
Activities of ATENA

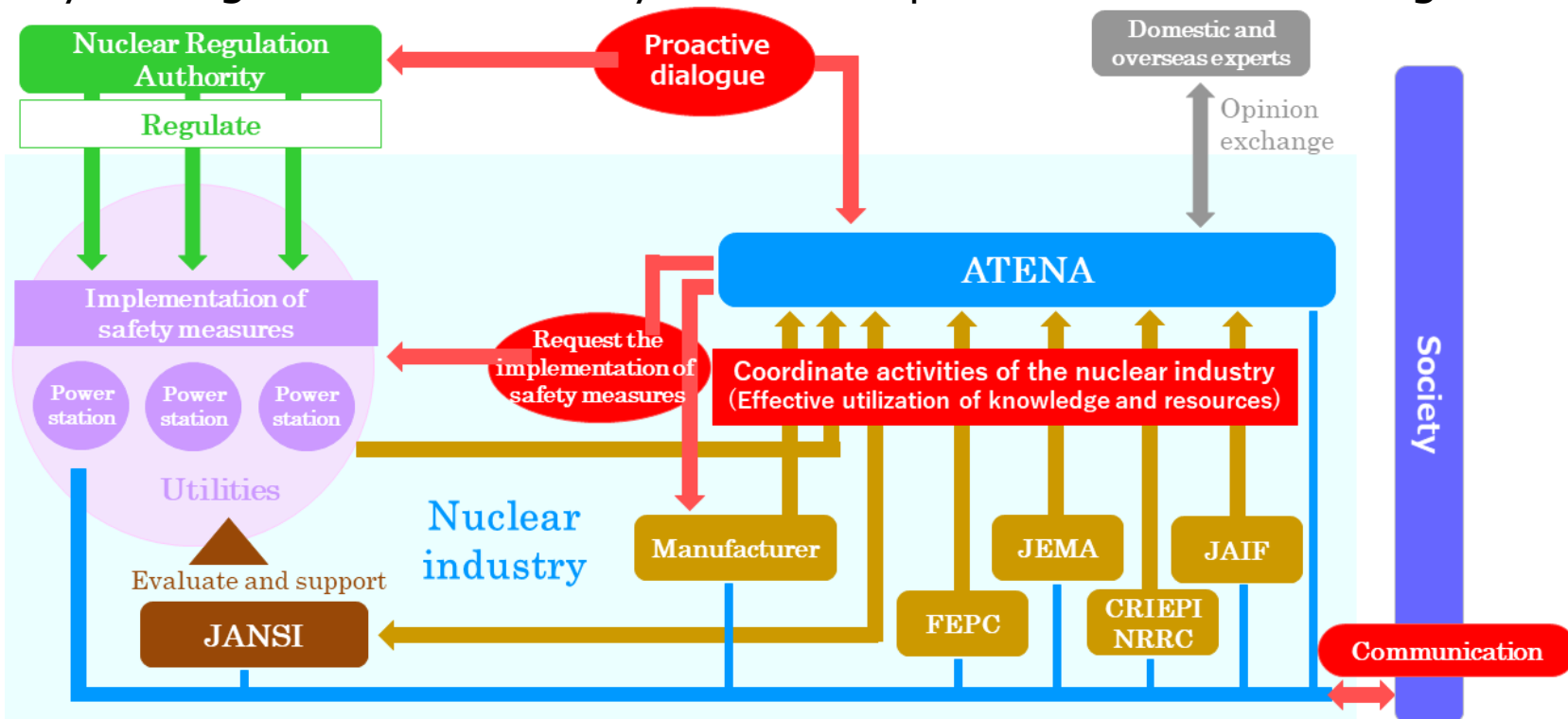
February, 2022
Atomic Energy Association
(ATENA)

Role of ATENA in the nuclear industry

[Mission]

ATENA addresses common technical issues related to nuclear safety, makes decisions on introducing voluntary and effective safety measures while effectively utilizing the knowledge and resources of the entire nuclear industry, and encourages utilities to implement these measures to actual site operations, thereby raising the level of safety at nuclear power stations even higher.

