

The 26th N-20 Joint Statement

The group N-20, consisting of representatives and experts of the nuclear industry and research field of Japan and France, held its 26th meeting in Tokyo on December 4th, 2019. During the meeting, experts from both countries exchanged information and opinion on the following topics:

1. National nuclear Energy Policy
2. Light Water Reactor Fleet General Issues
3. Nuclear Technology Innovation
4. Fuel Cycle Issues
5. Dismantling and Decommissioning Issues
6. Fukushima Issues
7. R&D Projects

The participants discussed in depth about several issues based on the 7 topics above, and key points are highlighted as follows:

I/ National nuclear Energy Policy

- ✓ METI overviewed Strategic Energy Plans decided in 2018 and explained each energy policy such as the fast reactor development policy, the fuel cycle policy and so on.
- ✓ CEA overviewed French energy policy such as the Energy Mix, the energy transition act for climate plan and MEP. The closed fuel cycle policy is reaffirmed.
- ✓ CEA reviewed the 9th Meeting of the Japan-France Nuclear Cooperation Committee. In the Plenary session, both parties exchanged views on the nuclear energy policies, nuclear safety cooperation, and back-end of the fuel cycle in particular. An official proposal from France to Japan to join the JHR project, a new Material Testing Reactor (MTR) under construction in Cadarache, was also made.
- ✓ Japanese and French sides affirmed the importance of nuclear energy in both countries' energy mix to realize a decarbonized society.

II/ Light Water Reactor Fleet General Issues

- ✓ Safety and Economic Competitiveness are the essential pillars of nuclear energy. Framatome is supporting outage optimization and cost optimization programs.
- ✓ FEPC reviewed the current state of nuclear power in Japan, mentioning the licensed operating period extension system, nuclear industry collaboration to improve safety, and fuel cycle status.
- ✓ ATENA explained its purpose, role, activity policy, etc. It also introduced how to deal with common technical issues and dialogue with the regulatory authorities.

- ✓ Japanese and French sides believe that nuclear power will continue to play a role as a realistic option for power supply from the viewpoints of the environment and economy, while ensuring continued safety and price competitiveness. Both sides shared the view that it is important to make effective use of existing power plants in the long term while enhancing the safety.

III / Nuclear Technology Innovation

- ✓ The participants shared that nuclear power is an important energy source that is carbon free and provides security of supply. Toshiba, Hitachi-GE, MHI and EDF each presented extensively their technology developments in the nuclear reactor field, both in terms of (i) improvement of mid/large reactors and (ii) innovation in Small Modular Reactor (SMR) and Advanced Reactor domains. All four companies share that a design-to-cost approach is necessary to improve the competitiveness of nuclear and that reduction of actinides should be a sustained objective to improve further the acceptability of nuclear.
- ✓ The three Japanese industrial companies are promoting SMR and Advanced Reactor developments via METI's NEXIP program and cooperation with Japanese nuclear organizations. Such initiatives cover micro reactors, SMRs, fast reactors and high temperature gas reactors for power generation, heat generation or alternative use like hydrogen production.
- ✓ EDF's approach with the NUWARD PWR SMR seeks to address the 300-400 MWe aging coal power plant replacement market with a design derived from proven technologies and open to international cooperation. It was acknowledged that modularisation, series effect, simplification and standardisation are key success factors for SMR designs.
- ✓ While addressing the wide range of market needs through high power, mid-range and SMR is EDF's core focus, France and CEA continue to develop other innovative concepts to prepare the longer term future. Constructability, notably efficiency of civil works, remains a core concern for the Japanese technology designers as they develop new concepts.
- ✓ Overall the session highlighted how innovative, cost-conscious and sustainability-conscious the French and Japanese industrials are, with a strong focus on the next generation of nuclear power plants.

IV / Fuel Cycle Issues

- ✓ Orano explained the status of French fuel cycle and its benefits. It focused on strategic roadmap for closure of the fuel cycle from short-term to long-term.
- ✓ Orano first underlined the experience gained in used MOX fuel reprocessing in La Hague.
- ✓ Orano then insisted on the activities launched in France towards multirecycling in LWRs, and the related roadmap, and it stressed the potential such a multirecycling option could present for Japan in particular to stabilize plutonium and used fuel inventories. This approach could lead to new bilateral cooperation.
- ✓ Orano then presented the feedback of the conversion facilities, Malvesi & Philippe Coste Plants as a case study as regards to the importance of the cooperation between field engineering and operating

teams, provided that their respective responsibilities are clearly identified and respected. It also underlined its openness to bring the expertise built in this domain to help match potential Japanese needs.

