

Results of ALPS Treated Water Marine Monitoring:
Seawater Survey (tritium and gamma ray nuclides (rapid analysis)) (December 19-20, 2023)

1 Outline of survey

(1) Date of sampling

December 19-20, 2023

(2) Sampling points

Tritium: 11 sampling points on coastal waters in the Fukushima Prefecture, 1 sampling point on coastal waters in the Miyagi Prefecture, and 1 sampling point on coastal waters in the Ibaraki Prefecture

*Water samples are collected from surface layer at all sampling points. At the sampling point E-S10, closest to discharge outlet, water samples are collected from bottom layer as well.

*Tritium analysis that prioritizes rapidness is planned at 11 sampling points every time. However, last time, sampling at 2 points was canceled due to sea conditions, and so this time sampling was performed at 13 points including them.

Gamma ray nuclides: 3 sampling points on coastal waters in the Fukushima Prefecture

(3) Details of the survey

The measurement of radioactive material concentrations in seawater (tritium and gamma ray nuclides (rapid analysis))

Tritium: Analysis with target lower limit of detection of 10 Bq/L.

Gamma ray nuclides: Analysis of broad range of gamma ray nuclides in a condition of target lower limit of detection to be 1 Bq/L for cesium 137

*1 A target lower limit of detection means a value that is set for quality control to assure at least the detection up to the value when analysis is conducted. Each actual lower limit of detection differs according to samples, and is equal to or lower than a target lower limit of detection.

*2 "Gamma ray nuclides" refers to radioactive isotopes that emit gamma rays, such as cesium-137, cesium-134, cobalt-60, ruthenium-106, and antimony-125. Gamma ray is a type of electromagnetic waves, thus the analysis of gamma ray that we adopt can detect broad range of nuclides with measuring the sequential spectrum from one sample.

2 Outline of results

(1) Seawater survey (tritium: 13 sampling points (14 samples))

Concentrations of tritium in seawater correspond to below the lower limit of detection in all samples.

(2) Seawater survey (gamma ray nuclides: 3 sampling points (3 samples))

Concentrations of gamma ray nuclides in seawater correspond to below the lower limit of detection in all samples.

(Detailed are attached)

(Maps attached)

Analysis result for tritium in seawater

Sampling point	Sampling date	Sampling layer	Sampling depth (m)	Nuclide	Radioactivity concentration ^{*1*2}	Unit
E-S3	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S4	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S10	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S10	2023/12/19	Bottom layer	12.2	H-3	< 8	Bq/L
E-S14	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S15	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S17	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S19	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S22	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S27	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S30	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S31	2023/12/20	Surface layer	1.5	H-3	< 8	Bq/L
E-S32	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L
E-S35	2023/12/19	Surface layer	1.5	H-3	< 8	Bq/L

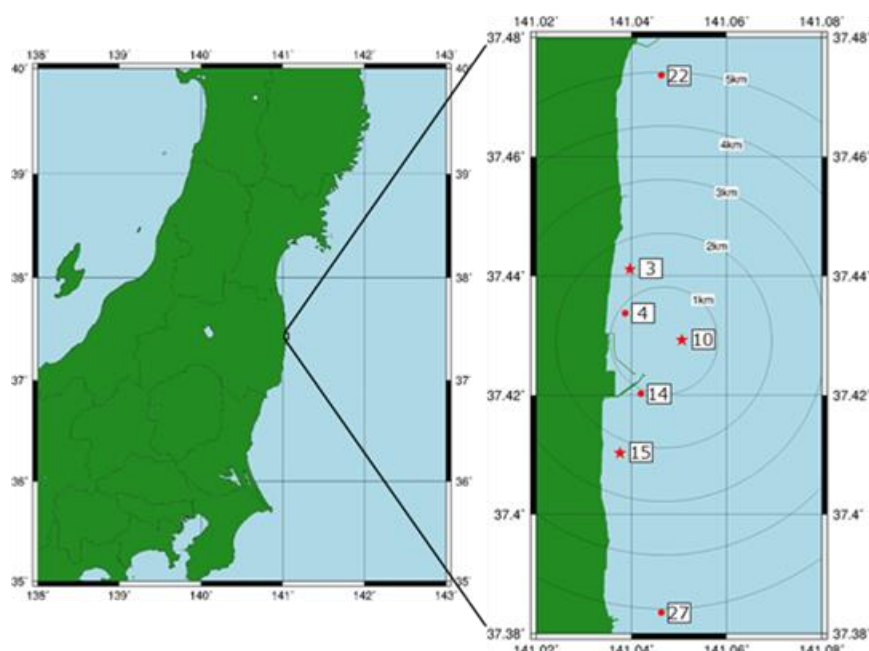
*1 Radioactivity concentrations are presented as radioactivity concentration \pm combined standard uncertainty.