[Role]

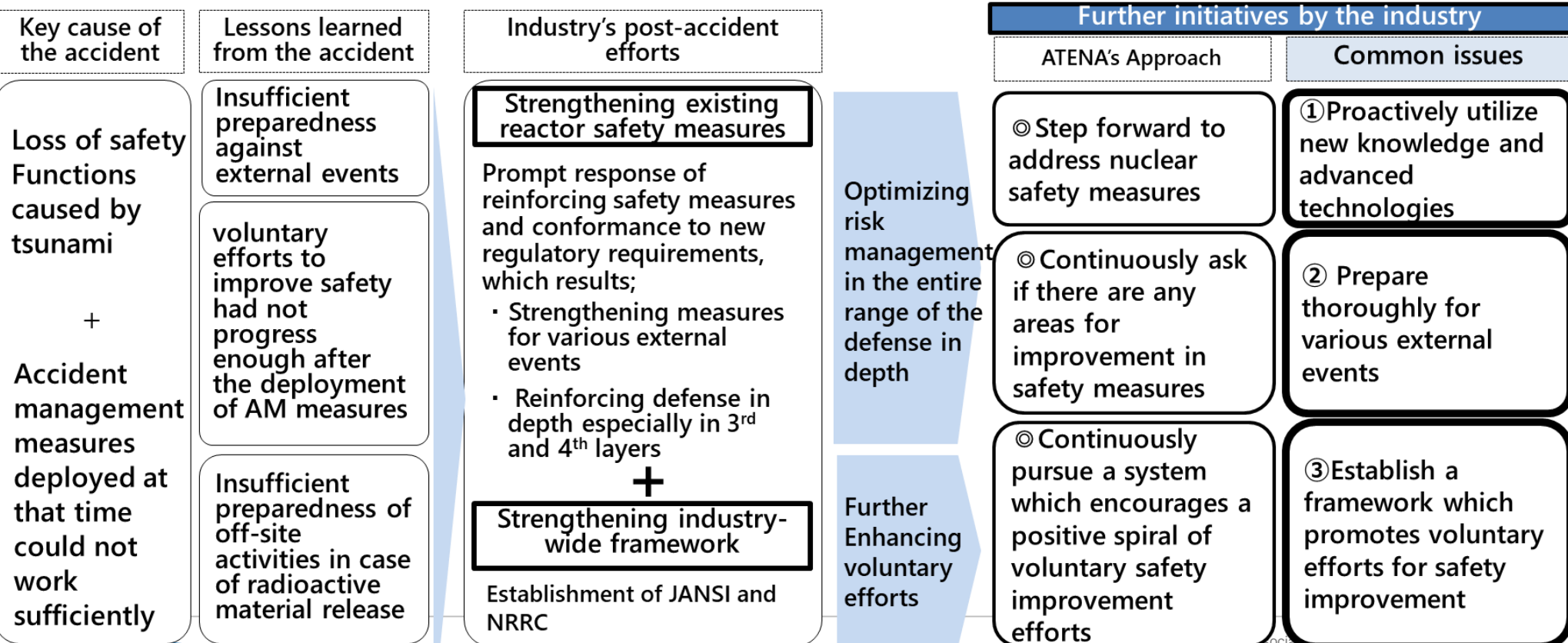


JANSI: Japan Nuclear Safety Institute, FEPC: Federation of Electric Power Companies of Japan, JEMA: The Japan Electrical Manufacturers' Association, CRIEPI: Central Research Institute of Electric Power Industry, NRRC: Nuclear Risk Research Center, JAIF: Japan Atomic Industrial Forum, Inc.

ATENA's approach to common technical issues

ATENA is to address the following common issues based on lessons learned from the Fukushima Daiichi Accident and subsequent efforts for safety improvement by utilities.

As of January 2022, ATENA identifies 20 issues as prioritized themes and is going to review them in technical perspective.



List of common technical issues (themes) (as of January 2021)

- ATENA selects the prioritized common issues expected to improve the safety at nuclear power stations effectively, and addresses to issues raised by the regulatory authority as required.

Technical issue	Theme
① Proactively utilize new knowledge and advanced technologies	Develop a new guideline for Cyber security
	Develop a new guideline to adopt measures for common cause failures in digital safety protection system
	Pursue efficient and effective operation with appropriate consideration of importance classification of SA equipment
	Establishment of improvement measure for "Open Phase Condition"
	Establishment of proper management of electromagnetic compatibility (EMC) related to the instrumentation and control system
	Propose back-fit processes with appropriate consideration of safety significance
	Develop the advanced methodology of soil liquefaction assessment
	Response to the findings from the investigation and analysis of the TEPCO's Fukushima Daiichi Nuclear Power Station Accident
② Prepare thoroughly for various external events	【Completed】 Review of the methodology to assess "design basis ground motion formulated without specifying seismic sources"
	Establish evaluation method to ensure conformance of base isolated buildings housing SA equipment to technical standards
	Establish optimized approach to natural events with significant uncertainty
	Establish reasonable treatment process when updating design basis ground motion (Ss) through new knowledge
③ Establish a framework which promotes voluntary efforts for safety improvement	Develop industry's guide documents for specific procedure to fulfill the NRA's inspection reform
	Establish guideline for responding to incompatibility of manufacturers' or component suppliers' product
	Initiative of aging management for safe long-term operation
	Propose incentive mechanism to enhance licensees' voluntary efforts of improving nuclear safety
	Propose more efficient procedures of operation and maintenance of equipment newly installed to conform new regulatory requirement
④ Others	Establishment of further improvement measures for Emergency Diesel Generators(EDG) reliability by analyzing operating experience
	Review and improve the current scheme of "Emergency Action Level"
	Further Investigation Related to the Intergranular Cracking on Stainless Steel Piping of PWR Primary System
	Cooperation to NRA's initiative of continuously improving the regulatory standards by reflecting review experience