- ✓ Then Orano presented in detail the major operation carried out at the La Hague Plant to replace the dissolver wheel, which demonstrate the ability to change even a major critical component in a highly active zone of a reprocessing plant.
- ✓ JNFL explained the overview of each of its plants and the preparation for completion and commercial operation of the Rokkasho Reprocessing Plant.
- ✓ Japanese and French sides reaffirmed their continued commitment to the closed fuel cycle policy and cooperation between the two countries.

V/ Dismantling and Decommissioning Issues

- ✓ The first statement has been made regarding the major link between D&D capability and public acceptance of future new build projects.
- ✓ Orano presented the past and ongoing D&D projects within Orano in the fuel cycle part and the related lessons learnt.
- ✓ JAEA gave an overview of the D&D activities and challenges in Japan, with a special focus on JAEA's Monju and Fugen reactors.
- ✓ EDF described its overall organization for D&D activities, with a focus on the Chooz A D&D project (first PWR to be decommissioned in France) and the perspectives for the rest of the French nuclear fleet. It particularly stressed the importance to take into account carefully waste management from the beginning of any D&D project (defining a "waste led decommissioning approach").
- ✓ Chubu EPC described the D&D project of Hamaoka 1&2 (BWR): main operations and also the challenges for waste treatment and management (recycling as much as possible but with the current constraints in Japan, and the ongoing approach for developing the necessary disposal facilities).
- ✓ Even if the situation of each country may be different (regulation framework, waste final repositories, waste treatment options), the conclusion of the session underlined the major impact of the waste management strategy on the D&D project performance and schedule.

VI/ Fukushima Issues

- ✓ Orano reviewed the experience in TMI fuel debris retrieval and explained NUHOMS system and the know-how on both fuel debris canister and dry storage.
- ✓ CEA emphasized similar issues with decommissioning of the reprocessing plant and so on. French entities have contributed to 1F decommissioning involving Dem&Melt In Can vitrification process and laser cutting of fuel debris, etc.
- ✓ TEPCO summarized the status of 1F D&D and some current issues. It will continue to proceed D&D, further with its D&D project and share timely information with the international society proactively.

- ✓ Orano's debris collection experience at TMI and CEA's and French industry partners' cooperation for 1F decommissioning can contribute to future decommissioning of the Fukushima Daiichi nuclear power plant.

VII/ R&D Projects

- ✓ CEA gave an overview of the JHR project (a new Material Testing Reactor (MTR) under construction at CEA-Cadarache steered and funded by an international consortium) and described the bilateral discussions that have started on the subject. In an international context characterized by the progressive shutting down of all MTRs, a Franco-Japanese seminar was organized last April and exchanges between CEA and Japanese actors were then held during these last few months and CEA has now invited Japan to join the JHR international consortium. For an improved appropriation by Japanese partners of the JHR experimental capacity to answer their specific R&D needs it was suggested to set dedicated Working Groups, on Fuel, Material and Technology that would produce a technical report for decision makers. A visit of FEPC to Cadarache is now in preparation with a target date at the end of February 2020 and this will be the opportunity to assess the progress of these actions. As a conclusion, it was confirmed as common view that JHR is important for worldwide nuclear development. And the importance to pursue a possibility of France-Japan cooperation was confirmed.
- ✓ JAEA and CEA explained the outline of ASTRID cooperation between France and Japan. Japanese and French sides have almost completed the six-year plan of the ASTRID program by Dec. 2019. Both sides underlined the very fruitful collaboration that led to numerous technical results and a strong relationship between the actors. From January 2020, a new CEA R&D program on FR and associated fuel cycle will start and both sides agree to continue to jointly develop Fast Neutron Reactor science and technologies.

VIII/ Conclusion

Both sides acknowledged that this 2019 edition of the N20 meeting was fruitful, and look forward to gathering again in 2020 in France, at a date to be mutually agreed.