

November 4<sup>th</sup>, 2014

## **The 21<sup>st</sup> N-20 Joint Statement**

The group N-20, which consists of nuclear industries, research experts, and representatives of governments from Japan and France, held its 21<sup>st</sup> meeting in La Defense, AREVA, from November 3<sup>rd</sup> to 4<sup>th</sup>, 2014. During the two-day meeting, the experts from both countries exchanged information and opinions on the following topics:

1. National energy and nuclear policy
2. Current situation of the fleet
3. Fast Action Forces for quick response to nuclear accidents
4. Japan-France long term cooperation on fuel cycle
5. Japan-France long term cooperation on fast reactor system
6. Fukushima Daiichi site status
7. Back-end
8. Future of N20

Besides, a brief report of the fourth meeting of the Japan-France intergovernmental committee held in September was made. It was agreed to pursue the possibility of coordinating the schedule and the agenda of both meetings for next year in order to optimize the synergies between subjects and participants.

### **1. National energy and nuclear policy**

Both sides pointed out the main highlights of 2014.

In Japan, the acceptance by the Nuclear Regulation Authority of the Safety Reports for Sendai one and two nuclear power plants is a strong positive signal for Japan's NPPs restart program and the remaining steps for actual restart, both with NRA, and the local communities are actively under way. On the national level, nuclear energy is set to remain a strong contributor to base load electricity production. A committee was set within METI to elaborate the related action plan structured on 8 main stakes:

1. TEPCO and the Government need to complete the decommissioning of Fukushima Daiichi NPPs as soon as possible, even though it takes a long time, so that the evacuees can return to their homes
2. Decrease the dependency on nuclear power generation even if it is to remain a major contributor to the energy mix.
3. Pursue the world's highest safety standards, through continuous and voluntary safety improvement.
4. The Government and the industry must maintain the necessary human resources
5. Utilities must play a proactive role in the field of human resources and nuclear technologies.
6. The Government must take the leadership for the final disposal of high level waste without leaving the issue to future generations.
7. The Government and the utilities must regain public acceptance to convince local governments to restart or host nuclear facilities
8. Japan must share the lessons learnt from the Fukushima Accident with the international community while many developing countries are introducing/expanding nuclear power generation.

For France, the new bill on Energy transition was voted by the lower house of Parliament on October 14th. It is now under examination by the Senate. Six main objectives were set:

1. Reduce greenhouse emissions by 40% by 2030
2. Reduce consumption of fossil fuels by 30% by 2030
3. Increase renewable energy share to 23% by 2020 and 32 % by 2030
4. Cap the total installed nuclear capacity to the current level (63,2 GWe)
5. Decrease the share of Nuclear electricity from 75 % to 50% by 2025
6. Half overall energy consumption in 2050 compared to 2012 level

Six principles backbone the law

1. Control energy demand
2. Diversify the energy supply
3. Involve all stakeholders including the public
4. Ensure transparency
5. Develop research in the field of energy
6. Address transport and storage issues

The energy mix will be managed through a multi-annual energy plan (MEP) set up by the government and the law stipulates that EDF will have to set up a strategic plan consistent with this MEP. Nuclear energy will remain the main component of the French power generation mix. It will be the keystone to move from fossil energy to renewable energy.

The average age of the NPPs in France is around 30 years. Operating beyond 40 years is an important step under consideration, and one of the key points of the energy bill is to bring flexibility and visibility to manage this step smoothly and avoid cliff-side effects, although it concerns a large number of reactors in a short period of time.

Two important points not mentioned in the law must be pointed out:

- The closed cycle strategy is confirmed
- Innovation is needed and will be supported, especially in the field of 4<sup>th</sup> generation through the Astrid project.

In the field of safety, the nuclear safety authority was reinforced. In particular, it will gain additional power for monitoring and financial sanctions.

## **2. Current situation of the fleet**

Japan explained its new safety standards, such as “bunkerisation” of buildings and new measures against natural disasters. The restart roadmap was explained. After the NRA’s green light, a certain period of time is needed for the remaining steps with the local authorities. The establishment of “Nuclear Risk Research Center (NRRC)”, inside CRIEPI, was explained. This organization is set to be an important tool for risk assessment. In addition, the consequences of the new deregulation market in Japan create a very challenging landscape and the Japanese utilities are organising themselves to cope with this new situation.

France explained that shutting down all the NPPs after 40 years would require building 30 NPPs or their equivalent between 2020 and 2035, which is not feasible. Therefore life extension beyond 40 years, along with safety improvements, is a matter of utmost importance for EDF. The safety standards for this lifetime extension will be upgraded.

Six 900 MWe plants have formally completed the process leading to regulatory prescriptions for operation beyond 30 years.

Ageing management calls for maintenance and component replacement. Only two components cannot be

replaced, the vessel, and the containment building, and their ability to reach 60 years must be assessed. The 900 MWe plants have received a generic approval for operation beyond 30 years. The remaining fleet is under examination. EdF is optimistic for a positive response for operation beyond 30 years.

