Activities of ATENA

February, 2023
Atomic Energy Association
(ATENA)

1. Outline of ATENA

2. Past Activities

3. Challenges

Overview of ATENA

○ Four years have passed since ATENA was established in July 2018 with the aim of tackling common technical issues, conducting technical dialogue with regulatory authorities on behalf of industry, and encouraging operators to introduce effective safety measures.

Board of Directors President & CEO Hiroto Uozumi (formerly of Hitachi, Ltd.), 2 directors, and 2 auditors

Staff Experts in each field have been gathered from nuclear operators and plant manufacturers (approx. 30 people)

(Areas of expertise) Safety design, external natural events, mechanical/electrical equipment, etc.

Member companies/organizations 11 utilities, 4 plant manufacturers, 4 related organizations

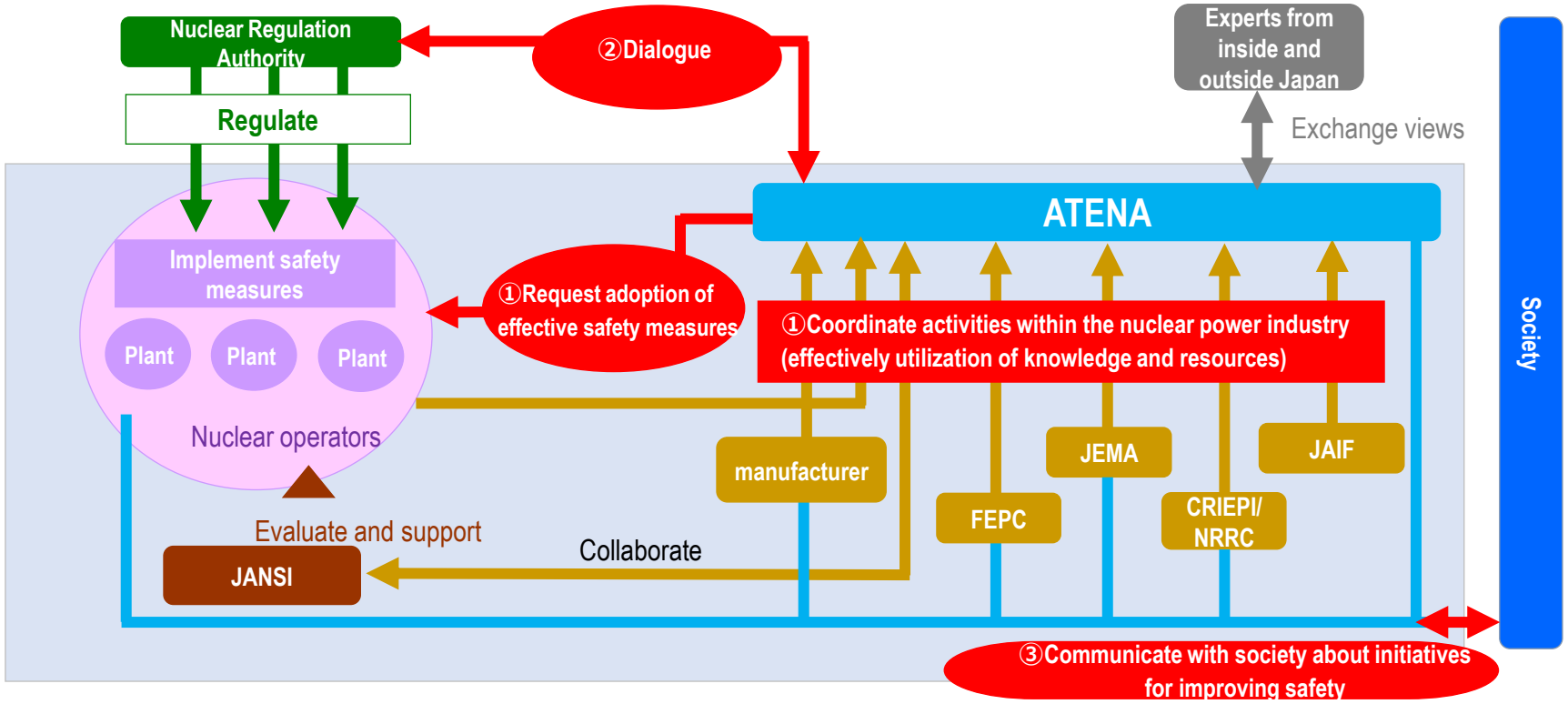
Hokkaido Electric Power Co., Inc., Tohoku Electric Power Co., Inc., Tokyo Electric Power Company Holdings, Inc., Chubu Electric Power Co., Inc., The Kansai Electric Power Company, Incorporated, Hokuriku Electric Power Company, Inc., The Chugoku Electric Power Co., Inc., Shikoku Electric Power Company, Incorporated, Kyushu Electric Power Company, Inc., The Japan Atomic Power Company, Electric Power Development Co., Ltd.,
Toshiba Energy Systems & Solutions Corporation, Hitachi, Ltd., Mitsubishi Heavy Industries, Ltd., Mitsubishi Electric Corporation, The Federation of Electric Power Companies of Japan(FEPC), Central Research Institute of Electric Power Industry(CRIEPI), Japan Atomic Industrial Forum, Inc.(JAIF), The Japan Electrical Manufacturers' Association(JEMA)

