

Activities of ATENA

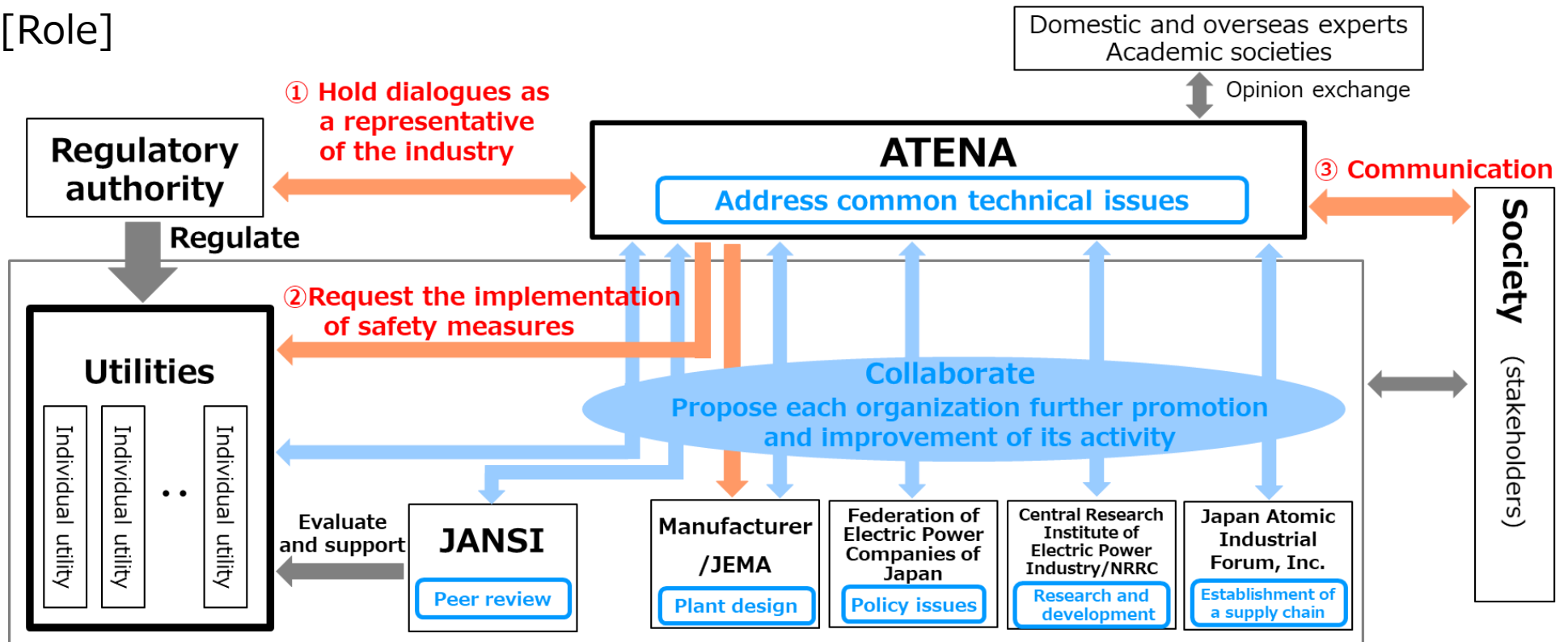
February 18, 2021
Atomic Energy Association
(ATENA)

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]

