

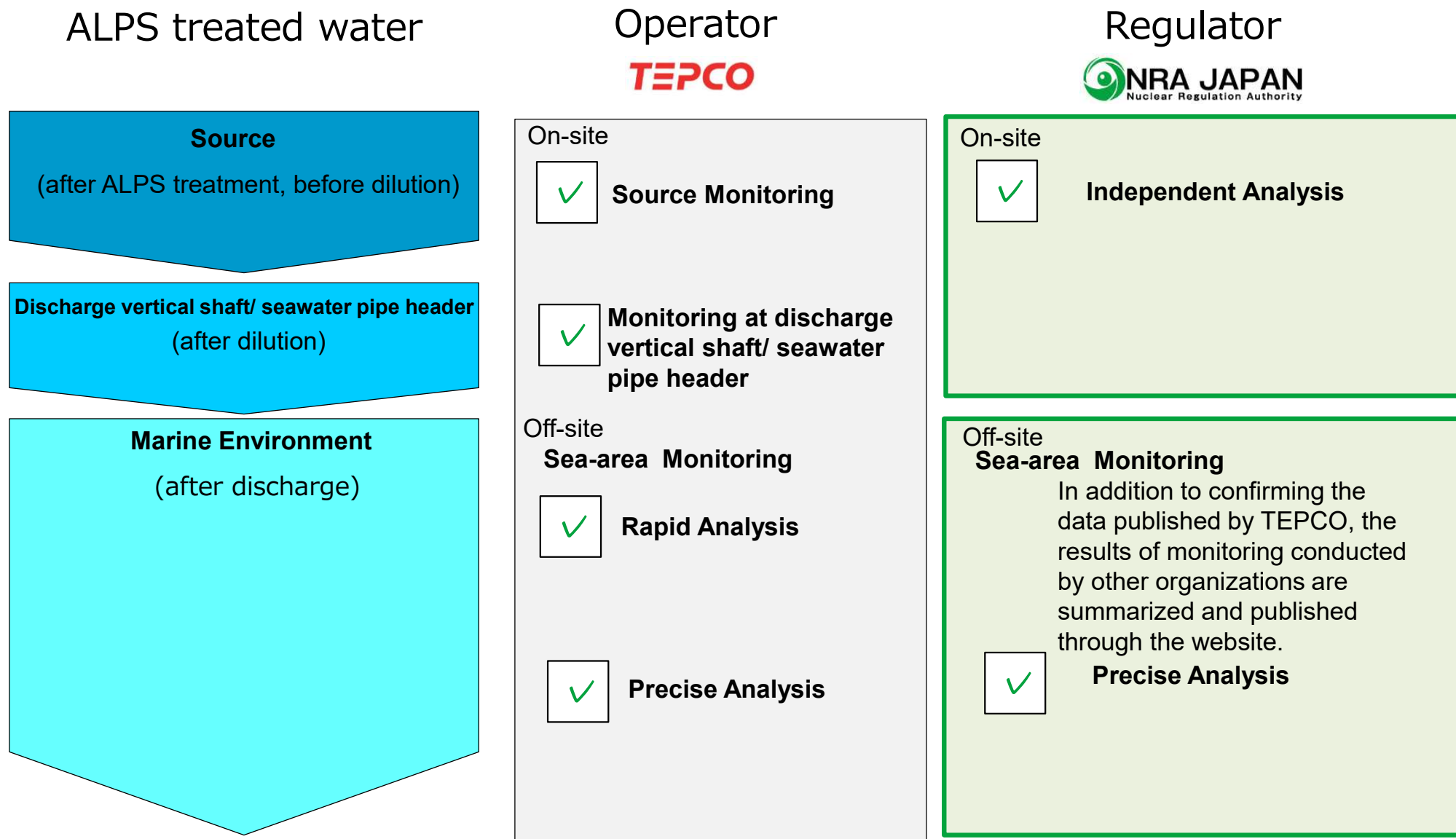
Relationship between IAEA Safety Standards and Japan's Sea-area Monitoring

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1. ALPS Treated Water Discharge and Activities as a Regulator
2. Relationship between IAEA Safety Standards and Japan's Sea-area Monitoring
3. NRA response in case that rapid analysis detects a value that differs from the historical fluctuation range
4. NRA response in case that precise analysis detects a value that differs from the historical fluctuation range

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- Nuclear Regulation Authority (NRA), as the regulator, received an implementation plan for the ALPS treated water discharge from the operator, which has been reviewed and approved. In addition, NRA conducts inspections to check the status of its implementation. The status of the ALPS treated water has been independently analyzed.
- In addition, after the discharge of ALPS treated water, NRA has been monitoring the sea area around FDNPS based on CRMP.