Published technical reports

- ATENA compiles and publishes safety measures related to common technical issues (themes) as technical reports.

FY 2019		Publication date
○Improvement Measures Proposed by Assessing Trends in Emergency Diesel Generator Malfunctions in Domestic Nuclear Power Plants		(June 21, 2019) [Rev. 1, November 7, 2019]
○Guideline Regarding Performance Indicators (PI) Used in Nuclear Regulatory Inspections		(June 28, 2019)
○Voluntary Guide on Introducing Cybersecurity Measures at Nuclear Power Plants		(March 12, 2020)

FY 2020		Publication date
○Guideline on the implementation of Licensee Inspections		(July 31, 2020)
○Maintenance Guideline for Long-term Plant Shutdown		(September 25, 2020)
○Guideline on Assessing Design Obsolescence		(September 25, 2020)
○Discontinued Product Management Guideline		(September 25, 2020)
○Design Guideline for the Base-Isolated Buildings Housing Severe Accident Equipment		(September 29, 2020)
○Guideline for Deterrence and Adequate Response to Fraudulent Activity by Manufacturer/Component Supplier		(October 28, 2020)
○Technical Requirements for Mitigation Measures of Software Common Cause Failures of Digital Safety Protection System		(December 24, 2020)

To be published	
○Report on the advancement of liquefaction evaluation methods (temporary name)	
○Report of knowledge build-up related to aging for safe long-term operation (temporary name)	
○Position Paper Related to the electromagnetic compatibility (temporary name)	

Activities in FY 2021

① Efforts for solving the common technical issues ➡ 7 ~ 11

- ATENA shall address the common technical issues such as utilization of latest knowledge and technology and review them with its expertise in order to achieve the effective safety improvement in NPPs. The result of the review shall be assembled and published as technical reports if necessary.
- ATENA shall formulate effective safety measures independently of varied interests among utilities and require utilities to incorporate them into their actual activities even in case there are some utilities who do not agree on the measures. ATENA shall also check and publish the status of utilities' implementation.

② Proactive dialogue with NRA ➡ 12

- ATENA shall be a responsible body to handle regulatory issues common to utilities.
- ATENA shall engage in dialogue with NRA as a representative of the industry.

③ Communication with various stakeholders ➡ 13

- ATENA shall release information on its activities to the public and incorporate feedback from the public to improve its activities.

Priority Initiatives to Improve Safety

Considering the current situation and various discussions being held in Japan and abroad, the following three areas are being addressed as **priority initiatives which effectively improve the nuclear safety.**

① Proper implementation of new digital technology

- As digital technology develops in general industries and is adopted widely by society, existing nuclear power plants have also been implementing digital technology in safety significant systems. In response, **the industry is commonly tackling new challenges such as cyberattacks and electromagnetic compatibility.**

② Continuous efforts against natural events

- Robust safety measures with sufficient conservativeness have been implemented in each site in response to the new regulatory requirements. Even in such situations, as natural events have general characteristics of accompanying significant uncertainty, ATENA leads utilities' efforts of increasing safety **beyond the regulatory requirement framework** taking into account the lessons learned in the Fukushima Daiichi Accident.