Observers: Japan Nuclear Safety Institute (JANSI), Japan Nuclear Fuel Limited (JNFL), Japan Atomic Energy Agency (JAEA)

(In no particular order)

Role of ATENA

① Develop effective safety measures and request operators implement these safety measures by taking full advantage of ATEANA ‘s composition which complies of experts not only from utilities but also from manufactures.
Coordinate efforts across the industry in the identification and addressing phase so that effectively utilize the knowledge/resources available in each organization.
② Actively engage in dialogue with the regulatory authority under the common goal of improving safety.
③ Communicate with various stakeholders to improve safety.



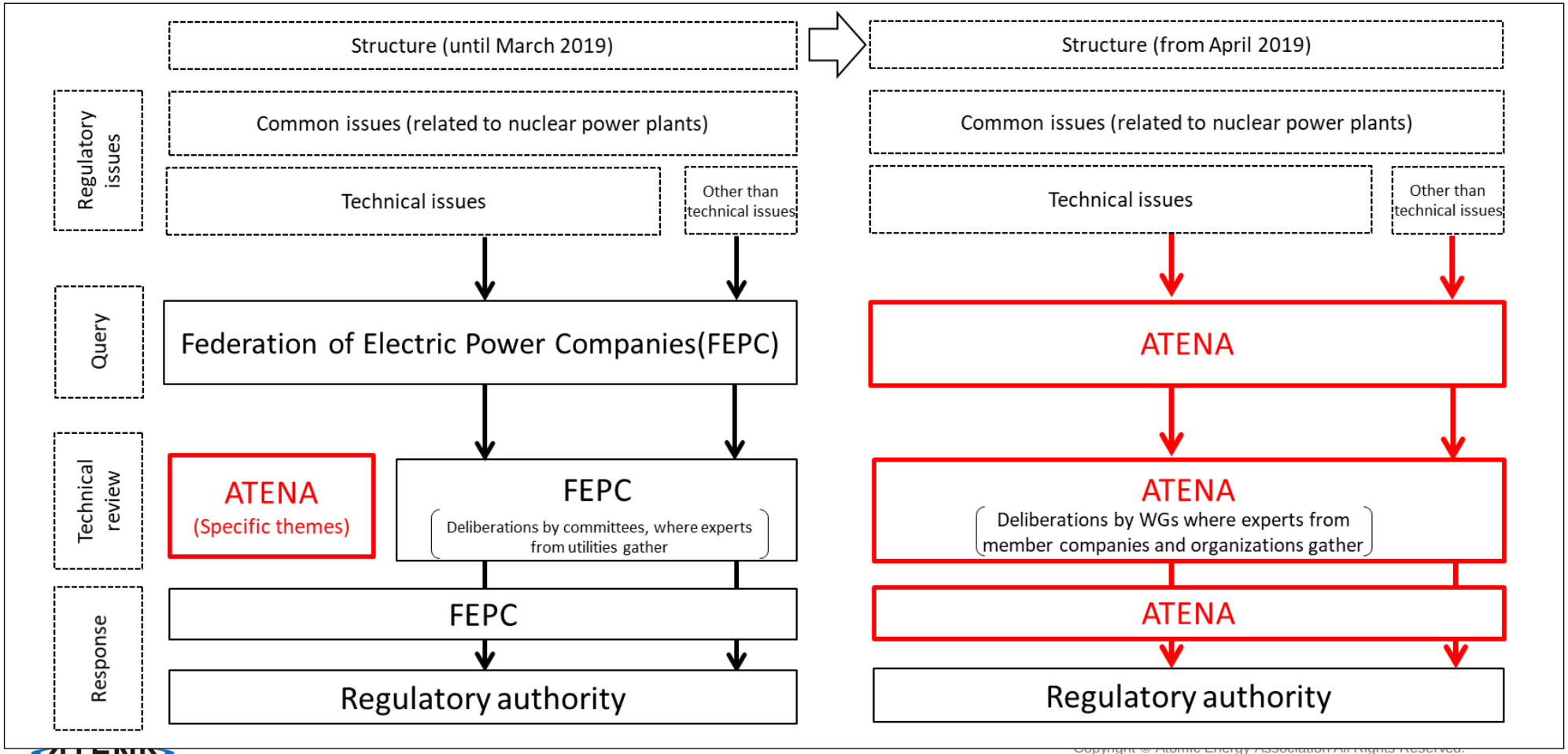
ATENA's approach to common technical issues

