Primary assessment of proposals (Period 1) on technology for separating tritium from ALPS treated water, etc.

<Reference Material>
December 16, 2021
TEPCO Holdings
Fukushima Daiichi D&D Engineering Company

- Taking thorough action based upon the government's basic policy on the handling of ALPS treated water announced in April of this year, TEPCO has decided to continually keep a close eyes on new technological developments in tritium separation technology. The NineSigma Group (hereinafter referred to as, "NineSigma") has been selected as our third-party partner to ensure the transparency of investigations of these technological trends, and on May 27 of this year, NineSigma began accepting proposals on technology for separating tritium from ALPS treated water from parties both within and outside of Japan. <Already announced>

- We have received word from NineSigma that the primary assessment results of proposals received during period 1 of the public appeal (May 27~September 30) have been conveyed to the submitting parties.
  - ✓ Number of proposals submitted: 65※（From within Japan:42; From overseas: 23）
  - ✓ Number of proposals that passed the primary assessment: 11（From within Japan: 4; From overseas:7）
  - ➢ Proposals that did not pass NineSigma's primary assessment were not detailed and quantitative enough to determine whether or not they would be able to fulfill all technical requirements in the future (Refer to Page 3 for information on requirements).

※ Includes some proposals not related to technology

- None of the proposals that passed NineSigma's primary assessment are at the practical application stage as of this moment, however it has been deemed that they have the potential to fulfill all requirements needed to practically separate tritium from ALPS treated water, etc. in the future. Going forward, TEPCO will use the same assessment criteria to perform a secondary assessment of these proposals.

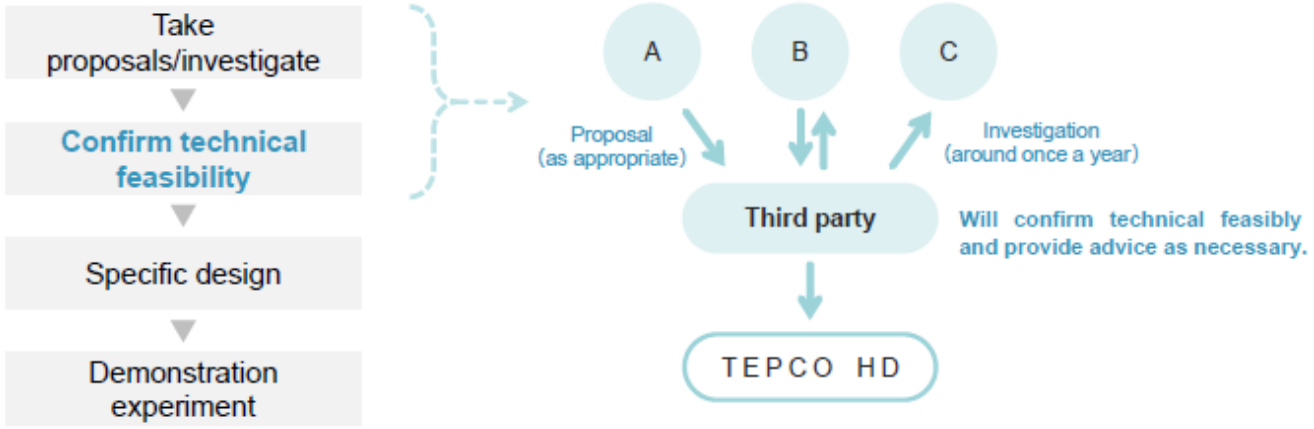
- After this second assessment, technical proposals that in the secondary assessment TEPCO has deemed to have the potential to fulfill all requirements in the future shall be examined in detail to identify and resolve issues pertaining to practical application, such as waste attributes and volume, and compliance with the Reactor Regulation Act, etc., after which development targets shall be set.

【Reference】Investigation Regarding Tritium Separation Technology

Review Status of Facilities to Secure Safety on the Handling of Water Treated with Multi-Nuclide Removal Equipment (August 25, 2021 Excerpts from documents)

We will continue to keep a close eye on new technological developments in tritium separation technology.

- In accordance with TEPCO's plan announced on April 16, we have devised a new model for eliciting proposals and promoting widescale research on tritium separation technology that employs the help of a third party in order to ensure transparency.
- NineSigma Holdings, Inc. has been selected as our third-party partner. On May 27, NineSigma posted links on its website that give details on the open call project and where to apply. This marks the commencement of our public appeal to Japan and the rest of the world for proposals and research related to tritium separation technology.
  Links： (Japanese) https://www.ninesigma.com/s/TEPCO-galleryJP
  (English) https://www.ninesigma.com/s/TEPCO-galleryEN
- Going forward, when technologies are proposed via NineSigma's website, NineSigma shall confirm/evaluate the details of such technology and provide advice as necessary. The results will then be examined by TEPCO, and if it turns out that the technology is able to be realistically applied to water purified with multi-nuclide removal equipment (ALPS treated water, etc.), detailed designs will be drawn up and verification tests of the technology conducted with the aim of establishing the technology.



【Reference】NineSigma's Primary Assessment Items

Review Status of Facilities to Secure Safety on the Handling of Water Treated with Multi-Nuclide Removal Equipment (August 25, 2021 Excerpts from documents)

- All of the following requirements need not be fulfilled at the time the proposal is submitted, but must be fulfilled at some point in the future.

＜Requirements＞

Separation/ measurement	All of the following requirements must be met: • The concentration of tritium after treatment must be less than 1/1,000 of that prior to treatment. （Technology that can reduce the concentration of tritium to 1/100 or less at present is anticipated, which was required in the government's Demonstration Project for Verification Tests of Tritium Separation Technologies) • The reliability of measurement of tritium concentration can be explained. • The material balance of tritium throughout the tests can clearly be indicated.
Treatment capacity	• There is a technical prospect that is able to be increased to target operating capacity levels (50~500 m^3/day)

＜ Recommended items ＞

Principle	It is recommended that one, or both, of the following conditions be fulfilled: • The principle of separation technology has been widely recognized at academic conferences, etc. • The principle of separation technology has been recognized by third parties, e.g., included in peer-reviewed papers.

- Regarding Technologies for which practical application has been deemed feasible by the primary and secondary assessments, nature and volume of waste generated, compliance with the Nuclear Reactor Regulation Law, and the size of the area required for equipment installation, etc. will be reviewed by TEPCO.