

## The 25<sup>th</sup> N-20 Joint Statement

The group N-20, which consists of representatives and experts of the nuclear industry, research experts, and representatives of the government from Japan and France, held its 25<sup>th</sup> meeting in Paris, on November 23<sup>rd</sup>, 2018.

Opening the meeting, Mr. Jacq, CEA General Administrator and Chairman, formally welcomed the Japanese delegation in Paris. In his opening speech, he then underlined that this meeting was held in a particular and important context for both countries, with an ongoing process that will lead to an update of the orientations of the respective energy policies. He went on stressing out that both countries had a number of common concerns and similar approaches, explaining the importance of the bilateral ties, and that the existing convergence between the two countries' energy policies and the strong support that respective governments provide, particularly on the closed cycle issue, provide a privileged framework for collaborations. He recalled the extensive nature of the existing exchanges and such collaborations, in R&D and in preparation of industrial projects, including export projects. Finally, he underlined France openness to examine all possibilities to further develop the bilateral collaboration.

Mr. Takahashi, President of JAIF, in his own introductory speech underlined the importance of this dialogue between Japan and France. He then stressed out five major subjects which Japan is facing now :

- Japan's new strategic energy plan, in which the role of nuclear energy is reaffirmed, highlighting the importance of R&D, especially for the development of innovative reactors, as well as is highlighted the importance of working to build public trust.
- The importance of restarting the reactors of the Japanese fleet, and the importance of strengthening the safety of these reactors, in the post-Fukushima context. A new association, ATENA, has been set up to reinforce actions of entire nuclear industry on these issues while engaging in a continuing dialogue with regulator.
- The closed fuel cycle policy. Mr. Takahashi gave here details about the situation of RRP and JMOX facilities, the Plu-thermal program, the ongoing process aimed at updating the Japanese fast reactors strategy and the actions recently taken in Japan concerning disposal of high level radioactive waste.
- Fukushima, which remains an issue but on which major advances have already taken place. Mr. Takahashi also stressed the importance of international cooperation including France for the decommissioning of Fukushima Daiichi NPS.
- The subject of human resources development, on which Japan will strengthen the functions of the Japan Nuclear Human Resource Development Network by industry-government-academia collaboration.

In the Plenary session, the basic policy for nuclear energy in the energy mix of each country were then presented.

In the case of France, Mr Louis presented the general context of the French energy transition with the main objectives of the French energy policy, including the very strong ambition to achieve carbon neutrality by 2050. He then spoke about the new multi-annual energy plan (PPE), whose forthcoming publication will specify the path to achieve these objectives and will in particular set the time target to reduce to 50% the share of nuclear in the electricity production. From this global picture, Mr Louis then insisted on the commitment of France in the nuclear field. This commitment first shows through the reinforcement of the organization of the French actors, with the key roles of the Nuclear Strategic Committee (CSFN) and of the newly created GIFEN, set to unite the industrial actors. This commitment is also visible through the major projects that France is conducting, whether concerning reactors, the CIGEO geological disposal project or the research facilities that are essential to support industrial projects and the development of human resources. The major investments under way in France, on the EPR but also on the current fleet ("Grand Carénage" program) as well the strong involvement of France in several major export projects also underline this commitment to nuclear energy.

In the case of Japan, Mr Shimizu underlined that the strategic energy plan was revised in July 2018, the position of nuclear power remaining the same, seen as an important base-load power source, with a 20 to 22% share in the energy mix in 2030. 9 reactors have now restarted in Japan, of which 4 reactors are Plu-thermal reactors.

Due to the demand for global warming measures, the innovation in nuclear technology is a key solution in the world. Governments should provide a vision of nuclear R&D, and it is expected the private sector will lead nuclear innovation.

Following these presentations, a report of the 8<sup>th</sup> edition of the Japan-France Nuclear bilateral committee that was held on November 21<sup>st</sup> was made by Mr Jacq who stated that this meeting was particularly fruitful, held in the context recalled above. Mr Jacq highlighted that this meeting had been another occasion to underline the importance of nuclear in the energy policy of both countries and that it was the occasion to hear the reaffirmation by both states of the importance of the closed cycle policy. This meeting also stressed out that research and experimental facilities will be mandatory to pursue these policies and that cooperation on this topic, that already exists could nevertheless be strengthened. The importance of cooperation actions on decommissioning issues was also particularly noted during this meeting.