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.

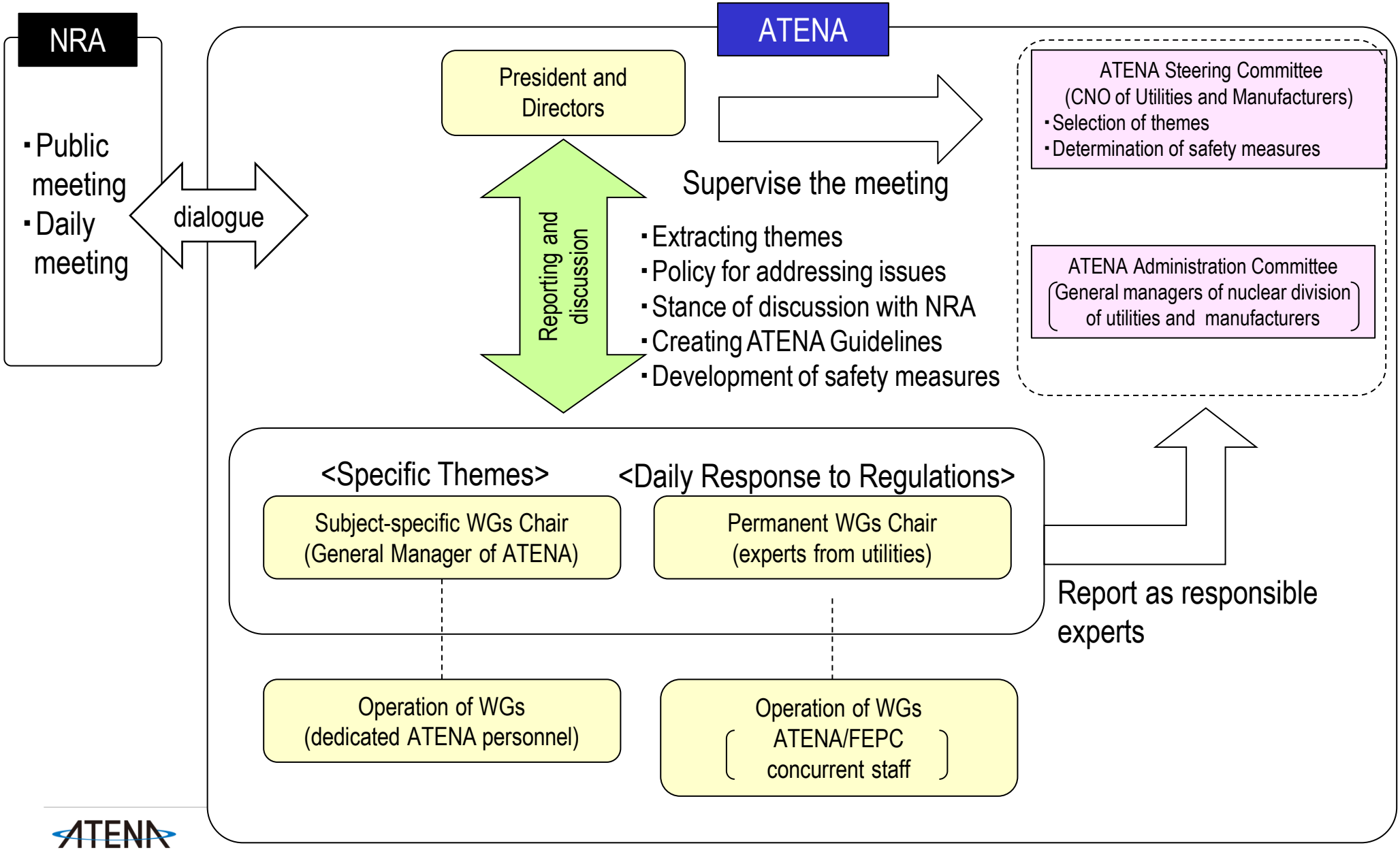
Key cause of the accident	Lessons learned from the accident	Industry's post-accident efforts		Further initiatives by the industry	
				ATENA's Approach	Common issues
Loss of safety Functions caused by tsunami + Accident management measures deployed at that time could not work sufficiently	Insufficient preparedness against external events voluntary efforts to improve safety had not progress enough after the deployment of AM measures Insufficient preparedness of off-site activities in case of radioactive material release	**Strengthening existing reactor safety measures** Prompt response of reinforcing safety measures and conformance to new regulatory requirements, which results; ・Strengthening measures for various external events ・Reinforcing defense in depth especially in 3rd and 4th layers + **Strengthening industry-wide framework** Establishment of JANSI and NRRC	Optimizing risk management in the entire range of the defense in depth Further Enhancing voluntary efforts	◎Step forward to address nuclear safety measures ◎Continuously ask if there are any areas for improvement in safety measures ◎Continuously pursue a system which encourages a positive spiral of voluntary safety improvement efforts	①Proactively utilize new knowledge and advanced technologies ② Prepare thoroughly for various external events ③Establish a framework which promotes voluntary efforts for safety improvement