As for safety standards, current plants comply with the WENRA reference levels, whereas lifetime extended plants will have to comply with the European safety directives of 2014. The definition of the related modifications is underway by EdF.

Besides EdF is deploying an extensive set of measures for the fleet upgrade program, which is currently being overseen by the EdF top level management.

As to D&D issues, Japan explained that 7 NPPs were close to 40 years. In Fukushima, 6 plants must be decommissioned. Currently 9 plants are under decommissioning. The new law of Japan requests that after 40 years' lifetime, only one new authorization is possible for 20 more years, which creates a far more binding system than the former one, especially in terms of capital investment. This, along with the new deregulated framework, increases the financial risk for the utilities.

As regards to the D&D budget, a special fund was established in 1989, but it was designed for at least 40 years' lifetime. The new regulation increases the capital demand since plants less than 40 years old are to be decommissioned and a new system has to be designed, the main guidelines of this new system were explained.

In addition, the uncertainties related to the final destinations and disposal costs of the waste coming from D&D increase the risk. This issue is currently being addressed by NRA.

AREVA explained how D&D activities were managed in La Hague along with operating activities. Altogether, 2000 staff is involved in D&D activities throughout the world, in mining sites, front end facilities, fuel fabrication facilities, reactors, and La Hague. In La Hague the key point is the strong interaction between old workshops under D&D, and the ones used for the rest of the plant operation.

In la Hague, whereas UP2-800 and UP 3 are under operation, UP2-400 is under decommissioning. Old waste stored in silos is under retrieval for a total budget of 4 bn €. Some facilities are used both for D&D and operation, such as vitrification, cementation, or effluent decontamination. This sharing has benefits in terms of cost, storage mutualisation, human resources, etc. The experience feedback AREVA at La Hague is that, even if plant operation and D&D activities are dealt with by different organisations, the synergies between both activities lead to a very effective plant management. AREVA is ready to share this experience.

### **3. Fast action forces**

EdF presented the “FARN<sup>1</sup>” established in EdF after the Fukushima accident. The context, organisation, and intervention methods of this special task force were explained. The existence of the FARN is now a binding request by the French safety regulator (ASN). It involves 30 people at the national level and 70 people on each of the 5 regional centers. More than 300 people can be engaged at any time and can arrive on site within 12 hours and be fully effective within 24 hours. The staff consists only of EdF employees. The main objectives are to prevent radionuclides release and core melting.

AREVA presented the “SAFER” initiative, which AREVA established in US. SAFER was designed to be consistent with the US national “FLEX” organization, which was set up as a response to abnormal external hazards.

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<sup>1</sup> French Acronym for Fast Nuclear Action Force (Force d'Action Rapide Nucléaire).

SAFER was created by AREVA and a US company, PEICo, and addresses the phase III of the FLEX program.

AREVA's organisation in France for crisis management, the FINA<sup>2</sup> organisation, was explained. It applies to the 3 French sites La Hague, Melox, FBFC at Romans, and to transportation. FINA aims to bring the necessary means to the site within 48 hours, and thus allow the local team to be concentrated on site stabilization and recovery. The total staff involved will be 1000 in 2017 (190 for now).

The Japanese utilities' common support framework in this field was presented. The Japan-Nuclear Emergency Assistance Center was established by the Federation of Electric Power Companies of Japan. Its mission is to send specific human and material means, and to coordinate their utilisation. For support requested by the operator struck by the disaster, logistic support such as activities to support evacuation of residents (off-site activities) are provided based on the Agreement on Cooperation among Nuclear Operators. Currently it involves 300 people.

***It was agreed that each side would send observers to drills and exercises of the other side's organisation to share experience and improve efficiency on each side.***

#### **4. Japan-France long term cooperation on fuel cycle**

AREVA summarized the French experience related to the closed cycle and recalled that it already saved 19000 tons of spent fuel storage, and 25500 tons of natural uranium ore. The new projects for the future are:

- The new TCP facility with new shearing and dissolution
- Contribution of AREVA to the progress of studies on Fast Neutron Reactor fleets and symbiotic fleets.

JNFL explained the output of the hot test campaign in Rokkashomura which led to mixed oxide of ~6t of heavy metal produced from about 425 tons of spent fuel. The situation of the current licensing process for restart with NRA was detailed. The current JNFL target for obtaining the operating license is now set for March 2016. The NRA's new requirements for the RRP were detailed, as well as JNFL's technical response. The main remaining issue lies in the Design Basis Ground Motion. The 2014 application to NRA is 600 gal (initial design was 375 gal). The MOX fabrication plant (JMOX) construction status was also presented. Commercial operation is now foreseen in 2017.

***JNFL asked the French side for support for definition of the safety target of the Rokkashomura facilities. AREVA and CEA accepted this request.***

Lastly JAEA presented the R&D on the nuclear fuel cycle performed in Japan. In the future the Tokai Reprocessing Plant main part will be decommissioned whereas the vitrification part (TVF) will be refurbished. The key strategy in the mid-term plan is related to the closed cycle development and also to the challenge of developing innovative MA partitioning and transmutation systems.