Parallel sessions were then organized, on various topics:

1. LWR Fleet General Issues / NPP Issues
2. New Build Projects
3. Fuel Cycle Issues

4. D&D issues
5. Fukushima Issues
6. R&D Projects

The key points that were highlighted during these sessions are as follows.

### **1/ LWR Fleet General Issues / NPP Issues**

In this session Chairman Minière first congratulated Japan for the restart of 9 NPPs. As to France, he stressed that no more reactor shut downs are expected at this stage in France before 2029 (Fessenheim not included) and that EDF is strongly involved in the current debate with the government regarding the preparation of the multiannual energy plan (PPE).

Mr Dutheil presented then the main features and guidelines of the EDF « Grand Carénage » program. This program encompasses 22 projects in three fields, exceptional maintenance (big components), sustained qualification after 40 years, and modifications. The key issue is global scheduling and strong anticipation. Each NPP operator has to integrate the « local scheduling » in the global one. This challenging program triggered also a strong cooperation between the design and the operating teams, from the very beginning and on the field during the operations themselves.

Mr Toyomatsu presented the new ATENA organisation, which gathers Japan utilities and manufacturers. It has been designed on the US NEI model and aims to be the industry interface with safety bodies.

Mr Hiroe presented the current situation of the fleet restart in Japan. 9 plants have been put back on the grid and 4 more will be restarted soon. The target for 2030 is 22% of nuclear electricity in the Japanese electricity mix. 37 plants have been allowed to be modified and could be possibly put in operation, therefore the 2030 target is achievable. The situation after this date is not yet clear because neither life extension, nor new plant construction issues have been yet addressed.

### **2/ New Build Projects**

In this session, chaired by Mr Yoshimura, Mr Just first proposed EDF's vision regarding new build (NB) projects, both for France and for export, underlining key points and common stakes with Japan in this field. Mr Just presented in details the major stakes for NB projects in France. The technical answer will be the optimization of the EPR, taking into account the experience of the construction in progress in Flamanville. Mr Just also gave a review of the different export projects involving EDF, either in progress or in preparation, underlining particularly the Jaïtapur project, a symbol of the possible collaborations between France and Japan.

Mr Yoshimura in turn proposed HITACHI-GE's vision on this subject, describing particularly the Horizon project, its perspectives, but also the key points it allows to identify for the future development of new nuclear projects. In this perspective the major point is to be able to operate

in a stable context, with the lowest possible risks, and namely with foreseeable electricity market conditions. To build on the experience accumulated on the first new build projects will also be crucial, and the collaboration between France and Japan will be essential in this domain.

The third presentation, given by Mr Kato, finally presented MHI's vision on NB projects, both for Japan and abroad. Nuclear has been confirmed as a key pillar of electricity production in Japan, this will require new constructions that will have to take into account the feedback of the Fukushima accident, and this is structuring for MHI's activities regarding NB. On the other hand, Mr Kato particularly stressed activities to further optimize the ATMEA-1 reactor to enhance the potential of this reactor for export markets, and the importance of the partnership with EDF on this reactor, that will be key to further strengthen its safety and improve its performances.

The open discussion that followed stressed finally that:

- NB projects are key to maintain nuclear industrial capabilities and human resources in countries like Japan and France,
- It will be essential to have stable framework if these new build projects are to develop and expand around the world,
- It will also be essential to take into account the feedback from the present new build projects, to optimize the following ones,
- And that collaboration between France and Japan will be essential in order to help further develop the corresponding market.

### **3/ Fuel Cycle Issues**

Chairman Dureau introduced the session recalling that this year was very important for both countries since the energy policy is under review. Both countries confirmed the choice of the closed fuel cycle strategy.