Structure of handling common regulatory issues

- At NRA-CNO Meeting in April 2019, major CNOs explained to the Nuclear Regulation Authority (NRA) how to handle common regulatory issues in a unified manner.
- In order to appropriately handle all common regulatory issues, FEPC has transferred the function of handling regulatory issues to ATENA.



ATENA's governance system



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Activities since the establishment of ATENA

FY	Accomplishments	Issues
2018	・Establishment of ATENA (July 2018) ・Selected common technical issues as themes and started review activities	・Prepare for starting dialogues with NRA ・Steadily implement technical reviews
2019	・Started dialogues with NRA (April 2019) ・Started producing fruitful results in the review of technical issues eg. Reduction of incidents due to human factors in emergency diesel generators (EDGs) (FY 2019: 1 incident; FY 2020: 0 incident)	・Establish practices such as conducting developing safety measures and requesting utilities to introduce countermeasures. ・Conduct active dialogues with NRA
2020	・Established a reasonable approach for the grace period for backfitting (Design basis ground motion formulated without specifying the epicenter). ・Conducted technical discussions with NRA on aging management initiatives, then NRA compiled its views on the operation period rule.	・Extract "potential risks" in addition to current technical issues ・Conduct productive dialogues with NRA and reinforce communication with stakeholders
2021	・Reinforced safety measures at each company in response to the inappropriate treatments in physical protection procedures at TEPCO. ・Enhanced cooperation with overseas organizations (Web meetings by senior management)	・ATENA actively proposes issues to the NRA ・Building trust with the NRA
2022	・A self-review of our efforts to date, four years since the establishment of ATENA ・Further efforts to identify issues for more effective promotion of safety improvement initiatives of the industry	・Identification of issues to be addressed ・Further strengthen cooperation with external organizations, such as overseas organizations

ATENA's Activity Policy

①Efforts for solving the common technical issues ➡ 10 ～ 25

- 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 all utilities to incorporate them into their actual activities through the votes at ATENA's Steering Committee meeting even in case there are some utilities who do not agree on the measures.
- ATENA shall also confirm and publish the status of utilities' implementation.