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Relationship between IAEA Safety Standards and Japan's Sea-area Monitoring

No	IAEA Safety standards※ ¹	 IAEA Safety Standards for regulator※ ²	 NRA Conformance status	
			On-site	Off-site
1	GSR Part3, 3.37. The regulatory body shall establish requirements that monitoring and measurements be performed to verify compliance with the requirements for protection and safety. The regulatory body shall be responsible for review and approval of the monitoring and measurement programmes of registrants and licensees.	Applicable	Satisfied	—
2	Requirement 32: Monitoring and reporting The regulatory body and relevant parties shall ensure that programmes for source monitoring and environmental monitoring are in place and that the results from the monitoring are recorded and are made available	Applicable	Satisfied	Satisfied
3	GSR Part 3, 3.135. The regulatory body shall be responsible, as appropriate, for: (a) Review and approval of monitoring programmes of registrants and licensees, which shall be sufficient for: (i) Verifying compliance with the requirements of these Standards in respect of public exposure in planned exposure situations; (ii) Assessing doses from public exposure. (c) Making provision for an independent monitoring programme. (d) Assessment of the total public exposure due to authorized sources and practices in the State on the basis of monitoring data provided by registrants and licensees and with the use of data from independent monitoring and assessments. (e) Making provision for maintaining records of discharges, results of monitoring programmes and results of assessments of public exposure. (f) Verification of compliance of an authorized practice with the requirements of these Standards for the control of public exposure.	Applicable	Satisfied	Satisfied
4	GSR Part 3, 3.136. The regulatory body shall publish or shall make available on request, as appropriate, results from source monitoring and environmental monitoring programmes and assessments of doses from public exposure.	Applicable	Satisfied	Satisfied
5	GSR Part 3, 3.137 Registrants and licensees shall, as appropriate (d) Report promptly to the regulatory body any levels exceeding the operational limits and conditions relating to public exposure, including authorized limits on discharges, in accordance with reporting criteria established by the regulatory body.	Applicable	Satisfied	Satisfied
6	GSG-9 5.36. The regulatory body and the operating organization should take into account that, for the above mentioned specific practices and radionuclides, the optimal management option from a radiation protection perspective might not result in the application of costly waste abatement techniques, but in the application of more stringent measures for the verification of compliance by the operating organization and the regulatory body, as relevant. The optimal management option and the justification of the selection of this option should be presented by the operating organization and endorsed, if acceptable, by the regulatory body. Examples of more stringent measures for verification of compliance for complex facilities, including nuclear installations, are a radionuclide specific source monitoring and environmental monitoring programme; more detailed assessment of the dose to the representative person, including the identification of relevant exposure pathways; and more frequent reporting of discharges to the regulatory body.	Applicable	Satisfied	Satisfied

※¹ IAEA Safety Standards, General Safety Requirements Part 3, No. GSR Part 3, General Safety Guide No. GSG-9, No. RS-G-1.8 Safety Guide

※² IAEA Review of Safety Related Aspects of Handling ALPS-Treated Water at TEPCO's Fukushima Daiichi Nuclear Power Station, Report 2: Review Mission to NRA(March 2022)