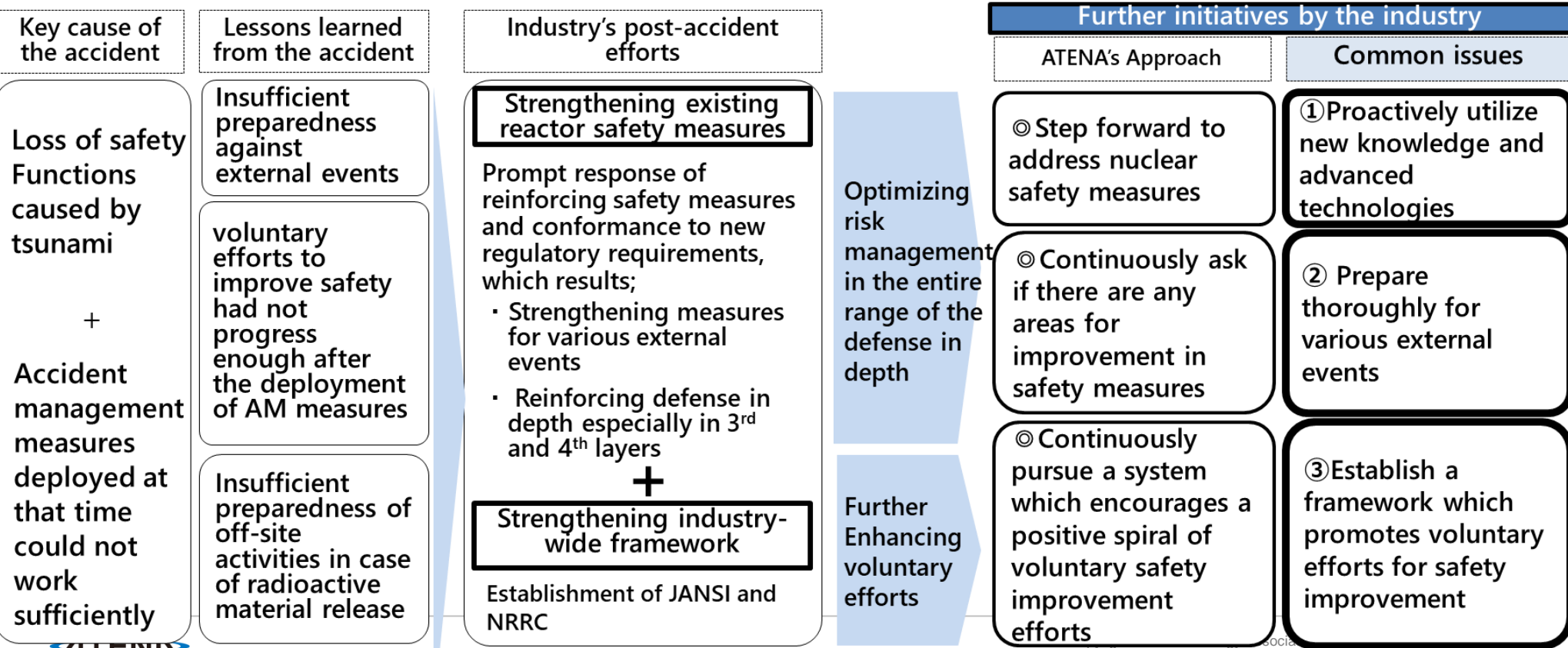


JANSI: Japan Nuclear Safety Institute, JEMA: The Japan Electrical Manufacturers' Association, NRRC: Nuclear Risk Research Center

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 2021, ATENA identifies 19 issues as prioritized themes and is going to review them in technical perspective.



History of ATENA's activities

FY	Activities	Issues
2018	<ul style="list-style-type: none"> • Establishment of ATENA (July 2018) • Selected common technical issues as themes and started review activities • Established a framework for collaboration with related organizations 	<ul style="list-style-type: none"> • Prepare for starting dialogues with NRA • Steadily implement technical reviews
2019	<ul style="list-style-type: none"> • Started producing fruitful results in the review of technical issues Published a technical report on "Improvement Measures Proposed by Assessing Trends in Emergency Diesel Generator Malfunctions in Domestic Nuclear Power Plants" and requested utilities to implement safety measures • Started dialogues with NRA (April 2019) 	<ul style="list-style-type: none"> • Establish practices such as conducting technical reviews, developing safety measures, and requesting utilities and manufacturers to introduce countermeasures. • Conduct active dialogues with NRA
2020	<ul style="list-style-type: none"> • Continuously published technical reports and requested the implementation of respective safety measures. Also, continued to update priority themes and strived to realize productive dialogues with NRA • Proceeded without any problem in the middle of the coronavirus pandemic by using telework and web conferencing 	<ul style="list-style-type: none"> • Extract "potential risks" in addition to current technical issues • Conduct productive dialogues with NRA and reinforce communication with stakeholders