②Proactive dialogue with NRA ➡ 26 ～ 29

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

③Communication with various stakeholders ➡ 30

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

List of common technical issues (themes) <as of January 2023>

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
	Deployment of new fuel
② Prepare thoroughly for various external events	【Completed】 Review of the methodology to assess “design basis ground motion formulated without specifying seismic sources”
	【Completed】 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
	【Completed】 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”
	Adoption of extended-cycle operation
	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 and schedule for reports <as of January 2023>

FY2019	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)

FY2020	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) [Rev. 1, October 5, 2022]

FY2021	Publication date
○Report of knowledge build-up related to aging for safe long-term operation	(March 25, 2022)

FY2022	Publication date
○Operational safety program revision guideline for improving safety through a diverse range of facilities	(July 29, 2022)

To be published
○Report on the advancement of liquefaction evaluation methods (working title)
○Position paper on electromagnetic compatibility (working title)

Overview of Safety Measures (1/4)

Further improvement of the reliability of emergency diesel generator (EDG)

- Although the number of EDG malfunctioning events has not increased since 2011, the proportion of EDG events among all events became relatively high, and the proportion of EDG events caused by human factors was large among all EDG events. Therefore, ATENA analyzed past EDG events in detail, summarized the items to be improved, and requested utilities to improve maintenance activity of EDG.
- In order to confirm and evaluate the status of the site to see whether safety measures have been appropriately implemented, ATENA continues to confirm the status of improvements by witnessing actual EDG maintenance activities on site.

Introduction of cyber security measures

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- Given the growing threat of cyber attacks and the strengthening of domestic and overseas guides, ATENA compiled an industry guideline that proposed utilities and manufacturers to strengthen countermeasures against cyber attacks, and requested utilities to strengthen countermeasures.
- Following the submission of the implementation plan for safety measures by each utility, ATENA again requested utilities to revise the implementation plan in order to further reinforce the measures. Such safety measures are currently being implemented by utilities.

Design Specifications for the Base-Isolated Buildings Housing Severe Accident Equipment

- Design specifications for base-isolated buildings housing severe accident equipment were developed and described in the ATENA guideline document. ATENA requested utilities to use this guideline when they start to design such buildings.

Overview of Safety Measures (2/4)

< Initiative of aging management for safe long-term operation >

Maintenance during long-term plant shutdown

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- Considering the aging deterioration during the long-term shutdown period, ATENA collected and organized each utility's idea of formulating maintenance plan for shutdown period, then compiled a guideline and requested utilities to improve their maintenance plans for shutdown period.
- It is assessed that the maintenance plans of utilities during long-term shutdown have been appropriately revised by reflecting the recommendations provided in the ATENA guideline.

Assessing design obsolescence

- Since ATENA decided that it is important to establish a scheme to extract vulnerability due to the obsolescence of plant design even at the plants which comply the new regulatory requirements, ATENA proposed a new scheme of "Design Obsolescence Assessment" which assesses the safety with addressing the difference of design between old plant and new plant. ATENA also requested utilities to start the assessment.
- Assessment is currently being carried out by utilities.

Proper management of discontinued products

- In order to ensure the handling of discontinued products and to maintain the functions of plant system, ATENA proposed the structure and operation which enables utilities to obtain information on discontinued products systematically and continuously from manufacturers, suppliers, and subcontractors, and manage in a unified manner with close cooperation between utilities and manufacturers. ATENA then requested utilities to implement such structure and operation.
- ATENA confirmed that utilities completed necessary documentations and introduced actual collaboration system.

In addition to the above initiatives, ATENA deploys enhanced activities to build-up various knowledge on aging management.

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Overview of Safety Measures (3/4)

Deterrence and adequate response to fraudulent activity by manufacturer/component supplier

- ATENA developed a guideline to implement measures by utilities and manufacturers to prevent inappropriate conduct at the time of manufacturing materials, parts, etc. by supplier companies, and to promptly confirm the impact on nuclear safety and system integrity when inappropriate conducts are identified. ATENA then requested utilities to deploy measures proposed in the guideline.
- After receiving the implementation status of the measures based on ATENA guideline from utilities and confirming the details of the status, it was evaluated that the preventive measures against inappropriate conduct are properly implemented in accordance with the guideline.

