

<ALPS-Treated Water>

Updated Data for Storage Amounts broken down by  
the Sum of Ratios for Concentrations Required by Law

August 27, 2020



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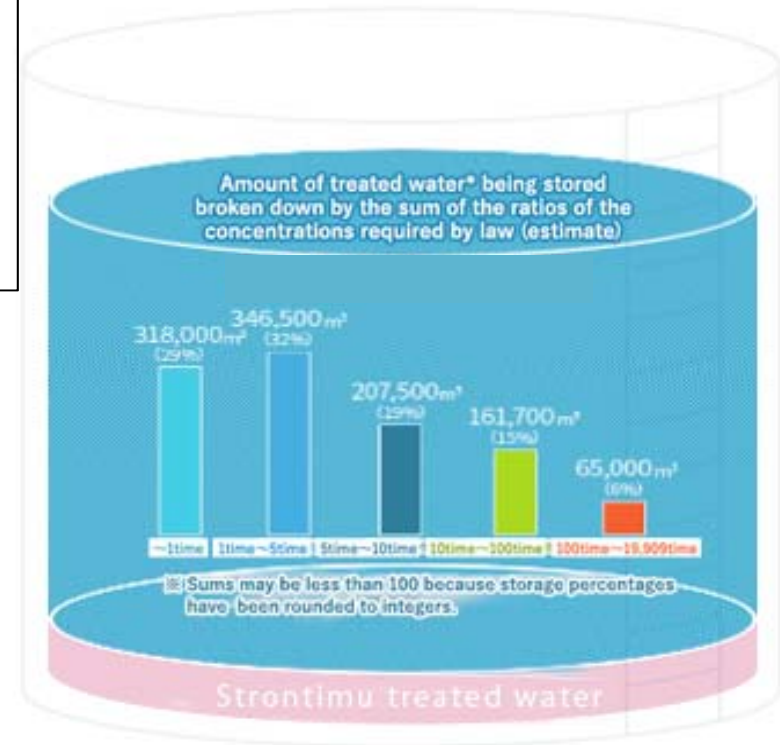
Tokyo Electric Power Company Holdings, Inc.

# ALPS-treated water storage amounts broken down by the sum of ratios of concentrations required by law

- ALPS-treated water storage amounts broken down by the sum of ratios of concentrations required by law
  - ALPS-treated water storage amounts broken down by the sum of the ratios of concentrations required by law are currently posted along with the ratios of concentrations required by law that have been assessed from the results of sampling from the ALPS outlet.
  - New data for storage amounts broken down by the sum of ratios of concentrations required by law for tank groups that became full between April and June will be posted, and this will include repurposed tanks.

“Repurposed tanks” refers to,  
✓ Tanks previously used to store Strontium-treated water (Sr-treated water) that have been cleaned and are currently being used to store ALPS-treated water.  
✓ Rises in the ratios of concentrations required by law for ALPS-treated water put in these tanks have been seen as a result of sludge that remains inside the tanks.  
(Already reported on during the meeting of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment )

- Repurposed tanks will be noted separate from other tank groups due to the large deviation that has been found between the sum of ratios of concentrations required by law from ALPS outlet assessments and the sum of concentrations required by law calculated from the results of tank sampling.
- In conjunction with this, the contribution from Carbon-14(C-14), which is the cause of the deviation between gross beta values and primary nuclide measurement values, as we reported at meetings of the Commission on Supervision and Evaluation of the Specified Nuclear Facilities, will be shown in the graph for storage amounts broken down by the sum of the ratios of concentrations required by law.



Storage amounts broken down by the sum of the ratios of concentrations required by law (as of the end March, 2020)

# Ratios of concentrations required by law for ALPS-treated water stored in repurposed tanks



- Ratios of concentrations required by law for ALPS-treated water stored in repurposed tanks
  - After repurposed tanks were filled with ALPS-treated water, a rise in the sum of the ratios of concentrations required by law was seen due to the presence of radioactive substances in sludge, etc. that still remained in the tanks after they were cleaned.
  - As a result, repurposed tanks will be noted separate from other tank groups due to the large deviation that has been found between the sum of ratios of concentrations required by law from ALPS outlet assessments (current assessment of storage amounts broken down by the sum of ratios of concentrations required by law) and of the sum of concentrations required by law calculated from the results of tank sampling.

