which the measurement of concentration of radioactive materials has been properly carried out or has not been done.
The scope of the confirmation is from the transfer pump of the treated water drawn in the red line, and next, the mixing of seawater for dilution of the blue line, and after that go to the discharge vertical shaft and the discharge tunnel to discharge the water.
Then go to page 10.
Of these, I will explain about the handling of abnormal events from these facilities.
As I mentioned earlier, the ALPS treated water dilution and discharge facility consists of the measurement and confirmation facility, transfer facility, and dilution facility.
We conduct a fault tree analysis with "unintended release of ALPS treated water into the sea" as the top event for these constructed facilities to be verified its validity of the design and operation by confirming that there is no release or extremely low release in the event of a single failure or a single malfunction of the active component.
In this case, we will take steps to extract abnormal events from the viewpoint of the nature of the water contained in the main components of the measurement and confirmation facility the transfer facility, and the dilution facility as described in the table below.
In this case, for example, as I mentioned earlier in the basic design in page 7, on the condition that the requirements that the sum of notification concentration ratio of radioactive materials other than tritium contained in the discharged ALPS treated water is less than 1 (one), and tritium levels are below 1,500Bq/L., and the annual release of tritium is less than 22 trillion Bq, we will take into account abnormal events which does not satisfy these requirements in an unintentional manner.
For example, as we described *2 at the bottom right of page 10, we conduct a fault tree analysis

assuming that if 1,500Bq/L are not observed, the seawater pump stops accidentally or cannot sufficiently take seawater for dilution, or if the transfer pump start accidentally so that the ALPS treated water is released in an unintentional manner, or other cases that the emergency shut-off valve does not close upon the receipt of shut-off signal and the treated water are discharged.
In terms of external events, we would like to show the appropriateness of the design in the main issue, item 2-1of Material 1-2 at the 3rd meeting, (1), ⑤ Protection of equipment structure and strength, earthquakes, tsunami, and other natural phenomena," so we do not consider it when extracting abnormal events.
Subsequently, in page 11, it shows the concept of extracting abnormal events for the water discharge-related facilities, i.e., water discharge facility.
The main components for the water discharge facilities consist of a water discharge vertical shaft, a water discharge tunnel, and a water outlet.
In the discharge facility, the nature of the water contained is ALPS treated water that is sufficiently diluted with seawater, the risk of leakage is small because it passes through the rock bed, and the structure is seismically resistant. Therefore, we believe that abnormal events need not be postulated.
On the other hand, we think it needs to explain in the review meeting that the discharge facilities are designed to withstand long-term use, including structural strength and earthquake resistance.
Today's main explanation is as I explained. For pages 12 and beyond, the outline of the diluted and discharge facilities for ALPS treated water and its related facilities is attached with reference to the materials used at the review meeting the other day.
That is all for my explanation.

○Kaneko (S/NRA):
Thank you very much. I am Kaneko of the S/NRA. Excuse me that it has been a little late.
From now on, I will be serving as the moderator.
With regard to the explanation, I would like to ask comments from the NRA if there is anything to be confirmed or clarified, including the information needed in the first part of the report.
Mr. Shibutani, please.

○Shibutani (S/NRA):
My name is Shibutani, Planning and Investigation Officer.
We received your response regarding the overall policy this time.
As for the overall process and risk assessment, it is required that the measures to be taken should reduce and optimize the risk of the entire SNF and that the risk reduction and optimization are sufficient for ensuring the safety inside and outside the site. Therefore, it is requested that the

discharge of the ALPS treated water of the present plan leads to a reduction in the risk in the future and the appropriateness thereof should be clearly explained and described in the implementation plan, although it has not been described in the present amendment application document. Therefore, it is necessary to be described and explained in the modification application document in the future.
That's all for my comment.

○Kaneko (S/NRA):
Mr. Matsumoto, please.

○Matsumoto (TEPCO HD):
I understand that there is currently no such description.
I will add the description in the future modification.

○Kaneko (S/NRA):
I understand.
Then, I would like you to make it clear again and add it in the form of modification in the application for the implementation plan properly.
Anything else?
Yes, please.