Relationship between IAEA Safety Standards and Japan's Sea-area Monitoring

No	IAEA Safety standards※1	 IAEA Safety Standards for regulator※2	 NRA Conformance status	
			On-site	Off-site
7	GSG-9 5.68. Discharge limits should be specified for different radionuclides, or groups of radionuclides, depending on: (a) The feasibility of measurement of the individual radionuclides; (b) The significance of the radionuclides in terms of dose to the representative person; (c) The relevance of the measurement of the individual radionuclides as an indicator of the performance of the facility or activity.	Applicable	Satisfied	—
8	GSG-9 5.84. The regulatory body should make provision for independent monitoring. The characteristics of independent monitoring and the resources devoted to independent monitoring should be based on a graded approach and should incorporate best practices and scientifically sound analytical methods. Such monitoring may be undertaken by the regulatory body or on behalf of the regulatory body by another organization that is independent of the operating organization.	Applicable	Satisfied	—
9	GSG-9 5.92. The regulatory body should verify compliance with the regulatory requirements and the operational limits and conditions of the authorization for discharges. This should involve, as appropriate, auditing of the operating organization's records (including those setting out the results of discharge monitoring and environmental monitoring), review of the periodic reports on the results of the radiological environmental impact assessment review, of the results of the independent monitoring programmes, and inspection.	Not applicable	Satisfied	—
10	GSG-9 5.93 The regulatory body should establish a process for identifying and managing any identified noncompliance with the regulatory requirements on discharges. When a regulatory requirement, including a condition of the authorization, has not been met, the operating organization should, as appropriate: (b) Take appropriate action to remedy the circumstances that led to the breach and to prevent a recurrence of similar breaches; (c) Promptly communicate to the regulatory body the causes of the breach and the corrective or preventive actions taken or to be taken; (d) Take whatever other actions are required by the regulatory body	Not applicable	Satisfied	Satisfied
11	RS-G-1.8 2.23. Monitoring of environmental contamination with long lived radionuclides would generally be justified if the annual dose due to this source comprised a substantial fraction (one tenth or more, i.e. 1 mSv or above) of the generic level as given in para. 2.22 or the appropriate national intervention or action levels	Applicable	Satisfied	—
12	RS-G-1.8 5.25. The design of an environmental monitoring programme should be consistent with the objectives of monitoring. The need for and the scale of an environmental monitoring programme will be determined primarily by the significance of the expected doses to the critical group. Measurements should be made and sampling carried out at appropriate locations accessible to the RS – G-1.8 public outside the operations boundary of the facility. The measurements should include measurements of external radiation levels and of radionuclide concentrations in all relevant environmental samples, food products and drinking water. The locations for measurements and sampling should be determined on a site specific basis with the aim of determining the highest radiation doses to the public and identifying the areas most contaminated with radionuclides.	Applicable	—	Satisfied

➤ The NRA reviewed the IAEA's safety standards and confirmed whether the matters related to NRA's implementation complies with the requirements of the IAEA review report for Japan ※2. All of the matters have been satisfied with IAEA Safety Standards for regulator.

※1 IAEA Safety Standards, General Safety Requirements Part 3, No. GSR Part 3, General Safety Guide No. GSG-9, No. RS-G-1.8 Safety Guide

※2 IAEA Review of Safety Related Aspects of Handling ALPS-Treated Water at TEPCO's Fukushima Daiichi Nuclear Power Station, Report 2: Review Mission to NRA(March 2022)

The details of NRA's conformance status (off-site: Sea-area Monitoring)

No	 IAEA Safety standards	 NRA Conformance status (Off-site: sea-area)
2	Requirement 32: Monitoring and reporting The regulatory body and relevant parties shall ensure that programmes for source monitoring and environmental monitoring are in place and that the results from the monitoring are recorded and are made available	The results of Sea-area Monitoring are available to the public all the time through NRA's website.
3	GSR Part 3, 3.135. (e) Making provision for maintaining records of discharges, results of monitoring programmes and results of assessments of public exposure.	(e) Provision for the preservation of monitoring results is described in the Public Records and Archives Management Act. The results are to be properly stored for the duration of the standard document.
4	GSR Part 3, 3.136. The regulatory body shall publish or shall make available on request, as appropriate, results from source monitoring and environmental monitoring programmes and assessments of doses from public exposure.	The results of Sea-area Monitoring is available to the public all the time through NRA's website.
5	GSR Part 3, 3.137. Registrants and licensees shall, as appropriate (d) Report promptly to the regulatory body any levels exceeding the operational limits and conditions relating to public exposure, including authorized limits on discharges, in accordance with reporting criteria established by the regulatory body.	The details are described at the following slides P8-P12.
6	GSG-9 5.36.. The optimal management option from a radiation protection perspective might not result in the application of costly waste abatement techniques, but in the application of more stringent measures for the verification of compliance by the operating organization and the regulatory body	More stringent measures for verification of compliance has been adapted. For example, NRA has conducted analysis for tritium.
10	GSG-9 5.93 The regulatory body should establish a process for identifying and managing any identified noncompliance with the regulatory requirements on discharges.	Although this is not required to NRA as one of the IAEA Safety Standards (see: IAEA Review of Safety Related Aspects of Handling ALPS-Treated Water at TEPCO's Fukushima Daiichi Nuclear Power Station), NRA conducts the monitoring and publishes the results obtained through NRA's website. The details are described at the following slides P8-P12.
12	RS-G-1.8 5.25. The design of an environmental monitoring programme	The design of an environmental monitoring for the ALPS –Treated Water is based on CRMP in consistent with the objectives of monitoring. The need for and the scale are determined from the previous monitoring experience.