③ Aging degradation management for safe long-term operation

- ATENA leads utilities' efforts of working on **aging degradation management, as a challenge shared across the industry, so as to assure the safe, long-term operation of existing reactors after their restart of operation in conformance with the new regulatory requirements.**

Proper implementation of new digital technology (EMC)

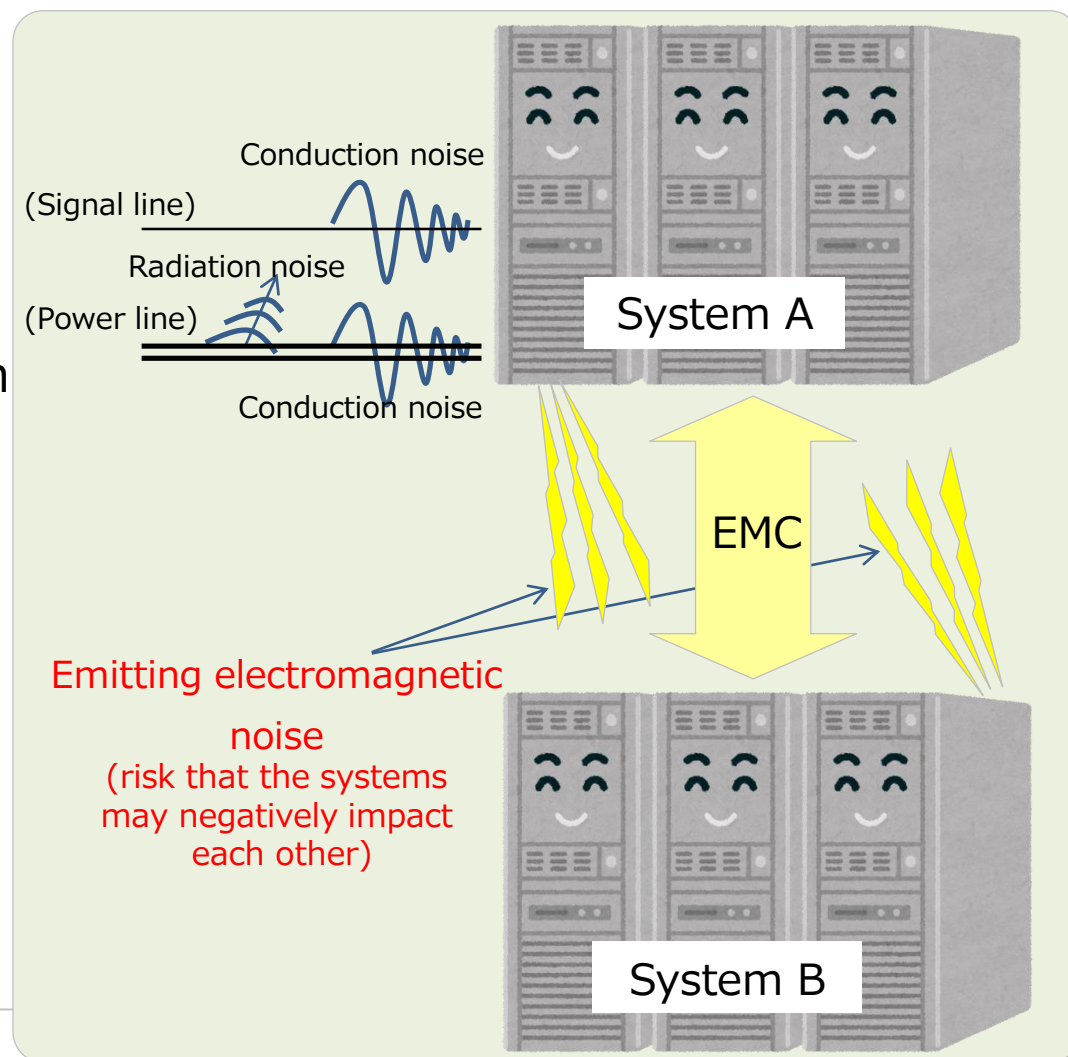
- Countermeasures for electromagnetic noise, which is becoming a common problem among operators as digital technologies grow more prevalent in nuclear power plants, are being discussed in Japan, referencing the latest standards in the US and Europe.

<Technical discussions action items>

- Investigating the latest technical developments in regulations and standards in the US and Europe for preventing weak electrical waves from affecting digital equipment

<Anticipated deliverables>

- Create a report on the nuclear power industry's policy for addressing EMC
- Keep on exchanging opinions with the NRA on industry initiatives



Initiative of aging management for safe long-term operation

- Knowledge about aging degradation needs to continuously updated and build-up to keep on using nuclear power while maintaining safety at a high standard.

<Technical discussions action items>

- Closely study the latest information on nuclear power plants domestic and abroad, including that of the US which has more than 50-years of operating experience and has multiple plants to be operated for 80 years, then identify issues that need to be investigated further

<Anticipated deliverables>

- Create a report on matters that need to be research further. Oversight progress and output of whole range of activities by cooperation with such as academia and CRIEPI.