○Masaoka (S/NRA):
This is Masaoka, Director for Administrative Assistant of the S/NRA
In terms of the number of pages, it is located in the third item of page 3, and this time, as an explanation of the risk reduction of the whole facility in the future, it was decided that the space at the site should be secured for the work of decommissioning.
As explained on page 4, there was an explanation that such equipment and facilities will be necessary in the future. However, the title of pages 5 and 6 is "actual discharge of tritium", but in reality, some amount of tritium will be stored in individual tanks.
Concretely speaking, I don't know when individual facilities will be built so that I would like to ask for a brief explanation of how the facility plan and the utilization plan of the site would be established as a whole as the tanks are removed and new facilities are built.

○Kaneko (S/NRA):
Mr. Matsumoto, please.

○Matsumoto (TEPCO HD):
First, the use of the site is shown on page 4.
Approximately the area required and annual development has been achieved for the following items: facilities in yellow color are planned in FY 2021 on the right side, facilities in blue color in FY 2022, bioassay facility in FY 2023, and comprehensive analysis facilities will be built beyond FY 2024. However, as for the waste recycling facilities and successive ones that have not yet been colored, it shows somewhat an estimated necessary area, and it is only indicated the construction will start from FY 2024 onward.
At the present time, we have not yet reached the stage where we would like to realize this plan around the time based on the fuel debris and spent fuel removal plan, but we would like to show the plan as soon as the plan is fixed.
On the other hand, we have estimated that the area on the right side of page 4 will be necessary.
In page 5 and page 6, the total capacity of the tanks is just under 1.4 million tons. There is a certain relationship between the total capacity of the tanks and its installation area. By reducing this tank capacity, it is possible to make open space for those facilities.
Some imminent conditions will continue around the 2020s and 2030, but we believe that if we can release approximately 0.3 million tons to 0.4 million tons of ALPS treated water daily by around 2030, we think we will be able to produce the necessary space.
That is all.

○Masaoka (S/NRA):
This is Masaoka
With regard to your explanation that it is possible to secure the space, in the explanation, the details have not been decided, but as the outline, we would like to ask you an explanation, a concrete and broad outline, that the site was almost properly utilized by removing tanks and installing the facilities, thus it can be settled as a whole.

○Kaneko (S/NRA):
Mr. Matsumoto, please.

○Matsumoto (TEPCO HD):
I understand.
In terms of a little accuracy, I am afraid to what extent I can be confident to explain but roughly I would like to explain where we can set it up within the framework of the plan.
The biggest issue is, however, the disposal order of tanks in which ALPS treated water is contained and the usage of the space.

In terms of ensuring a certain level of opened area, it is not appropriate to simply discharge water from the one side one by one. In order to clear up the space successfully, it would be better to start the operation from the tank of low concentration of tritium so that the tank dismantling speed would increase. Therefore, it is necessary to consider it a little while taking into account these points.
As Mr. Masaoka mentioned, I would like to present the status in a broad sense and the conditions to be considered.
That's all.

○Masaoka (S/NRA):
I have accepted.
Needless to say, there are quite a few assumptions at the present point in time, so I hope that you will consider them in that direction.
Thank you very much.

○Kaneko (S/NRA):
Yes.
Thank you very much.
As for the current point, I was also thinking of talking a little bit from me, but in relation to what you just pointed out, I do not intend to ask you to write that plan in the implementation plan but ask to explain as specifically as possible that there is a proper appropriateness of the policy to be carried out in this way.
I don't intend to ask about the facility shown in the white square on the right side of page 4, one of which is a few, but there are, for example, thousands of square meters in terms of order, and the required capacity of the tank is reduced due to the ocean discharge that you mentioned earlier. In conjunction with this, there are operations such as dismantling, so not all the land can be used in a timely manner, and perhaps, as Mr. Matsumoto said earlier, it is not in the form of insect-eating, but it is not always possible to operate the tank dismantling in such a way that the area of the tank becomes cleaner in a clean manner.
Therefore, I think there are some elements of such change that are difficult to achieve in an ideal form, but you said that if you show them in the plan now, for example, it will be finished in 2051. It has been about 30 years, so if you divide it every 10 years, you will probably need to deal with it in such a way that it will be reduced to about this level, and if you can show it with specificity, you will probably estimate to what extent you need to deal with it.
Or perhaps we have not yet been able to discuss the 2040 or 2050 years that I mentioned earlier. If you could give us an explanation that includes these points, I believe that your explanation will

support the policies outlined in the implementation plan, and that we will be able to deepen our understanding.
I hope you will understand that this is the purpose of ours.