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 []: Mid-to-long term issues
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 measures 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]
② Prepare thoroughly for various external events	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 equipment newly installed to conform new regulatory requirement]
④ Others	Establishment of further improvement measures for Emergency Diesel Generator (EDG) reliability by analyzing operating experience
	Cooperation to NRA’s initiative of continuously improving the regulatory standards by reflecting review experience
	Review and improve the current scheme of “Emergency Action Level”

Activities in FY 2020

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)

① Proactively utilize new knowledge and advanced technologies

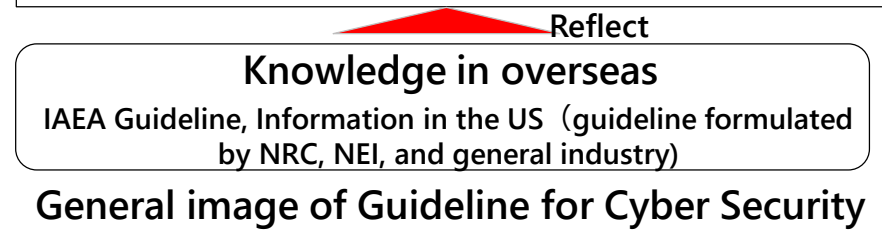
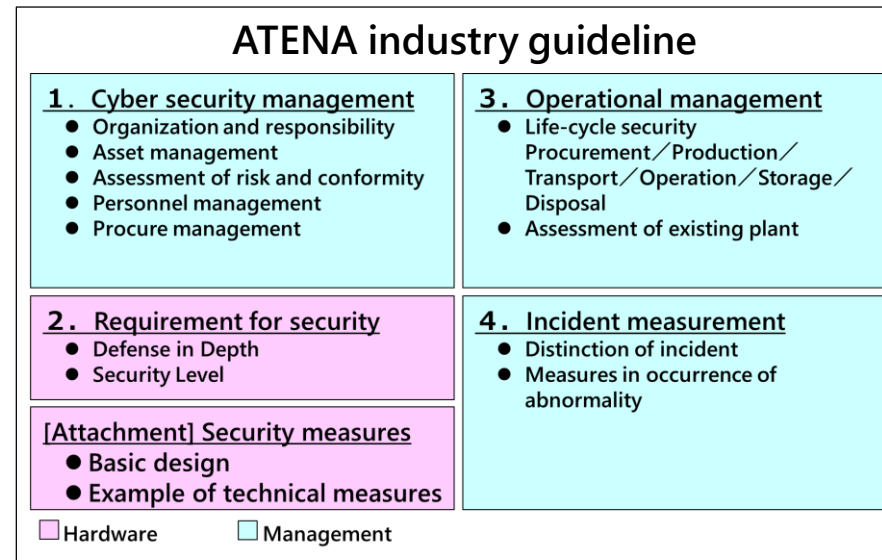
◎ Develop a new guideline for Cyber security

- Given the increasing threat of cyberattacks and the strengthened domestic and international guides, ATENA has created an industry guideline to request each utility and manufacturer to strengthen their countermeasures.

<Results of activities>

- From September 2018 to June 2019, ATENA surveyed the knowledge in the overseas nuclear industries and drafted an industry guideline after reflecting the comments from hearings with all utilities.
- From November 2019 to January 2020, ATENA held dialogues with the NRA to confirm the consistency with the NRA guideline.
- In March 2020, ATENA issued the industry guideline and requested utilities to implement safety measures.

Utilities plan to complete security enhancement measures in line with the guideline by FY 2022. ATENA will confirm the implementation status of utilities.