- The details of NRA's conformance status (off-site: Sea-area Monitoring) is shown in the above table.
- In the following slides, NRA will discuss the activities (**GSG-9 5.93, which is listed on the above table as No.10**) which is not applicable to NRA implementation in IAEA Review Report 2 ※.



GSG-9 5.93 The regulatory body should establish a process for identifying and managing any identified noncompliance with the regulatory requirements on discharges. When a

regulatory requirement, including a condition of the authorization, has not been met, the operating organization should, as appropriate:

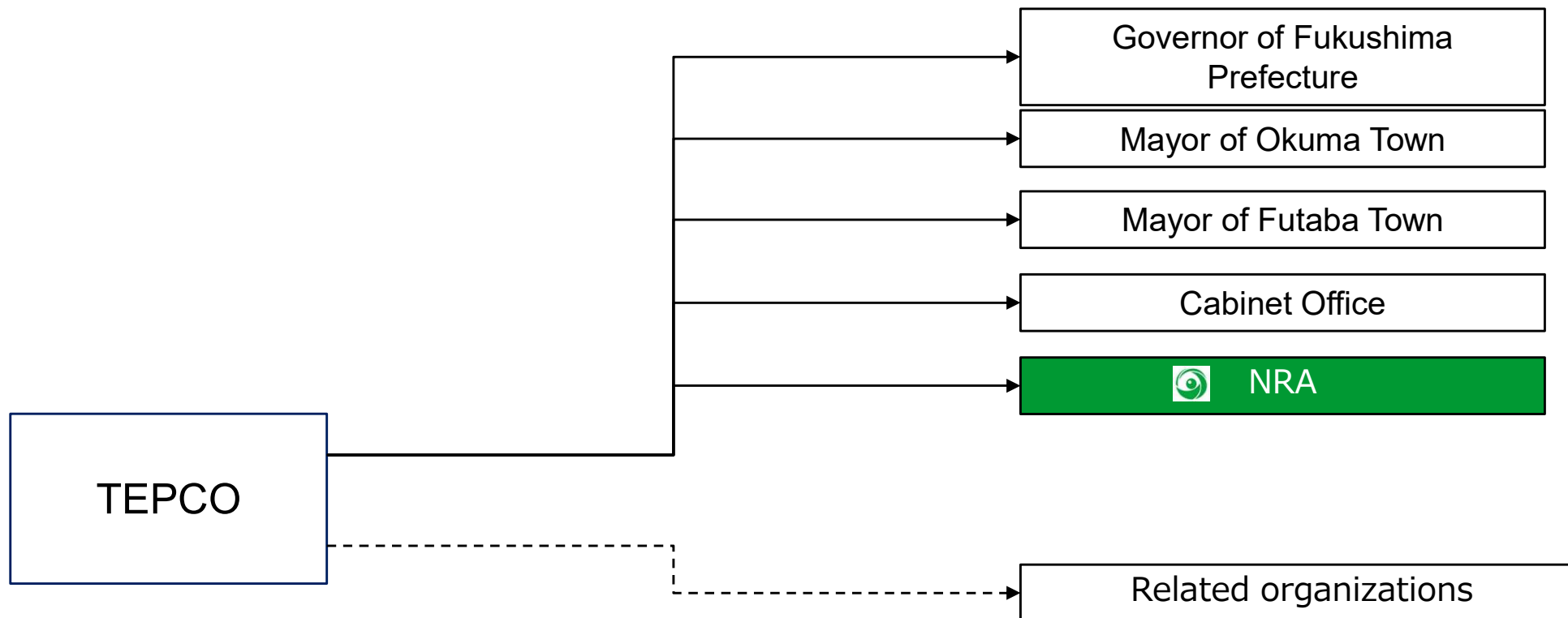
- (a) Investigate the breach and its causes, circumstances and consequences;
- (b) Take appropriate action to remedy the circumstances that led to the breach and to prevent a recurrence of similar breaches;
- (c) Promptly communicate to the regulatory body the causes of the breach and the corrective or preventive actions taken or to be taken;
- (d) Take whatever other actions are required by the regulatory body