2. Results of tank water analysis from the G3-H and K2-B tank groups

Excerpt from materials presented during the secretariat meeting of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment (July 2020)

	G3-H group (approx. 6400m <sup>3</sup> )	K2-B group (approx. 6200m <sup>3</sup> )
Sum of the ratios of the concentrations required by law for tank water when Sr-treated water was being stored <sup>※1</sup>	2914.41	Not measured. Results for the K2-D group which has a similar storage history was 6349.11
Sum of the ratios of the concentrations required by law from existing ALPS outlet <sup>※2</sup>	0.05	0.05
Sum of the ratios of the concentrations required by law for tank water after filling the tanks with treated water from existing ALPS equipment <sup>※3</sup>	G3-H1 tank : 8.87 G3-H4 tank : 113.24	K2-B1 tank : 2.31 K2-B6 tank : 1.07
Tank usage history	After the tank was built it was used to store RO concentrated brine. After the RO concentrated brine was drained, the tank was filled with treated water from SARRY and KURION (Sr-treated water)	After the tank was built it was used to store water treated with RO concentrated water treatment equipment <sup>※2</sup> (Sr-treated water)

※1 : Six nuclides: Cs-134/137, Sr-90, Co-60, Sb-125, Ru-106  
 ※2 : Seven nuclides: Cs-134/137, Sr-90, Co-60, Sb-125, Ru-106, I-129  
 ※3 : Equipment removing Cs and SR, etc. from RO concentrated brine

- The sum of the ratios of the concentrations required by law at the existing ALPS outlet is very low at 0.05 thereby showing that **existing ALPS is performing sufficiently**. Furthermore, risks are lower compared to when Sr-treated water was being stored.
- The sum of the ratios of the concentrations required by law for the G3-H and K2-B tank groups exceeds 1 to the impact of radioactive substances, such as sludge, etc., that were still present in the tank after it was washed.
  - The G3-H group has been used to store RO concentrated brine and it is assumed that the sum of the ratios of the concentrations required by law will be higher than that of the K2-B group as a result.
- **ALPS-treated water in the G3-H and K2-B tank groups** for which the sum of the ratios of the concentrations required by law exceeds 1 **shall be subjected to purification**.

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- Even though the sum of ratios of concentrations required by law was sufficiently decreased through ALPS treatment, a rise in this number was seen due to the impact of sludge, etc. that remained in the repurposed tanks when they were refilled.
- Large deviation between sums of ratios of concentrations required by law calculated from ALPS outlet assessments and tank sampling.