○Matsumoto (TEPCO HD):
I understand.
I would like to prepare explanatory materials on the assumption that we can secure a site for the planned implementation of decommissioning operations. At the same time, I would like to clarify what the preconditions I mentioned earlier are, and then to be able to withstand the discussion.

○Kaneko, (S/NRA):
Thank you.
Do you have anything else?
Yes, Mr. Takeuchi.

○Takeuchi, (S/NRA):
Regarding (1), (2) and (3), which are the first squares on page 7, the annual releases of tritium are even lower than 22 trillion Bq, which is set forth in the Government's policy. The Government's policy also states that the release of tritium into the sea should be started carefully from small amount of tritium.
There is no objection to those.
Nevertheless, regarding the end of this description, there is a sentence of “revise the annual release of tritium in accordance with the progress of the decommissioning process”. As the government's policy is to revise the annual tritium release on a regular basis, as explained so far, not only from the viewpoint that the release of treated water into the ocean contributes to the overall risk reduction of Fukushima Daiichi as a whole, but from the viewpoint of steadily advancing the decommissioning. I believe it is also necessary to clarify the policy in this paper.

○Matsumoto (TEPCO HD):
I understand.
TEPCO would like to show you how TEPCO is thinking of those not only because it is stated in the Government's basic policy.

○Kaneko (S/NRA):
Do you have any other comments? You may proceed the topics into the current policy on page 7, or something like the background of overall plan as mentioned earlier.

Are you okay with NRA side?
With regard to the current point, I think there is naturally a discussion about what you mentioned on page 3 and how far qualitative things should be put into concrete form. However, I would like you to firmly position it in the implementation plan, and then, I would like to reconfirm in your thorough explanation whether it contributes to the direction of reducing the overall risk in the process of decommissioning.
Whether or not it is necessary to discuss the matter mainly again in the review meeting depends on the content of the change of the implementation plan or after looking at the materials for your explanation. I can understand this qualitatively, but I would like to confirm this matter with a little more support.
Regarding the page 7, there have been some revisions to the annual release amount. I think, as a whole, those contents could be split into some parts as the specific design portion or as the specific operation policy portion. I would like to confirm how this is reflected in each item on the implementation plan, and whether it is the design of the specific equipment or the operation method in the future.
Do you understand about the discussion at this point?
Do you have any questions from TEPCO?
Mr. Matsumoto, please.

○Matsumoto (TEPCO HD):
I am aware of the story of Mr. Kaneko.
In the future, I would like to discuss our overall policies and basic design concepts through review meetings and interviews, and finally reflect them on interview materials or amendments to the implementation plan.
Thank you very much.

○Kaneko, (S/NRA):
Thank you. Let me now turn to the second point.
If there is anything to say, I think it would be fine supplementary at the end of meeting.
Today we received TEPCO's approach evaluating the validity of the design of equipment in the event of a failure. It may not be possible to discuss enough if it is not clear such as the design of specific equipment, its function, how and when it works, under what conditions it will take as the next countermeasure. However, there may be a slight omission, such as the point of concern in the explanation today, or the point that should be added as a viewpoint. Therefore, I would appreciate it if NRA has any points to recognize.
Then Mr. Arai.

○Arai (S/NRA):
Please turn to page 10.
There are three square pots, and in the second, there is the term “fault tree analysis”. The term of “fault tree analysis” used in this case is not used to calculate exact probabilities such as those used in the PRA, but is it used to comprehensively summarize what abnormal phenomena the "unintended release of ALPS treated water into the sea" as described here?
This is just confirmation.

○Matsumoto (TEPCO HD):
That is right.
In the case, we don’t deal with the fault tree analysis as so-called core damage or severe accidents in nuclear power reactors.
At a minimum, we intend to take measures after clarifying what contributes best and what should be considered in case of the release of ALPS treated water into the sea in an unintended manner as a top-level event, covering the facilities and human operations that lead to the release.