In the event of an abnormal value in Sea-area Monitoring, the established communication methods will be used.



- ✓ In the unlikely event that a violation of laws and regulations occurs, reports are made to NRA and the relevant organizations based on laws and regulations and safety agreements with local governments.
On the site, TEPCO will provide explanations with the resident inspectors of NRA Regional Office near at Fukushima Daiichi Nuclear Power Station.
- ✓ TEPCO will take corrective actions to the event based on their management system and the Implementation Plan.
- ✓ NRA resident inspectors follow the corrective actions if necessary.

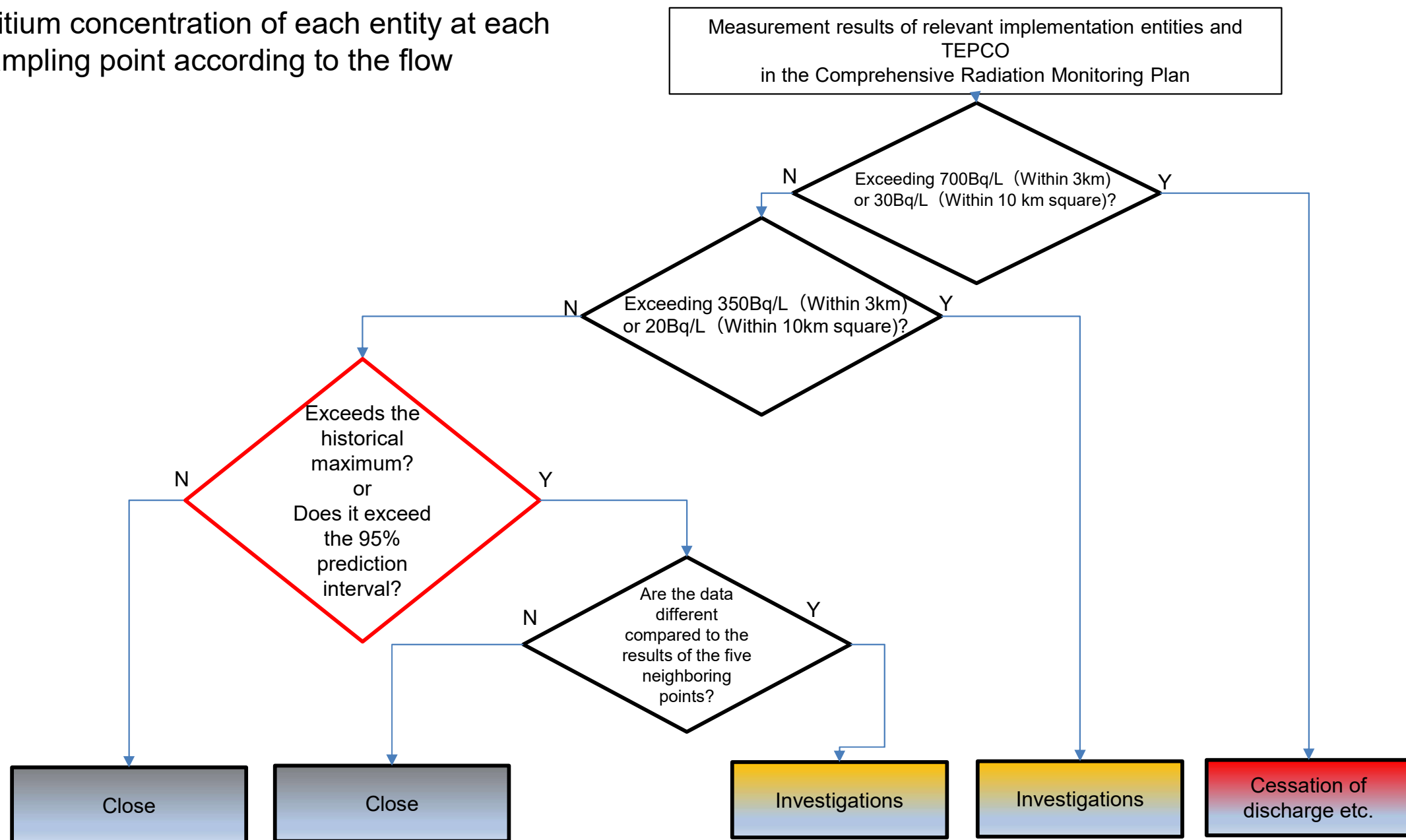


Ref: Fukushima Daiichi Nuclear Power Plant Nuclear Operator's Disaster Prevention Operation Plan P.II-4

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Regulator response in case that rapid analysis detects a value that differs from the historical fluctuation range

Tritium concentration of each entity at each sampling point according to the flow



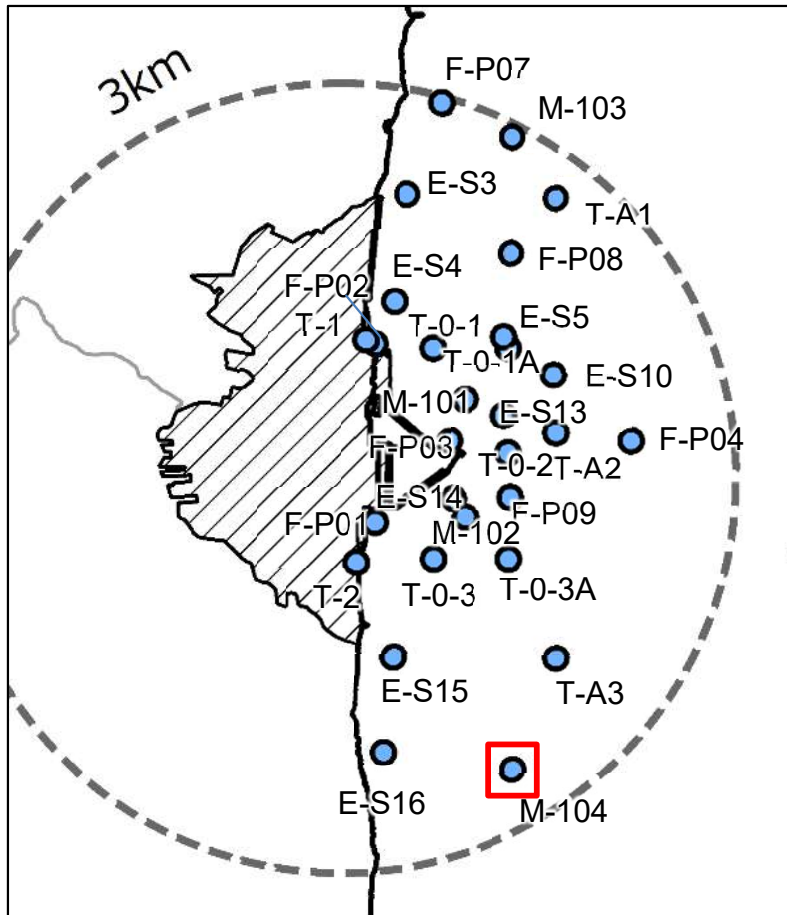
Process for Confirmation of Sea-area Monitoring Results at the NRA

(Confirmation of tritium concentration trends at each sampling point)