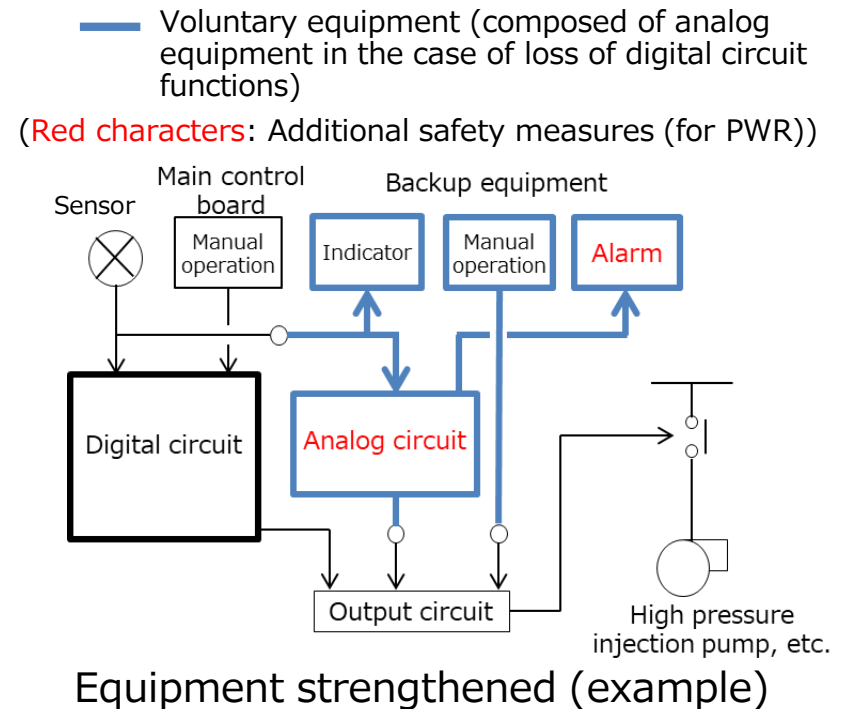
① Proactively utilize new knowledge and advanced technologies

◎ Develop a new guideline to adopt measures for common cause failures (CCFs) in digital safety protection system

- As a measure against CCFs, utilities have voluntarily installed backup equipment. Although the probability of CCFs is sufficiently low, further safety measures will be identified and implemented based on discussions with the NRA.

<Results of activities>

- At the NRA meeting in October 2019, ATENA explained the risk reduction effect of the existing voluntary equipment to prepare for the risk of loss of functions of the digital safety protection system.
- In January 2020, ATENA decided to introduce further safety measures to voluntary equipment so as to ensure the prevention of core damage, based on discussions in NRA meetings.
- In December 2020, ATENA published the technical requirement document to strengthen voluntary equipment and requested utilities to implement safety measures.