○Arai (S/NRA):
Thank you.
I would like to ask you to explain once again what the condition of the "unintended release of ALPS treated water into the sea" is described here, and the table below on page 10 shows that there is a dramatic leap up of contents to the respective equipment failure. Could you tell me what is the condition of the "unintended release of ALPS treated water into the sea" once again?
As explained by Mr. Matsumoto, I understand a condition in which, for example, a predetermined dilution mixing ratio has not been achieved or a condition in which a predetermined concentration has not been homogenized. Is this correct?

○Matsumoto (TEPCO HD):
That's right.
As you said, it is not a development of malfunction due to sudden top events. As Mr. Arai mentioned, when dilution mixing ratio has not been achieved, I would like to make sure that a fault tree is covered even if the amount of treated water is too large, or that the value of dilutions is insufficient, and that the pump is stopped, etc.

○Arai (S/NRA):
Thank you very much.
Probably our understanding is same. Nevertheless, there is among these pots, it seems to include

a single failure necessary for subsequent analysis and evaluation when you extract this abnormal event. In the actual analysis evaluation, in addition to this abnormal event, a single failure of the equipment necessary to cope with the abnormal event is assumed.
Are you aware that this will be assumed separately?

○Matsumoto (TEPCO HD):
Yes.
First there is an event, or something is broken, or not measured by a human error that triggers a case in this fault tree, which may eventually cause a release or radiological impact. Then we take some additional countermeasures, where I think we should consider some cases that the additional countermeasures will not operate or fail.
Is that different from the consciousness with Mr. Arai?

○Arai (S /NRA):
That's right.
In terms of the reactor, we recognize that it is a transient plus a single failure, so this time we recognize that it is an abnormal event plus a single failure.

○Kaneko (S/NRA):
Yes, Matsumoto, please.

○Matsumoto (TEPCO HD):
However, unlike nuclear power reactors, there are not meaningful definition for the dilution and release facilities for ALPS treated water, for example, as a load shutdown or as a so-called transient. So, I think it would be best if we could complete the fault tree by showing what we mean when we look at the facilities one by one, if they fail or fail, in the form of an initiating event.

○Arai (S /NRA):
Then, I would like to confirm the details later in the materials, etc.
In the following Review meeting, I am aware that you will explain the evaluation of the amount of discharge when measures are taken in order to cope with the abnormal events that are being extracted this time. However, I think it is necessary to set the criteria and evaluation conditions in the evaluation process, so I would like you to explain how to set the criteria and evaluation conditions appropriately, and how to think about them.
Additionally, when setting the evaluation conditions, it is necessary to set the initial condition in which the evaluation results become most severe regardless of whether it is in operation or during

maintenance. Please also explain how to operate the basic equipment, etc. in addition to explanation above.
That's all from me.

○Matsumoto (TEPCO HD):
I understand.
I believe that it is necessary to clearly show the assumptions regarding the characteristics of ALPS treated water released into the environment, and the amount of the water released in severe conditions, for example, a condition such that the emergency isolation valves do not close.
After providing such explanation, I would like to explain the impact on the environment.
That's all.

○Kaneko (S/NRA):
Are there any comments?
Yes, Mr. Iwanaga, please.

○Iwanaga (S/NRA):
Regarding the content on page 10, I think that mutual understanding of the basics has increased and deepened through discussions with Mr. Arai earlier.
In this table, the types of the components and the typical constructions of components, etc. are shown, but it is a little difficult to understand the table.
First, the TEPCO should be aware of what are wrong with the circulation pumps and what conditions are abnormal. Under such recognitions, the types of the components and how to think about the single failure of the active components should have been considered, but such flow of thinking is not shown in the table, so I think it is difficult to understand the table.
Also, regarding stopping, I think it is necessary to consider and show how to think about the risks of stopping components as the risks of large releases due to stopping the operation of components, so I would like you to prepare to discuss such things.

○Matsumoto (TEPCO HD) :
I understand.
As for the table, there are still some insufficient points, and I think such points must be shown in the fault trees, so I would like to deal with it in that way.
That's all.