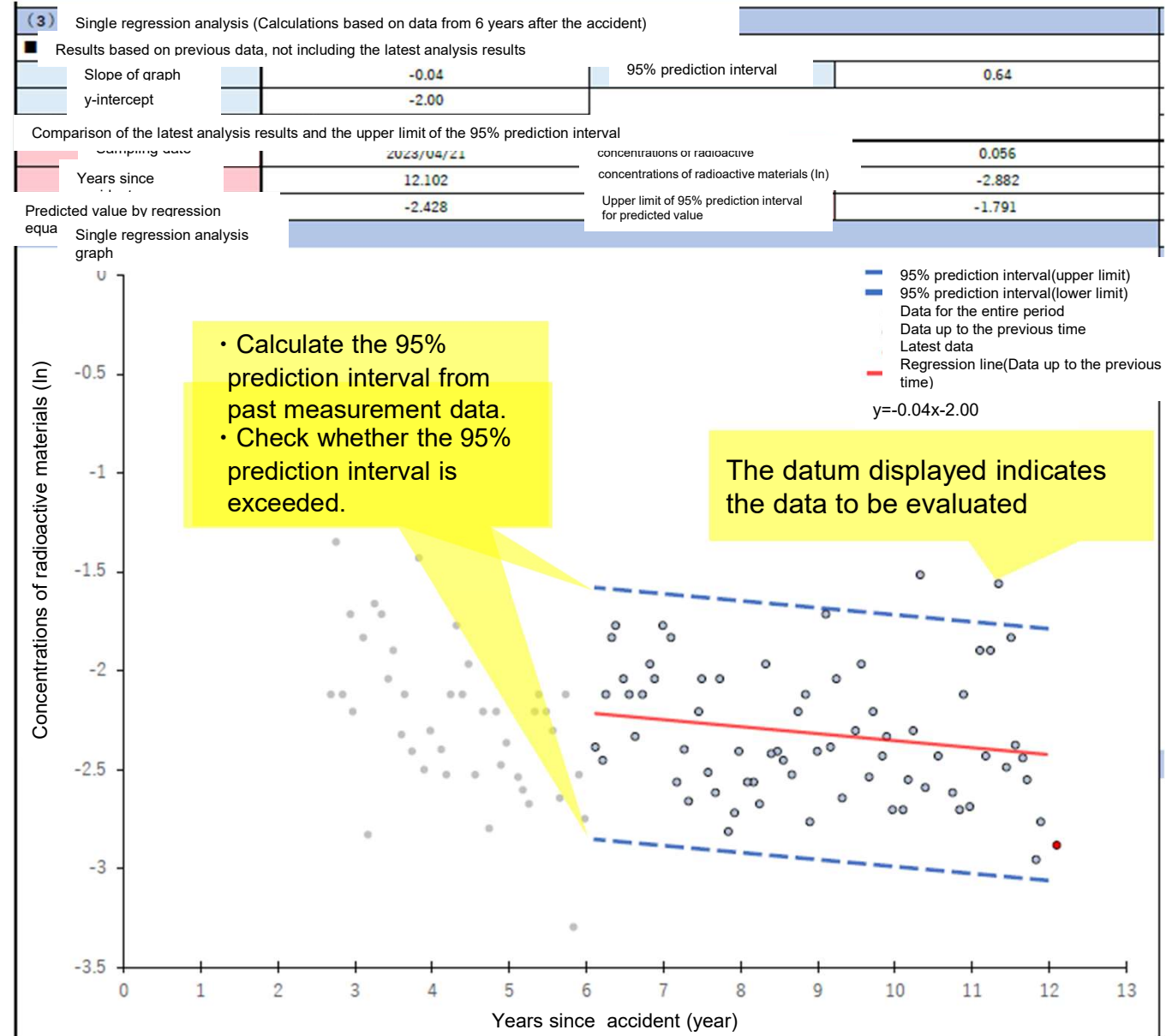
Evaluation of 95% prediction interval: For each sampling point, evaluates whether the 95% prediction interval calculated from the historical trend is exceeded or not.

Example of checking tritium concentration trend (M-104)



※ M-104 is an example, and the trends were confirmed in the same way for all sampling points (except Tokyo Bay), all environmental samples (seawater, sea sediment, marine biota), and all radionuclides (including 7 major nuclides and other radionuclides) in the comprehensive radiation monitoring plan.