# The contribution of C-14

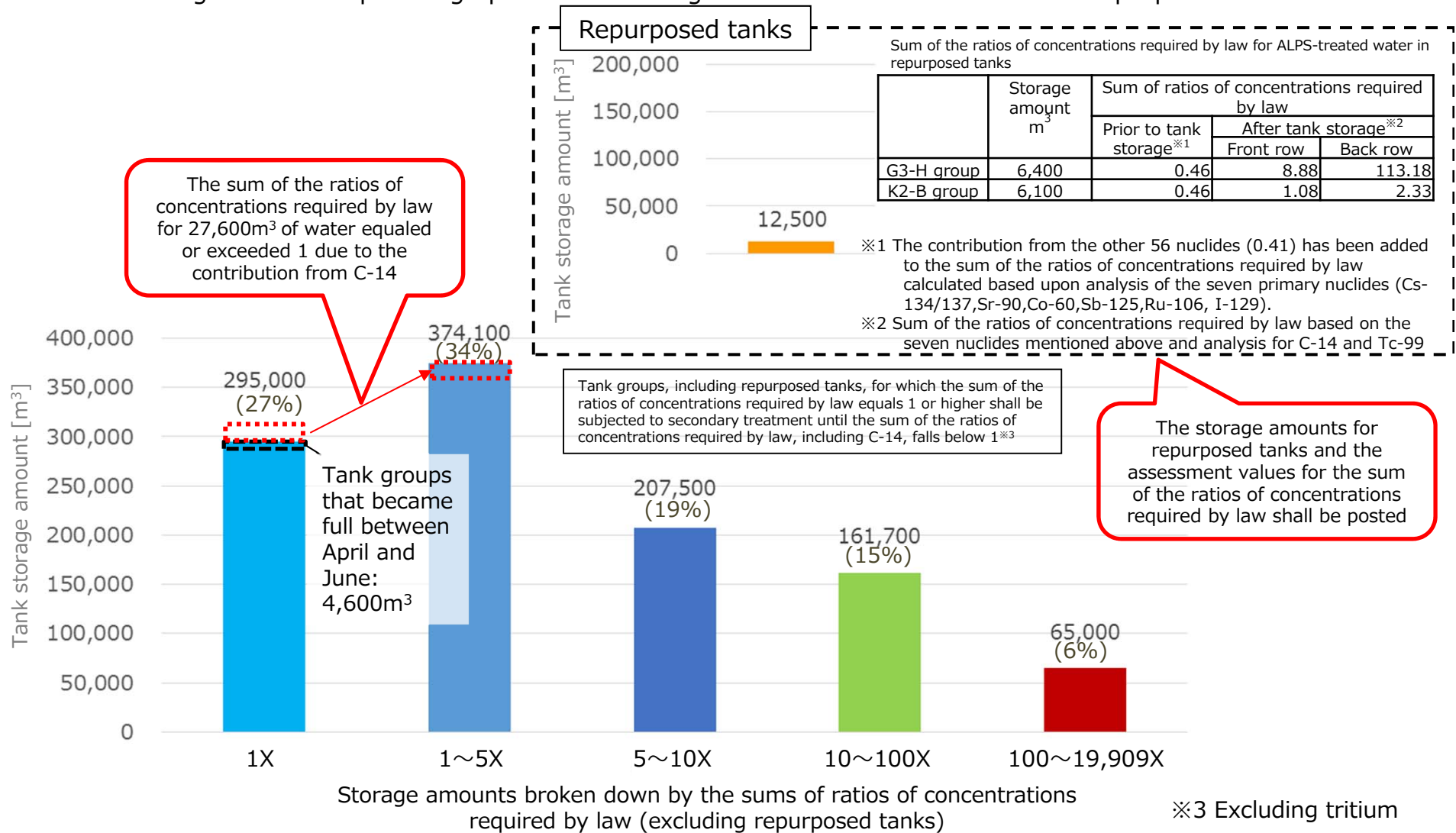
- We have confirmed that the cause of the deviation between gross beta values and values for the primary seven nuclides is Carbon-14 (C-14) and Technetium-99 (Tc-99) (Already reported on during the meetings of the Commission on Supervision and Evaluation of the Specified Nuclear Facilities)
- As a result of these findings, we have added C-14 and Tc-99 as analysis targets for ALPS-treated water tanks that have become full, and are conducting analyses (some tanks for which the sum of the ratios of concentrations required by law was less than 1 when they became full prior to the implementation of C-14 and Tc-99 analyses will be analyzed again with analysis also targeting C-14 and Tc-99 this time).
- C-14 is not a nuclide targeted for removal by ALPS and the contribution from C-14 is not currently indicated in graphs showing the storage amount broken down by the sums of the ratios of concentrations required by law. However, now that a substantial amount of analysis data has been accumulated, going forward, the concentration ratio of 0.11, which is the highest analysis result obtained to date, will be added to all tank groups in the graph as a conservative measure to account for the contribution of C-14.
  - ⇒Going forward, the total of required concentration ratios from analysis results for the primary seven nuclides (Cs-134/137, Sr-90, Co-60, Sb-125, Ru-106, I-129) calculated from sampling of the ALPS equipment outlet will be considered along with the contribution from 56 nuclides (0.41), which was arrived at by adding the contribution from C-14 (0.11) to the conservative estimate of the contribution of the other 55 nuclides (0.3) to the required concentration ratios.
  - Ratio of concentrations required by law for C-14 in ALPS-treated water tanks

Max	Min	Mean
<b>0.11</b>	0.0013	0.021

\* Analysis results from 80 tanks (as of the end of June 2020)  
Individual tank analysis results as of the end of March have already been posted, and results from April through June will be posted.