○Iwanaga (S/NRA):
Mr. Matsumoto, the word of "fault tree" itself sounds very logical and rigorous, but the most important point of fault tree analysis is setting what will happen successively. So, I think it is better to conduct the fault tree analysis after considering issues above. If you stick to the format of fault tree from the beginning, it's hard to understand such issues, so I hope you will proceed with that way.

○Matsumoto (TEPCO HD):
I understand.
Rather than showing the output suddenly, I would like to be able to explain it step by step.

○Kaneko (S/NRA):
Thank you very much.
Mr. Masaoka, please.

○Masaoka (S/NRA):
This is Masaoka, NRA.
Regarding the page 10, I would like to clarify just one point.
Abnormal events are shown in the lower right corner of page 10, and in which how to handle the active components is described. Concerning the passive components, please explain how to handle them with regards to the initiating events of them and the occurrence of abnormal events.

○Matsumoto (TEPCO HD):
We are still worried about how to handle the passive components of the dilution and release facilities for ALPS treated water.
For example, regarding the piping, is it appropriate to assume the "guillotine-rupture", i.e., sudden breakage or cracking? Does such assumption have no problem because it is conservative? We have not fully thought about such issue yet. So, we would like to summarize our idea about this, and then show it at the interviews, etc.

○Masaoka (S/NRA):
This is Masaoka, NRA.
I understand.
There may be a discussion that a pipe breakage does not need to be considered in the evaluation because the concerning parts are originally under low pressure where pressure-resistant materials are not used.

Also, I think it is possible to evaluate that effects from leaks, e.g., those due to thinning or those due to defective connections can probably be negligible even if you consider the pipes as simple passive components, but please comprehensively examine these effects and explain properly why they can be regarded negligible.
Additionally, it is clearly stated in the new regulatory standard that a single fault of passive devices should be assumed. When considering this issue, I believe that it is possible to explain that passive components of the facilities do not need to have mitigation functions for such long term that is required for reactors because the facilities will be stopped immediately in the abnormal events.
Anyway, we would like you to ask comprehensive evaluation for passive components as same as that of active components, then to show us the extent of their effects clearly.
That's all.

○Matsumoto (TEPCO HD):
I understand.
What we are worried about is that the water we handle is the ALPS treated water, and on the other hand, it is seawater. Based on these points, we would like to reconsider how to assume failure mode of the passive component, and then bring the results to you.

○Kaneko (S/NRA):
Thank you very much.
I would like to make the common understanding about one point regarding what you mentioned. The third square on page 10, or the second square on page 11, may be the same purpose, and I understand that you do not mean considering the abnormal event or the abnormal condition caused by natural phenomena.
For example, there may happen a leak at the seams of the piping that you mentioned or a pump break, which is caused by an earthquake, a tsunami or flying object leading a loss of its function. As for such certain scenarios, I understand that you will not consider probabilities of these scenarios in quantitative evaluation.
In that sense, you don't know exactly what causes the components to be affected, but I understand that you will not eliminate the effects on components caused by earthquakes and tsunami when setting the failure modes of components and others. That is my understanding. Is it right?

○Matsumoto (TEPCO HD):
We would like to discuss and agree on that point. Regarding the structure and strength etc. of the dilution and discharge facilities, we intend to explain clearly what kind of protections are given or how much they can withstand by design for natural phenomena such as earthquakes and tsunami.

In addition, we think that we will provide explanations about the point, e.g., this is not to be superimposed on the abnormal event since a kind of protection is designed when extracting the abnormal events.

○Kaneko (S/NRA):
The purpose of my previous remark is as follows.
You told us that "this is not to be superimposed". In my understanding, that means you just do not assume scenarios such that an earthquake occurs, and some unexpected situations happen further. Having said that I would like you to explain that the concerning items meet with certain requirements.
There is a possibility that a variety of earthquakes may occur, and it leads that something beyond the assumptions may come and some components may be broken. However, I understand that you do not set such scenarios because such consequences are probably included as some of the causes of equipment degradation, failure, or malfunction. Is that correct?

○Matsumoto (TEPCO HD):
I am sorry, the sound has been cut off a little, so could you please kindly talk again?