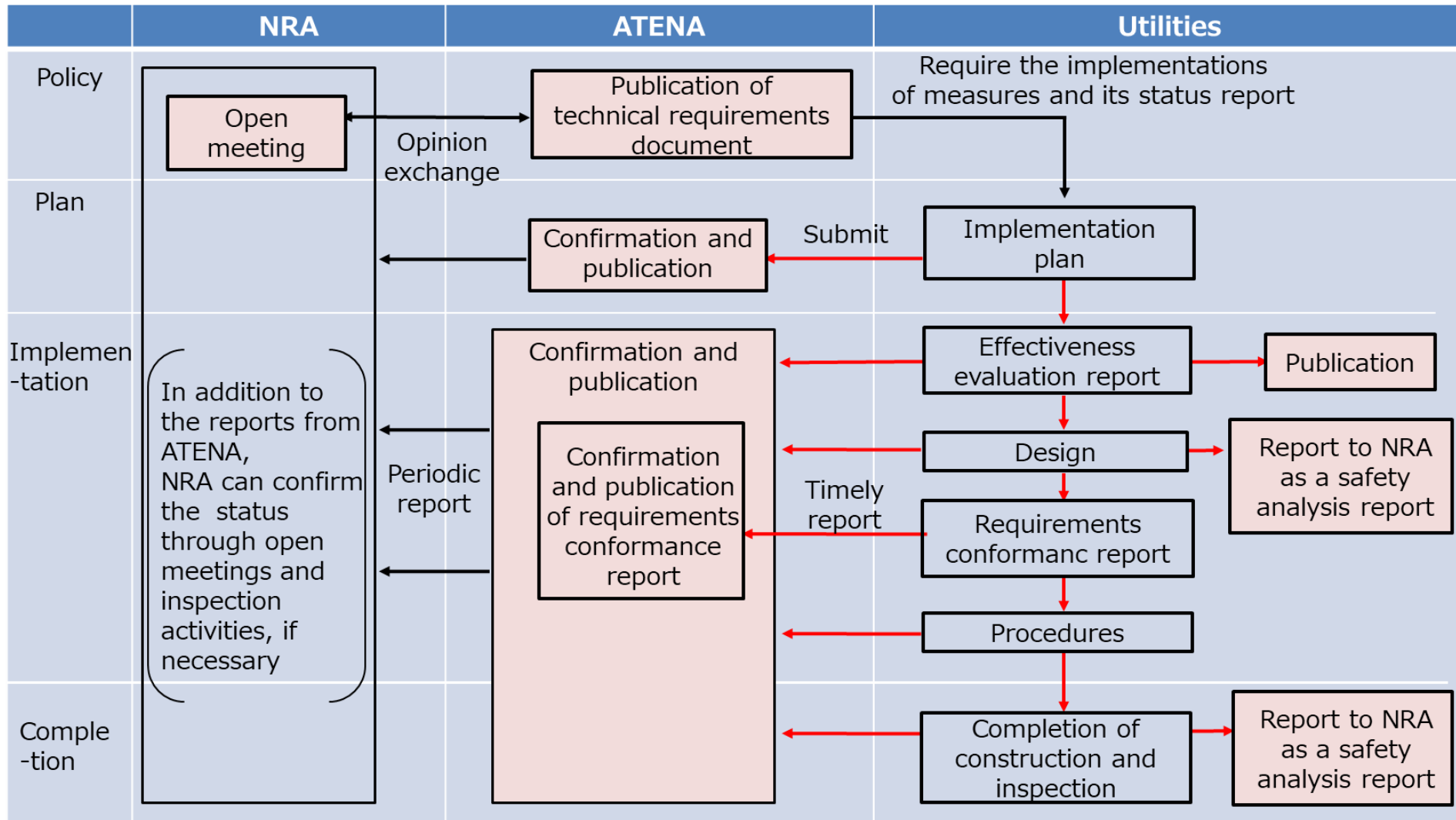


Utilities have begun to implement the measures stipulated in the technical requirement document and plan to introduce them from FY 2023.

ATENA will periodically confirm the status of efforts by utilities.

Proposed scheme to confirm the progress of software common cause failure (CCF) measures of digital safety protection system

- ATENA regularly confirms the status of efforts by utilities at each stage of planning and implementation.



③ Establish a framework which promotes voluntary efforts for safety improvement

◎ Initiative of aging management for safe long-term operation

- Implement further measures by reviewing current efforts of aging management, with consideration of the current situation of each plant's prolonged long-term shutdown and ensuring safe long-term operation in the future.

<Results of activities>

- ATENA held technical discussions with NRA from March to July 2020, at the NRA's "Practical level technical opinion exchange meetings with ATENA regarding aging management."
- ATENA published three guidelines in September 2020 for aging management (① Maintenance during long-term plant shutdown, ② Assessing design obsolescence, and ③ Discontinued product management).
- ATENA required utilities to implement safety measures related to these guidelines.

	Initiatives	New ATENA initiatives (policy)
Physical degradation	Response to the aging degradation of components (Aging degradation events) Corrosion, SCC, wear, irradiation embrittlement, fatigue, etc.	Review each operator's approach to their shutdown maintenance plan considering aging degradation during long-term shutdown
Non-physical degradation	Reflecting the latest knowledge (response to old design)	Create a mechanism to assess plant design from a "design obsolescence" perspective and continuously improve safety
	Response to discontinued products	Create a mechanism to efficiently manage product discontinuation information and the status of spares among plant manufacturers and operators

Proposed initiatives

Utilities are currently implementing necessary measures with establishing individual implementation plans according to these guidelines.
 ATENA is involved in common technical reviews and regularly confirms the status of efforts by utilities.