Mitigation measures of software common cause failure of digital safety protection system

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- Along with the introduction of digital technology to systems of high safety importance, digital safety protection systems have been equipped with analog backup system which takes into account software common cause failures. In addition to such measures, the industry decided to introduce reinforced measures to the backup system by taking into consideration the situation in other countries, then ATENA developed a technical requirement document to reinforce measures and requested utilities to implement such measures.
- NRA presented its thought on this issue in their report as follows.

"NRA decided not to enforce new regulatory requirements on this issue, by letting utilities to voluntarily address this issue with considering the "required level of measures" expressed by NRA, confirming implementation status through periodic reports from utilities, and also monitoring implementation status at the occasions of regulatory inspections. NRA considers this issue as a pioneering scheme in which utilities voluntarily implement measures and NRA follows up those activities, with taking into account the discussions in "The deliberation team of continuous safety improvement" composed by NRA commissioners/officials and external experts.

Overview of Safety Measures (4/4)

Efficient and effective operation with appropriate consideration of importance classification of SA equipment (Improvement of LCO)

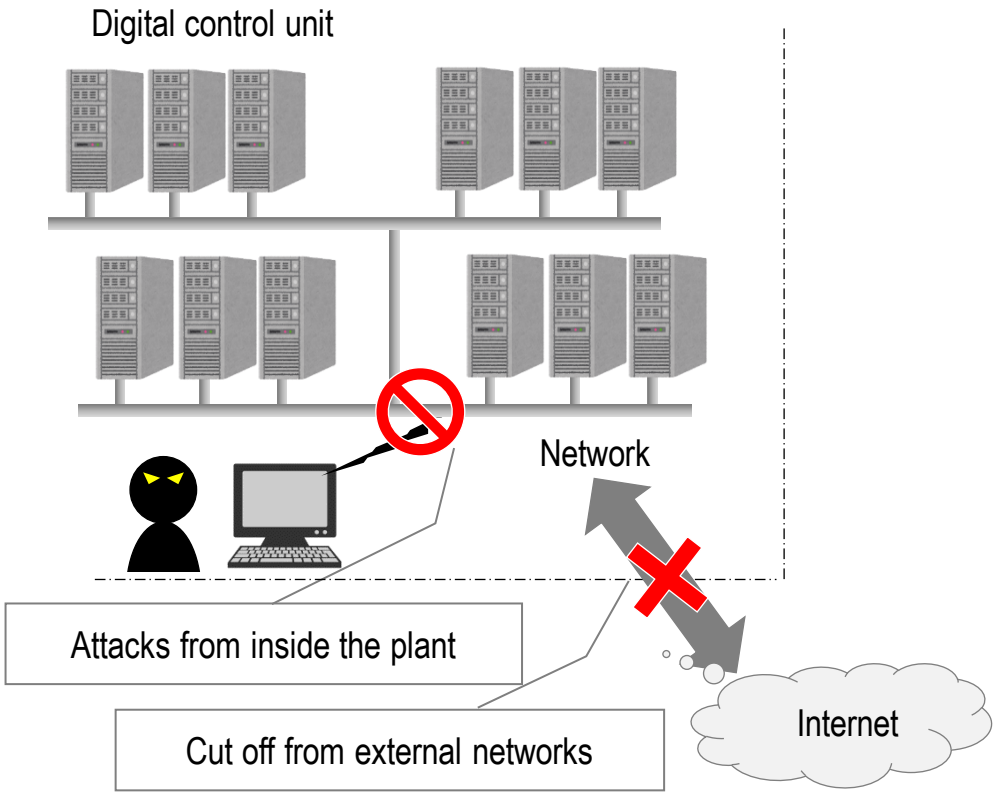
→ 24

- 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. ATENA compiled the recommendation into guideline and requested utilities to implement necessary measures when they will revise the operational safety programs.
- Utilities are preparing to apply for the revision of operational safety programs by referring ATENA guideline.

Improvement of detectability of Open Phase Condition

- In response to the reactor trip event occurred at foreign nuclear power plant which was caused by the one-phase open-circuit failure event (OPC:Open Phase Condition), the industry decided to voluntarily introduce measures to improve the detectability of OPC (installation of detectors to relevant transformers) in order to improve plant reliability. ATENA formally requested utilities to implement such measures.
- Utilities are implementing necessary measures of installing detectors.