*2 Values below detection limit are shown by lower limit of detection (e.g., “<10 Bq/L” indicates a value below 10 Bq/L).

Analysis result for gamma ray nuclides in seawater

Sampling point	Sampling date	Sampling layer	Sampling depth (m)	Nuclide	Result
E-S3	2023/12/19	Surface layer	1.5	Gamma ray nuclides	Below lower limit of detection in all gamma ray nuclides
E-S10	2023/12/19	Surface layer	1.5	Gamma ray nuclides	Below lower limit of detection in all gamma ray nuclides
E-S15	2023/12/19	Surface layer	1.5	Gamma ray nuclides	Below lower limit of detection in all gamma ray nuclides

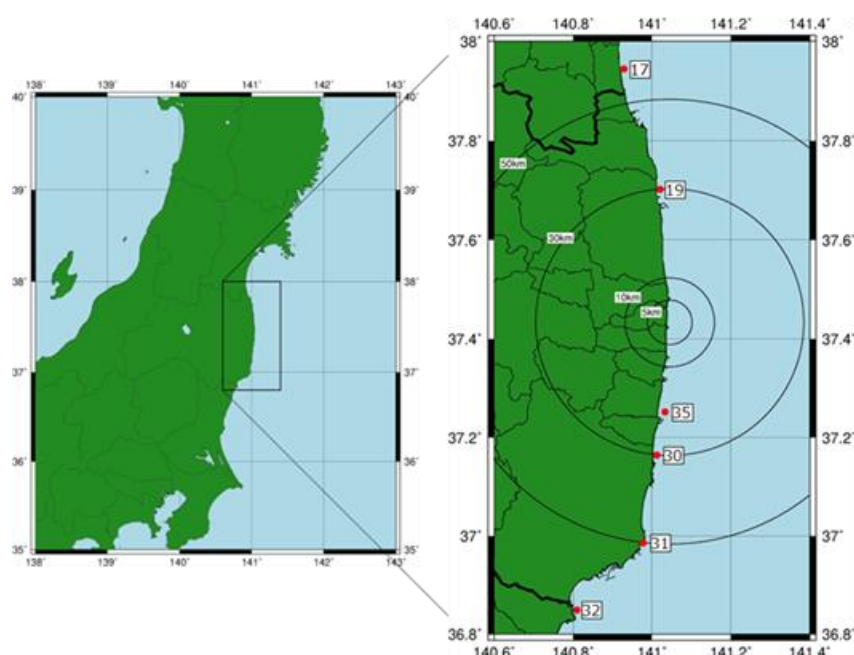
*Lower limit of detection is set in a condition of target lower limit of detection to be 1 Bq/L for cesium 137.



*Numbers in the map show sampling points this time, and “E-S” is omitted from labels in the map (e.g., E-S3 is marked as 3)

*Tritium analysis that prioritizes rapidness is planned at 11 sampling points every time, and sampling points this time are plotted in the map. 11 sampling points are subject to rotation every time so may include some different sampling points next time. Last time, sampling at 2 sampling points (E-S31 and E-S35) was canceled due to sea conditions, and so this time sampling was performed at 13 points including them.

Fig. 1: Sampling points within 5 km of ALPS treated water discharge outlet



*Numbers in the map show sampling points this time, and “E-S” is omitted from labels in the map (e.g., E-S17 is marked as 17)

*Tritium analysis that prioritizes rapidness is planned at 11 sampling points every time, and

sampling points this time are plotted in the map. 11 sampling points are subject to rotation every time so may include some different sampling points next time. Last time, sampling at 2 sampling points (E-S31 and E-S35) was canceled due to sea conditions, and so this time sampling was performed at 13 points including them.

Fig. 2: Sampling points beyond 5 km of ALPS treated water discharge outlet