Progress on specific common technical issues (4/5)

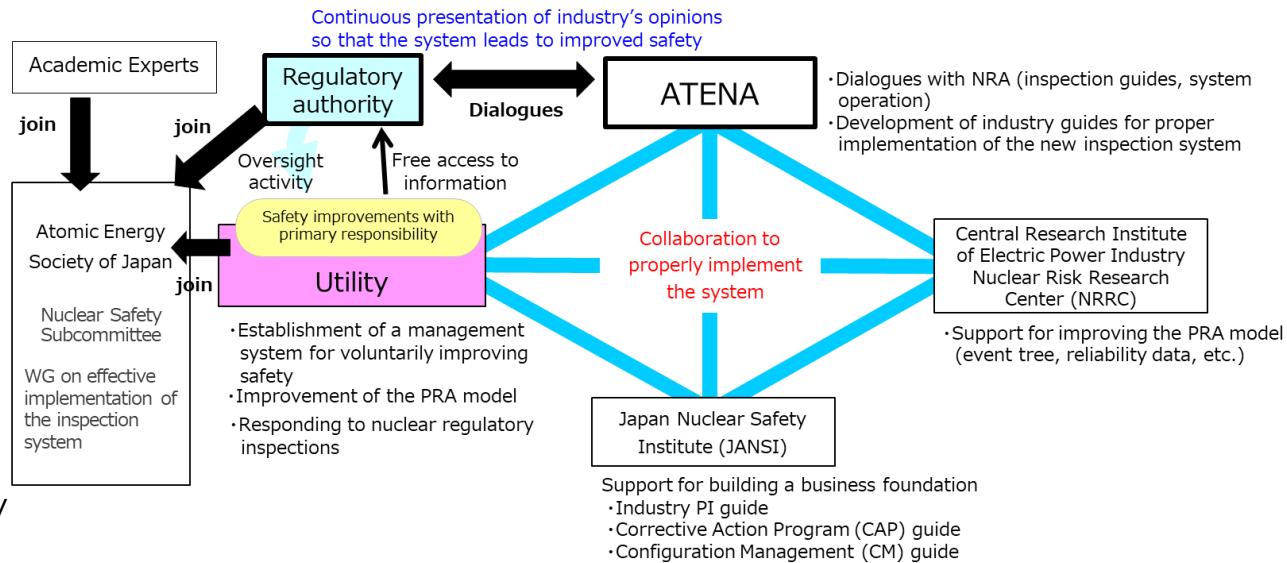
③ Establish a framework which promotes voluntary efforts for safety improvement

◎ Develop industry's guide documents for specific procedure to fulfill the NRA's inspection reform

- After a trial operation period of one and a half years, the new inspection system entered operation in April 2020.
- ATENA has published necessary guides and, as the responsible organization for dialogues with NRA, continuously presents opinions at the NRA's opinion exchange meetings.

<Results of activities>

- Industry organizations are going all-out in complying with the new inspection system.
- ATENA participates in the NRA's opinion exchange meetings and continuously discusses inspection guides and system operations.
- ATENA developed the following guidelines:
 - Guideline Regarding Performance Indicators (PI) Used in Nuclear Regulatory Inspections (June 2019)
 - Guidelines on Implementation of Licensee Inspections (July 2020)



Collaboration structure in the industry

ATENA continuously works to appropriately implement the system and continues to present opinions to polish up the system for improving safety.

④ Others

◎ Establishment of further improvement measures for Emergency Diesel Generator (EDG) reliability by analyzing operating experience