Ensuring cybersecurity



- As nuclear power plants adopt new digital technologies, the threat of cyber attacks looms large. Latest knowledge in such as IAEA guides, NEI guides, recommendations issued by the US NRC was surveyed.

- **A cyber security guideline** drafted by a WG comprised of experts of ATENA, plant manufactures and operators, that reflected the latest knowledge obtained from abroad, was **published in March 2020.**
- In light of the importance of cybersecurity, **ATENA requested that operators reinforce their safety measures implementation plans to accelerate the deployment of additional cybersecurity measures in April 2021.**

Safety enhancement measures recommended in the ATENA guideline

- Measures for hardware
  - Ensure separation from external networks
  - Access control etc.
- Measures for the management process
  - Organization, training, equipment management

- **Operators will implement safety measures in line with the guideline by October 2023.**
- ATENA will check on and disclose operator's progress accordingly.

ATENA aging degradation management initiatives

	Issue	Operator initiatives (udes regulatory response) and ATENA initiatives
Physical degradation	**Response to aging degradation of facilities** (Aging degradation events) Corrosion, SCC, wear, irradiation embrittlement, fatigue, etc.	**<In normal operating conditions>** • Conduct planned maintenance • Conduct periodic aging degradation assessment (aging degradation assessment: every 10 years after 30 years in operation) • Apply for approval of operational life extension (assessment of 40 years+ (up to 60 years) operation) • Continuously review aging degradation management based on the latest knowledge
		<Long-term shutdown period> • Conduct maintenance considering the shutdown state • Conduct aging degradation management (cold shutdown PLM assessment, aging degradation assessment during long-term shutdown)
Non-physical degradation	**Reflection of the latest knowledge** (design obsolescence management)	Gather the latest knowledge every cycle. Review plant safety based on the analysis results and the plant safety assessment results.
	Response to discontinued products	Each operator is exploring stable procurement methods based on the characteristics of part and the service

④ATENA has published a report on the issue (published March 2022)

Issues that require further investigation have been identified to enable safer long-term operation, referencing the example of the 80-year operating life license in the US as an example.

Investigate intergranular cracking in primary system of PWRs (being addressed in WG)

The issues has been designated as a common technical issue identified in OE to be addressed as the industry

ATENA published guides for each issue (in September 2020)

<①Long-term shutdown maintenance guide>
Organized each operator's approach to shutdown maintenance plan formulation considering aging degradation in long-term shutdown

<②Design obsolescence assessment guide>
For building a mechanism to assess plant design from a design obsolescence standpoint and continuously improve safety

<③Discontinued product management guide>
For building a mechanism to efficiently share information about discontinued products and to stockpile spare parts between plant manufacturers and operators

ATENA Atomic Energy Association

*IAEA Guide "Aging Management and Development of a Programme for Long Term Operation of Nuclear Power Plants" (SSG-48)

Efforts for safe long-term operation

<Background and Results>

- At the 10th NRA-CNO meeting (December 2, 2019), ATENA presented ATENA's efforts to manage aging degradation for safer long-term operation. At the same time, ATENA requested NRA to set up meeting occasions for technical opinion exchange.

- At the 57th meeting of NRA (January 29, 2020), NRA approved the launch of ※1 the Technical Opinion Exchange Meeting with ATENA on Aging Management by practical level members.

Results of the Opinion Exchange Meeting

Round	Date and time
The first	March 6 10:00 to 12:00
Second	April 27th 9:00 to 12:00
Third	May 22 10:00 to 12:00 13:30～16:00
4th	June 1 9:30 to 12:00
5th	June 15 9:00 to 12:00
6th	July 1 16:30 to 18:30

※1:Https://www.nra.go.jp/disclosure/committee/ikenkokan/ATENA/index.html of working-level technical meetings with ATENA on ageing control

- Although NRA has long announced that it is not in a position to express any opinions on the operation period issue, NRA released a position paper ※2 at the 15th meeting of NRA (July 29, 2020), which was one of the results from technical opinion exchange meetings with ATENA.