○Kaneko (S/NRA):
Yes, I understand. Are you all right, do you hear me now?

○Matsumoto (TEPCO HD):
Yes, fine.

○Kaneko (S/NRA):
In your previous speech, you mentioned the word "be superimposed". I understand that this exactly represents what you mean.
You said that when assuming a certain failure or something like that you do not assume additional scenarios such that an earthquake occurs further, and it breaks something, or the situation becomes worse.
On the other hand, various components are designed against the earthquake and tsunami, e.g., ensuring seismic resistance, taking some measures which are in response to the levels of requirements. However, there is a possibility that the components could break if something beyond the levels could happen.
There may be possible scenarios due to something or whatever, e.g., causing the piping to break, the pumps may break, or some components may lose their functions.

We do not assume such scenarios one by one, but these consequences are included in the failure modes of components as you mentioned previously. That is, we do not set scenarios by clarifying the effects due to earthquakes and tsunami, but if the components are broken by such effect, of course, such situations are included in the assumed loss of functions or failure of components.
That is my understanding. Is that correct?

○Matsumoto (TEPCO HD):
Yes, my understanding is the same.
There are a variety of factors that cause the piping to break, including earthquakes and some heavy flying objects caused by the tornado, but we think that we can explain the situation that follows piping breaks by developing the fault tree.

○Kaneko (S/NRA):
I was relieved that we could have such a common understanding. It's okay. Thank you very much.
Do you have any other opinions? Is that okay with you?
As for this second point, first, it is important to firmly understand what the unintended conditions are, i.e., what the abnormal conditions are.
Then, in relation to the criteria of the occurrences of abnormal situations and such conditions, it should be carefully classified such that what kind of state do the abnormal situations transition to, what kind of measures are prepared to prevent the bad effects due to the transitions, and what kind of consensuses are caused with assuming single failures, and then each one should be evaluated properly. After that, the work to evaluate that the safety is ensured in the most severe scenarios will become the core issue in the future.
As a premise, I mentioned a few things that you should think about. I hope you will do the work based on them.
As I mentioned at the outset, it is difficult to make concrete discussions on this issue without discussing the details of actual design or assumptions. If there is anything TEPCO wants to confirm or clarify for further elaboration of future discussions, please do not hesitate to let us know.
Yes, Mr. Matsumoto.

○Matsumoto (TEPCO HD):
We would like to work step by step while defining and clarifying what are the unintended conditions and how components are going to break, as Mr. Masaoka and Mr. Iwanaga have stated.
That's all.

○Kaneko (S/NRA):

Thank you very much.
Then, I think we were able to share the understanding in such a way, and I would like to discuss it at the review meetings at an appropriate stage.
Today, there are a lot of qualitative items on the contents of your explanations, but we have completed a series of discussions on some points. Do you have any items to be discussed?
Do you have any other items to be discussed for the future review meetings, e.g., issues in the future, items to be prepared in relation to certain things?
Is there anything from the NRA?
If the TEPCO has any questions about how to proceed the review in the future, relevant requests, and whatever, I hope you can tell me.

○Matsumoto (TEPCO HD):
I have nothing, today. I hope that we will continue to prepare for the review meetings through interviews, etc. Thank you very much.

○Kaneko (S/NRA) :
Thank you very much.
By the way, with regards to the preparations for the next discussions, do you have any idea on the preparation activities related to subjects to be discussed?

○Matsumoto (TEPCO HD) :
We would like to discuss the seawater, e.g., mixed dilution of seawater. In any case, I would like to make some arrangements through interviews.
That's all.

○Kaneko (S/NRA):
Yes, I knew.
I understand that you are currently planning to include these matters mainly to the scope of discussion.
I think that you need some preparations in advance, so I would like to discuss these and other matters before the next review meeting.
We are thinking that the schedule will be as flexible as possible, so after you are ready, we would like to adjust the schedule for the next meeting and set it up.
Is there anything you would like to say throughout? Is that okay with you?
Do you have anything to say from the TEPCO?

○Matsumoto (TEPCO HD):

No, we don't.

○Kaneko (S/NRA):

Well then, although it is a little earlier than planned, I will finish the review meeting today.

Thank you for your cooperation in the smooth progress of the meeting.