# Graph of storage amounts broken down by the sums of ratios of concentrations required by law after data has been updated

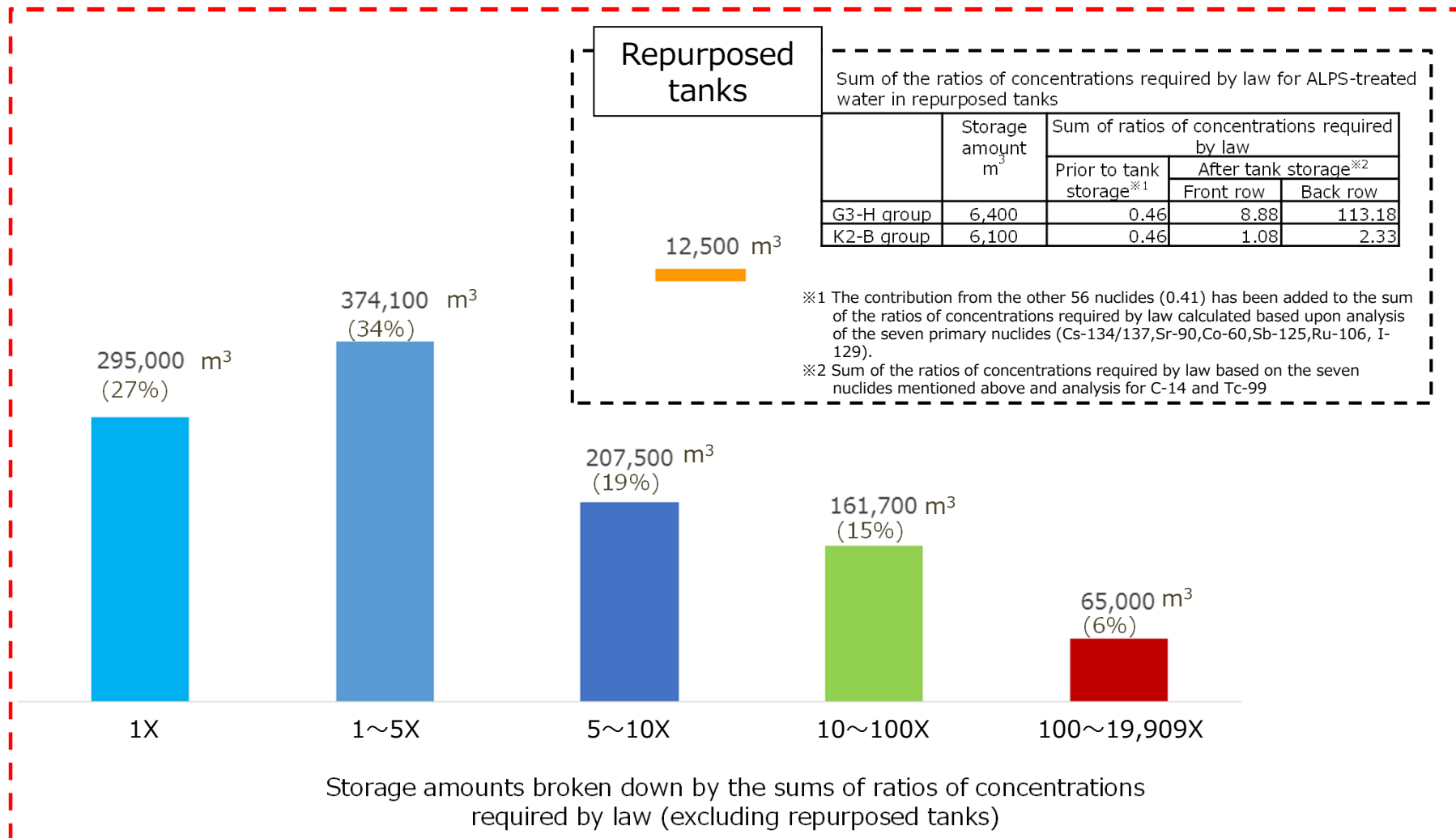
- Graph of storage amounts broken down by the sums of ratios of concentrations required by law after data has been updated
- The following shows the updated graph after reflecting the contribution from C-14 and repurposed tanks



\*The sum of the ratios of concentrations required by law after storage in repurposed tanks may be lower even when considering C-14 and Tc-99 since the number of digits after the decimal point of the analysis value used during assessment differs from that considered during the assessment mentioned on page 2.