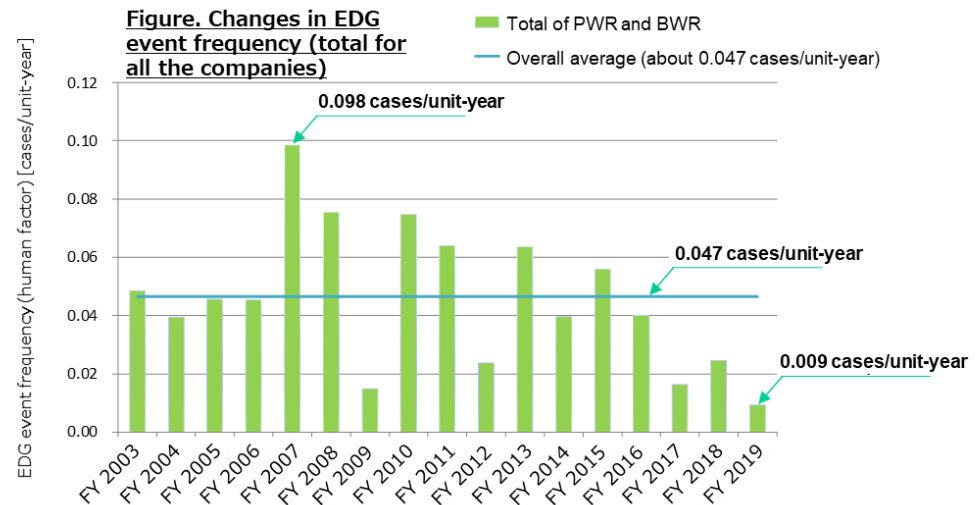
- Although the number of EDG failure events has not increased since 2011, the ratio of EDG failure events to the number of total events is relatively increasing, and the ratio of events due to human factors is high. Therefore, ATENA investigated the past events in detail and identified further improvement measures.

<Results of activities>

- ATENA compiled a report on items to be improved that are common to all utilities and requested them to make the improvements in June 2019.
- ATENA confirmed and evaluated the improvement status of utilities in June 2020.

[Evaluation results]

Only one EDG event (human factor) for all utilities occurred in FY 2019. The EDG event frequency was 0.009 cases/unit-year, which was the lowest since 2003.



ATENA continues to check the status of efforts by utilities and the EDG event frequency and strives to ensure EDG reliability.

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.

[Results of activities]

- ATENA has actively engaged in dialogues with NRA through weekly administrative meetings, NRA-CNO opinion exchange meetings and public meetings since April 2019.
- However, when engaging in dialogues on issues other than the themes that ATENA is working on as common technical issues, in some cases, ATENA is not ready to present its own thoughts and opinions and only delivers utilities' voice. We think such kind of communication is not productive and need to be improved.

Item	2019												2020											
	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.				
	Dialogues by ATENA →																							
NRA-CNO meeting			▽				▽							▽										
Public meeting	New inspection system (WG and review team meeting)																							
	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		
	EAL review																							
Seismic ground motion formulated without specifying the epicenter																								
Ergonomic design evaluation guide																								
Open phase condition																								
Digital safety protection system																								
Base isolation structure																								
Improvement of regulatory standards by reflecting review experience																								
Aging management for safe long-term operation																								

Areas for further improvement

1. Industry initiatives for independent measures

- ❑ Strongly recognizing ATENA's approach of "take the initiative with one step ahead" and "always re-question whether there is any room for improvement," ATENA should continuously solve safety issues for the utilization of nuclear energy and lead the nuclear industry's activities by:
 - Continuously extracting potential risks by collecting and analyzing new technologies and knowledge, and
 - Identifying industry's voluntary measures for improving substantial safety and requesting the implementation of such measures regardless of the individual interests of utilities and manufacturers.
- ❑ Further enhanced collaboration among the industry organizations is required to effectively promote the entire process of "identifying potential risks," "implementing necessary measures," and "ensuring the proper implementation."

2. Further promotion of communication with the NRA

- ❑ ATENA, as a representative of the industry, should proactively share common understanding of issues with the regulatory authority, and openly discuss such as the direction of safety improvement, safety significance of each issue, implementation schedule, thereby ensure the enhanced safety of nuclear power.
- ❑ In order to achieve it, ATENA should always focus on improving its technical capabilities and try to realize productive discussions with the regulatory authority.

Summary

- In this March, ten years have passed since the accident at the Fukushima Daiichi Nuclear Power Station.
- The nuclear industry has been making every effort to improve nuclear safety under a strong will that such an accident shall never happen again.
- It is important to keep lessons learned by the accident in our mind everlastingly and also make steady and enhanced efforts for safety improvement.
- Again, ATENA's mission is to continue to deliberate what should be done in order to improve nuclear safety voluntarily and continuously, and to exercise leadership in industry wide efforts to accomplish industry's objectives.
- ATENA shall fulfill its mission with kind advice and support from not only nuclear industry entities but also other various stakeholders.

Thank you for your attention