※ In addition to checking trends for each sampling point, we also compare the data for each oceanic area to see if there are any differences in trends among implementation entities.



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The results of the detailed analysis will be submitted to the Nuclear Regulation Authority (NRA) by the analytical labs after 1.5 - 2 months.

- Those data are checked in the same way as previous.
- The results of these analyses will be published on the Nuclear Regulation Authority website.

At meetings attended by various experts, the results are reported to the expert meetings by each monitoring implementing organizations. The results are thoroughly reviewed as well. Those meetings and presentation materials are opened to the public through YouTube channels.

**The Experts Meeting on Sea-area Monitoring
regarding ALPS treated water**



水産庁



TEPCO

**Fukushima Prefectural Environmental
Assessment committee**



TEPCO

Backup Slides

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Organization Responsibility: Government Regulator Registrant/Licensee/Employer

¹ RS-G-1.8 will be superseded by DS505, which is expected to be published within the next year. While this represents an update, specific clause numbers will change with DS505

² The clauses listed here for RS-G-1.8 do not specifically assign responsibility, as it provides guidance on monitoring programs to whomever is carrying them out

The status of implementation of Japan's Sea-area Monitoring satisfies the requirements of the IAEA Safety Standards for regulators as indicated in the summary table.

Note: Except for the following two items, details are described in slides from P5 to P7, so please refer to them.



GSG-9, 5.74

The operating organization should make available, on request, results from source monitoring. This request may be incorporated within the operational limits and conditions of the authorization or specified in other regulatory documents.



GSG-9, 5.76

The requirements for source monitoring and environmental monitoring should be specified in the authorization for discharges by the regulatory body. The necessity for and frequency of monitoring should be determined by the assessed level of risk of radiological impact.



GSG-9, 5.74

The operating organization should make available, on request, results from source monitoring. This request may be incorporated within the operational limits and conditions of the authorization or specified in other regulatory documents.



NRA approved TEPCO's information disclosure action related to ALPS treated water in the following sentence of the Implementation Plan.

Response Based on Government Policy

Before the marine discharge of ALPS-treated water, TEPCO will confirm the tritium concentration in the treated water and ensure that the sum of the ratios of the concentrations of radioactive substances other than tritium is less than 1. To verify this, TEPCO will conduct analyses at its own facilities and also at third-party analytical institutions specializing in radioactive substance analysis. By comparing the results, TEPCO will confirm that the radioactive substances other than tritium are purified to levels well below the regulatory safety standards. The results of these analyses will be published each time ALPS-treated water is discharged. (Refer to "III Part 3 Section 2.1 Supplementary Explanation on the Management of Radioactive Waste" and Appendix-1)



GSG-9, 5.76

The requirements for source monitoring and environmental monitoring **should be specified in the authorization for discharges** by the regulatory body. The necessity for and frequency of monitoring should be determined by the assessed level of risk of radiological impact.



The NRA has confirmed the following in the Implementation Plan.

For the source monitoring conducted by TEPCO, the measurement methods for radionuclides and the requirement that the sum of the ratio against concentration limit be less than one are set. Therefore, a detection limit at the level necessary to confirm this is required.

The environmental monitoring conducted by TEPCO must follow the comprehensive monitoring plan.



GSG-9, 5.84-5.85

The regulatory body should make provision for independent monitoring. The characteristics of independent monitoring and the resources devoted to independent monitoring should be based on a graded approach and should incorporate best practices and scientifically sound analytical methods. Such monitoring may be undertaken by the regulatory body or on behalf of the regulatory body by another organization that is independent of the operating organization.

The purpose of such independent monitoring may be one or more of the following:

- a. To verify the quality of the results provided by the operating organization;
- b. To verify the assessment of doses to the representative person;
- c. To determine the consequences of any unforeseen release of radioactive material;
- d. To undertake research into exposure pathways, including the contributions to dose from other sources of exposure;
- e. To provide public reassurance.



The NRA conducts independent monitoring of both source and environment. Source monitoring is primarily conducted from the perspective of "a," while environment monitoring is conducted from the perspectives of "c" and "e."