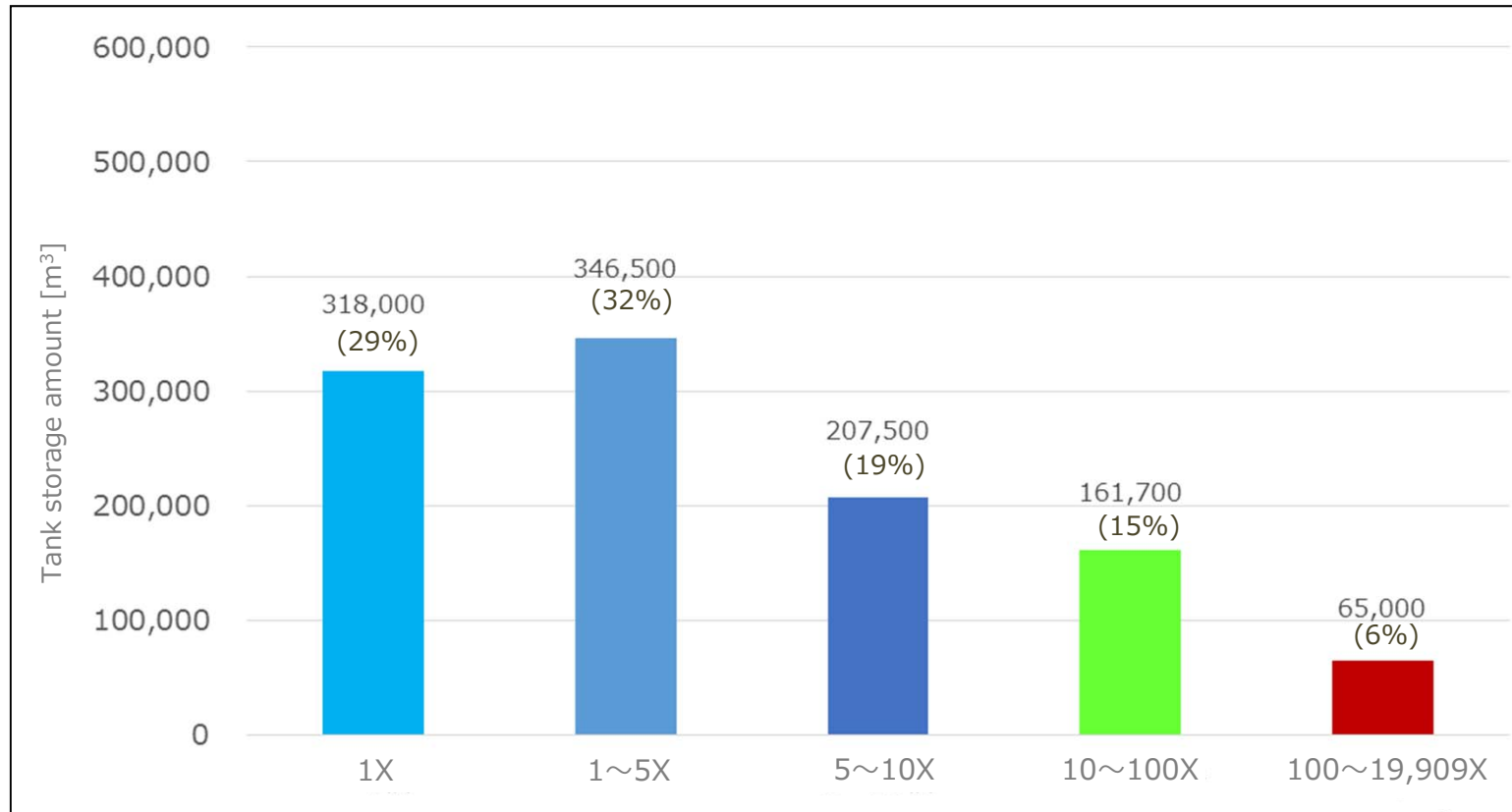
Graph of storage amounts broken down by the sum of ratios of concentrations required by law after data update (As to be shown)

Scope of data posted



\* The layout of data may differ

(Reference) Storage amounts broken down by the sum of the ratios of concentrations required by law as shown currently



\*Graph shows storage amounts for tank groups that are full as of the end of March 2020.