Mr Gay presented the current status of the Orano La Hague and Melox plants. Both plants are on strong maintenance and improvement programs. In La Hague, high activity big components are under replacement such as evaporator or even the dissolution wheel. In Melox, the main issue is the roadmap to go back to the initial capacity. Among others, the powder production process will be reverted to the wet process. The first batches will be produced in 2022.

Mr De Montagnac presented the current status of the cooperation in back-end. As to the MOX contracts, Kyushu and Shikoku Mox deliveries have been completed. Next delivery will be for Kansai Epc. As to the waste, high level waste return has been completed mid-2000, while intermediate level waste return remains to be done. Besides, important stakes contracts regarding Rokkashomura plants, both reprocessing and J Mox have been signed recently.

Mr Pays from EDF, presented the fuel cycle strategy currently developed between the different industrial players (Orano, EDF, CEA). This includes first recycling allowing natural uranium economy, and reduction of ultimate waste toxicity. Multirecycling in LWR will also be

considered, taking into account the delay of SFR deployment, this latter remaining the strategy for the long term.

Mr Sakai, from JNFL, presented the status of RRP and JMOX. Several examples of additional features and improvements required by NRA were described. The current schedule for the restart of RRP is 2021 and JMOX one year later. JNFL is aiming for the last approval of NRA, which will have to be followed by the local authorities green light.

Mr Kurata from CHUBU presented the dry storage facilities projects in Chubu. The unbalance between spent fuel production and reprocessing capacity leads to the need for such facilities. On site facilities and away from reactor facilities are under consideration. In both cases, a dual purpose, transportation and storage cask will be used.

#### **4/ D&D Issues**

In this session, chaired by Mr Granger, Mr Patout first described the D&D actions taken by Orano for the decommissioning of the UP2 400 plant. He presented in details the challenges that were identified, the main actions that were taken and the main lessons learned, and illustrated the technological innovations that were already developed for this deconstruction project.

Mrs Piketty then presented the D&D activities regarding CEA facilities, all different, that then require to proceed in an adapted manner, and for which important actions regarding waste retrieval have to be carried out. A special focus was then given on D&D for sodium-cooled fast reactors, Mrs Piketty presenting the French expertise in this field, that could serve Japan's potential interests and needs, and she insisted on the fact that active exchanges are already ongoing. The way France is dealing with soda was in particular noted as a subject of interest for Japan.

Mr Martelet then described EDF's overall organization for D&D activities, the perimeter of these activities, and their general objectives. He particularly stressed in this the importance to take into account the waste from the beginning of a D&D project (defining a "waste led approach"). Finally Mr Kodama gave an overview of the D&D activities and challenges in Japan, with a special focus on JAEA's Monju and Fugen reactors. He presented that personnel dispatch between Japan and France for Monju decommissioning will be started.

The conclusion of the session underlined the potential to share even more between Japan and France in this field of D&D.

#### **5/ Fukushima Issues**

This Session, chaired by Mr. Makino, provided 2 presentations, which were 'Fukushima Status & Issues' and 'French Contribution in the Framework of 1F D&D'.

Mr. Makino explained Fukushima status by use of topics on the current layout in Fukushima Daiichi NPS, the work environment, the water management, the spent fuel removal, the way to retrieve fuel debris, and the brief summary on 4th IAEA Review Mission. And, Ms. Piketty

proposed the application of French R&D results to Fukushima D&D, which was related to the remote control systems for decommissioning, the laser cutting, the way of vitrification process, the study on corium characterization, the project on decontamination of soils so-called 'DEMETERRES'. While her presentation, she pointed out that those technologies could be used for Fukushima D&D, because France has experiences and knowledge on decommissioning and decontamination. In addition, she introduced their engineering support for fuel debris retrieval operations, collaborations with Japanese universities/organizations, and participation to the expert groups in the international organizations, such as OECD/NEA and IAEA.