	Start of operation	Operation years
Takahama Unit 1	1974	47 years
Takahama Unit 2	1975	46 years
Mihama Unit 3	1976	45 years
Tokai Daini	1978	43 years
Sendai Unit 1	1984	37 years
⋮	⋮	⋮

Reflect overseas knowledge

Operating plants in the US
 (40 - 50 years) 41 units (50 year +) 8 units

Plants that have been approved for an 80-year operational service life
 6 units
 Turkey Point-3&4
 Peach Bottom-2&3 , Surry-1&2

Pursue efficient and effective operation with appropriate consideration of importance classification of SA equipment

- Safety improvement initiatives that optimizes for the entire plant are being discussed. This takes into consideration severe accident response equipment (SA equipment) and specialized safety facility (SSF) as additional back-ups in case the plant enters LCO, i.e., safety critical design basis equipment (DB equipment) failure or SA equipment failure.

<Technical discussions action items>

- Discuss adding SA equipment and specialized safety facilities as back-ups for DB equipment and SA equipment

<Anticipated deliverables>

- ATENA is putting together a guide that allows NRA reviews to be conducted efficiently when operators apply to revise operational safety programs
- Open discussion will be held with the NRA regarding the guide

“Copyright of photos: Kansai Electric Power Co.”

【Current】

DB equipment (power supply)



Check on the soundness of the remaining DG unit when entering LCO

【Future】

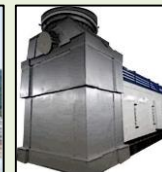
DB equipment (power supply)



SA equipment



SSF



Check the soundness of SA equipment and SSF in addition to the remaining DG unit when entering LCO

Follow-up activities in FY2021

Voluntary Guide on Introducing Cybersecurity Measures at Nuclear Power Plants

Posted on Website

- ATENA had operators submit their safety measures plan and revise parts of it to ensure measures are more effective.
- ATENA confirmed and assessed the implementation status of safety measures.

April 9th

Improvement Measures Proposed by Assessing Trends in Emergency Diesel Generator Malfunctions in Domestic Nuclear Power Plants

- The number of emergency diesel generator malfunctions due to human error was 0 in FY2020 across all operators, at a low level similarly to FY2019. It was confirmed that each operator was continuing activities to increase performance quality and reduce the number of malfunctions.

June 24th

Maintenance Guideline for Long-term Plant Shutdown

- ATENA confirmed that operators' maintenance plans for long-term shutdown reflected recommendations in the ATENA guideline.

July 30th

Technical Requirements for Mitigation Measures of Software Common Cause Failures of Digital Safety Protection System

- ATENA summarized operator reports on how operators are implementing safety measures in the first half of FY2021.
(Progress in operator safety measures will be checked periodically)

November
29th

Guideline for Deterrence and Adequate Response to Fraudulent Activity by Manufacturer/Component Supplier

- ATENA reviewed operator reports on the status of fraud countermeasures implemented by operators based on the ATENA guide, and found that the fraud deterrence measures were being implemented adequately according to the guide.

November
29th

② Dialogues with the regulatory authority

- ATENA shall be responsible in handling of common regulatory issues.
- ATENA shall engage in dialogues with the regulatory authority on behalf of the nuclear industry.

Item	2020												2021											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
NRA-CNO Meeting							▽											▽				▽		
Public meeting	New inspection system (WG and review team meeting)		▽▽▽										New inspection system (opinion exchange meeting)											
			EAL review	▽		▽			▽						▽	▽								
													Ergonomic design evaluation guide											
													Open phase condition											
		▽											Digital safety protection system											
Regular meeting												Base isolation structure												
												Improvement of regulatory standards by reflecting review experience												
			▽		▽		▽▽	▽	▽				Aging management for safe long-term operation											
Regular meeting	Dialogues between administrative level of NRA and ATENA																							

③Communication with various stakeholders

<Forum in session>

OHosted the ATENA Forum

- Held in February every year as a public event
- In the 2021 Forum, had panelists discuss the safety improvement activities each organization is implementing



OPresented ATENA activities in academic conference

- Conference of the Japan Society of Maintenology (July 2021)
- Planning session of the Fall Meeting of the Atomic Energy Society of Japan (AESJ) (September 2021)

OInterviewed by newspapers and magazines

- Interview with the ATENA CEO was published in the Denki Shimbun (Electric Industry's Newspaper) (March and July 2021)
- An interview with the ATENA CEO was published in the "Energy for the Future" journal

OMeetings with executives of organization overseas

- Met online with the Nuclear Energy Institute (NEI) (August 2021)
- Met online with the Électricité de France (EDF) (July 2021)
- Met online with the Nuclear Energy Agency, Organisation for Economic Co-operation and Development (OECD/NEA) (May and November 2021)