***As for the development of pyro chemistry and metallic fuel under development in Japan, CEA proposed to organise an exchange of views on these technologies.***

As for Fukushima, JAEA mentioned the joint program with CEA regarding the MCCI characterization, and lastly it must be pointed out that a hotlab is to be built in Fukushima, along with a facility dedicated to robotic technology development

## **5. Japan-France long term cooperation on fast reactor systems**

France presented a perspective about the different steps of the fuel cycle development with symbiotic fleets (LWR and FNR reactors). It foresees four main steps categorised according to plutonium management and FNR introduction, with a realistic increase of the FNR's share, the driving factor being plutonium recycling enhancement, from mono-recycling in LWRs (current stage), then MOX first recycling in FNRs, and then Plutonium multirecycling management in FNRs and possibly LWRs. These industrial scenario studies are made jointly by EdF, AREVA and CEA. The first report will be published next year. In the longer term, minor actinides management could also bring a better use of the disposal facility through, for instance, the decrease of the thermal footprint.

Consistently with this strategy, France implements the ASTRID project, a G-IV sodium cooled technological demonstrator prototype. Its status, both for the reactor design steps, related fuel cycle development, and the related R&D were presented, especially the innovation in the safety field and the current schedule, which sets the start up around 2025. The current organisation involves 650 staff from different companies in different countries.

An important cooperation with Japan was agreed in 2014, which paves the way for Japan to be a major partner in this project. Japan recalled the agreements in detail which were signed in 2014. Three design topics and 29 R&D task sheets have been agreed, and this first core allows Japan to become the major foreign partner of Astrid and a specific governance team has been set up to manage the cooperation, both on the governmental level, and the operational one. Both sides expressed a strong positive appreciation of this cooperation and stated that the extension of the cooperation, which is now designed until 2019, should be discussed starting from the second half of the basic design (2017-2018).

Lastly Monju and Joyo status was explained. The restart timing of Monju and Joyo will depend on the discussion with NRA of new safety design criteria for SFR. For both issues, Japan proposes to increase the relationship with the French counterpart.

## **6. Fukushima Daiichi status**

The current status of the Fukushima Daiichi site was presented in detail. The situation is now under control and the radioactivity release has dramatically decreased both in air and in the sea. The average dose for workers on site is also under control (half the regulation limit of 100msv/5years).

The flowsheet of contaminated cooling water treatment system was explained. 720 m<sup>3</sup> are to be treated every day. It is very important to eliminate the 400 m<sup>3</sup>/day which come from groundwater and important emergency measures have been taken.

The current status of fuel debris removal was also explained. It was stressed that international cooperation is welcome.

It must also be noted that TEPCO makes dedicated efforts to disclose any information related to the status of Fukushima Daiichi, and considers transparency as a matter of utmost importance.

The French side expressed the strong commitment of French industrial companies and CEA to support Fukushima decommissioning activities. The different contributions of France are made through TEPCO or in answer to IRID RFI and METI RFP. The awarded contracts are a good start to involve French companies but the potential of French support is much higher and they are ready to increase their participation. The establishment of a new JV, ANADEC, dedicated to Fukushima, was presented.

## **7. Back-end**

ANDRA presented the status of the CIGEO project. It concerns the geological disposal of waste which cannot be disposed of in surface disposal facilities. It followed a long research period that started with the law enacted in 1991. The underground laboratory in Bure (north-east of France) was selected through a call for voluntary application, and the disposal location was confirmed, according to the result of the research activities and the consent of local communities, in the same area. The roadmap was set up by the law enacted in 2006. In particular this law requests that the application license must be reviewed in 2015. The concept was also explained.

The main figures of the public debate were detailed. It was mainly held over the web instead of actual meetings, because radical opponents blocked them. This allowed however to reach a greater number of people.

The start of the construction is foreseen in 2020 for the commissioning of the industrial pilot phase in 2025.

ANDRA is willing to share its experience with foreign partners.

The status of the geological disposal project in Japan, which started in 1976, was explained. To achieve this project, NUMO was created by law in 2000. Two underground laboratories were launched in 2002 and 2003, in Horonobe and Mizunami. The site selection process was launched in 2002. It started with a call for voluntary applications but without success. The process was reviewed and will start with scientific selection, discussion with the public, and then a decision. A first report was released in spring 2014, it detailed the main guidelines for site selection and set the general roadmap toward the implementation of the process but the schedule remains to be defined precisely.

It must be pointed out that in both France and Japan, reversibility is requested by law.

## **8. Future of N-20**

It is proposed that from next year the Intergovernmental meeting and the N20 should be organized at the same time. A common meeting could be organized in addition to the two meetings but it is important to avoid the creation of a new structure.

To smooth the process, it is important

- To decide the date and the agenda with enough notice,
- To decide the topics to be addressed in the common meeting
- To decide the scheme of the coordination between the two meetings

The topics to be addressed could be organized around

- Public policies and their consequences
- Projects and identification of potential synergies
- Innovation
- Sharing of experience related to Fast Action Forces
- Standards and their evolution (for example safety regulation)  
For this topic, the attendances of the safety body are to be discussed.