While Q&A session, some good discussions were held as follows;

- Regarding DEMETERRES project, it seemed that there was no experience to apply their technology for a large scale decontamination of soils. However, it was informed that DEMETERRES was likely to propose implementing another test at large area in EDF site.
- There was a question on how to deal with the treated water in near future. Mr. Makino said that TEPCO should consider an emotion from local residents because they were annoyed about worse reputation. Therefore, TEPCO needs to make best effort to decrease an effect of such reputation. Further to this, he mentioned it was needed that the government might lead TEPCO so as to adequately address how to deal with treated water.
- As for a visit to Fukushima Daiichi NPS by public people, the participant have a question on whether or not the public people started to visit there. Mr. Makino said that they could easily visit the site because the environment was being improved so as to enter the site without any special equipment. He, therefore, hopes they would like to visit the site. TEPCO will be pleased to accept a lot of visitors who are interested in Fukushima Daiichi NPS.

Thus, this session had the participants understand the status of Fukushima Daiichi NPS and French R&D projects on D&D, which could be applied to Fukushima Daiichi NPS. The objectives on this session have been achieved due to good presentations and fruitful discussions.

## **6/ R&D Projects**

In this session chaired by Mr Kodama, Mr Abonneau, from CEA, presented the Generation IV R&D programs in CEA. The Astrid program is related to the long term strategy of Plutonium management. The program is based on SPX and PHX feedback. It is carried out through a general arrangement with the French government which runs until 2019. It aims to gain data on materials and to test improvements and innovations such as core catcher, inspection in service, and low void effect core design to cope with coolant loss. 10 years of development have already been carried, with international and industrial partners, Japan being a major one.

The total power targeted initially is 600 MWe but a smaller design has been studied last year. The Astrid program covers several CEA facilities (hot labs and critical mockups) and JAEA facilities such as Athena. As to the future, within CEA a new hot lab « MOSAIC » is under preparation, and a specific facility for severe accident, PLINIUS 2 is under investigation. The JHR reactor will also be used for material studies.

Considering now that the possible industrial deployment of fast reactors in France is seen as much less urgent, the SFR development program is currently being adjusted, focusing on R&D and technological developments.

Mr Sagayama, from JAEA, presented the status of the cooperation of the two countries in this respect. Japan provides one active decay heat removal system and a magnetic passive shutdown safety system. JAEA reported about design collaboration on active decay heat removal system, passive shutdown system, seismic issues and various items such as above core structure, polar table, transient and thermal-hydraulic analysis and main vessel and core. The last item is related to the current discussion of the program re-orientation in which Japan would like to be involved. The present agreement goes until 2019. For after 2019 cooperation program, 12 working groups have been established, each of them on a key system such as safety design, core and fuel, etc. These groups detailed the current status of each of these programs, possibly towards a common design and the both sides basically agreed that the common design could fulfill both sides requirements.

The output of this comprehensive work should be a new cooperation program

In Japan, Joyo commissioning is now postponed, the restart is under consideration by 2023. In OARAI, JAEA operates the MELT and PLANDTL-2 facilities which are opened to international cooperation.

During the open discussion, the following topics were discussed namely:

- The current status regarding the multi-recycling in LWR R&D in France and the Japanese views on this subject,
- The importance of economy for the industrial development of fast reactor systems.

It was finally stated that Japan and France pursue the same policy regarding closed fuel cycle, and that they should then continue and enhance the two countries cooperation through the present research program on fast reactors.

### **Conclusions**

To conclude the meeting, Mr. Stohr, as Chairman, recalled the very strong existing convergences between the two countries, both regarding their global energy policy and the nuclear field, and in particular the closed fuel cycle policy. He stressed that this gives a very strong basis to share approaches and share information and experience feedback, in a mutually beneficial process. He finally emphasized a few important subjects that were stressed out during the meeting : skills, engineering, technologies, innovations, these either for

decommissioning, cycle back-end or Generation IV, operational capacities..., showing once again how deep and rich are the bilateral ties.

In the end both parties recognized that this 2018 edition of the N20 was fruitful, and allowed as usual frank and deep discussions about all the issues at hand for Japanese and French nuclear executives (both parties confirmed that the new N20 meeting organization implemented since 2017, with parallel sessions, is more efficient) and they look forward to gathering again in 2019 in Japan, at a date to be mutually agreed.