※2:Opinion on the Relationship Between Review of Operation Period Extension Approval and Aging Degradation of Power Reactor Facilities during Long Term Shutdown Period
https://www.nra.go.jp/data/000323916.pdf

Identifying issues that require further investigation in aging degradation assessment based on knowledge from Japan and abroad

State of domestic plants

Plant	Start of operation	# of years in operation
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

(12 other units, for a total of 17 units have been operating for 30+ years)

State of US plants

Number of years in operation

40 to 50 years … 41 units

50+ years … 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

Identify technical challenges that come with long-term operation (issues that require more information)

Update knowledge through research and reflect onto units

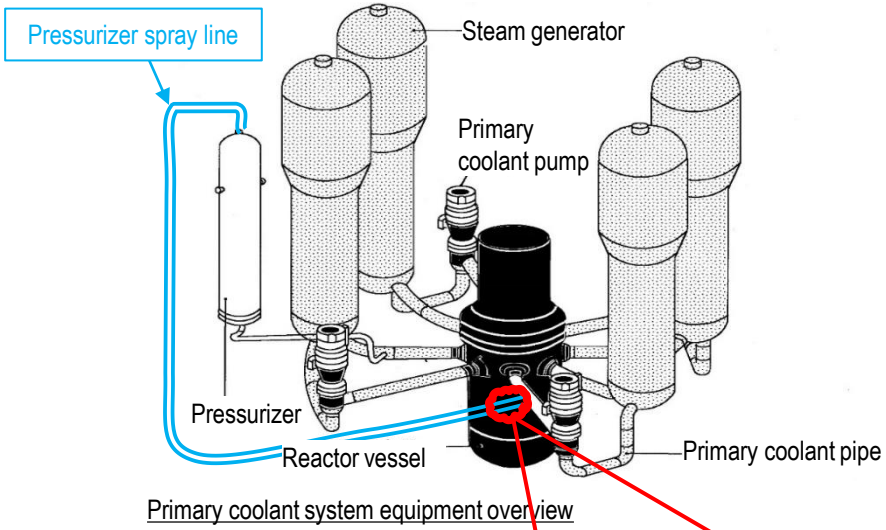
- Of the 33 nuclear power plants in Japan, 17 have been online for more than 30 years (4 units for more than 40 years.) In light of this, to keep on using plants in the long term while maintaining safety at a high standard, **knowledge on aging degradation needs to be continuously updated and expanded**.
- The US may be a source of useful information as multiple plants have been in operation for more than 50 years and multiple plants that have been approved for 80-year operation.

- **Technical challenges for long-term operation (issues that require further investigation) were identified** based on US efforts to extend the operational service life to 80 years and the latest domestic knowledge on aging degradation.
- **A technical report summarizing the challenges was published in March 2022** https://www.atena-j.jp/report/2022/03/atena-21me01rev0.html#000225

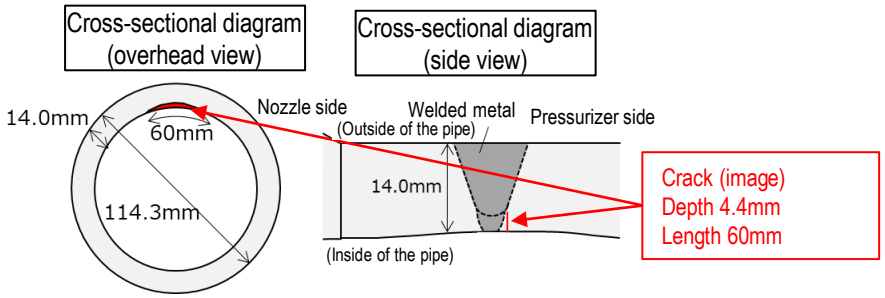
- **ATENA will be making recommendations to the Atomic Energy Society of Japan, operators, and research agencies on the issues that require further investigation, and will be keeping track of developments.**

*: On February 24, 2022, the US NRC retracted its approval of the 80-year license for these plants.

Further investigation related to the intergranular cracking on stainless steel piping of PWR primary system



Primary coolant system equipment overview



Intergranular cracking of stainless steel in a PWR primary system coolant environment is **extremely rare**.

- In August 2020, a crack was identified near the pressurizer spray pipe weld at Ohi Unit 3. The pipe was replaced and similar welds were checked for cracks.

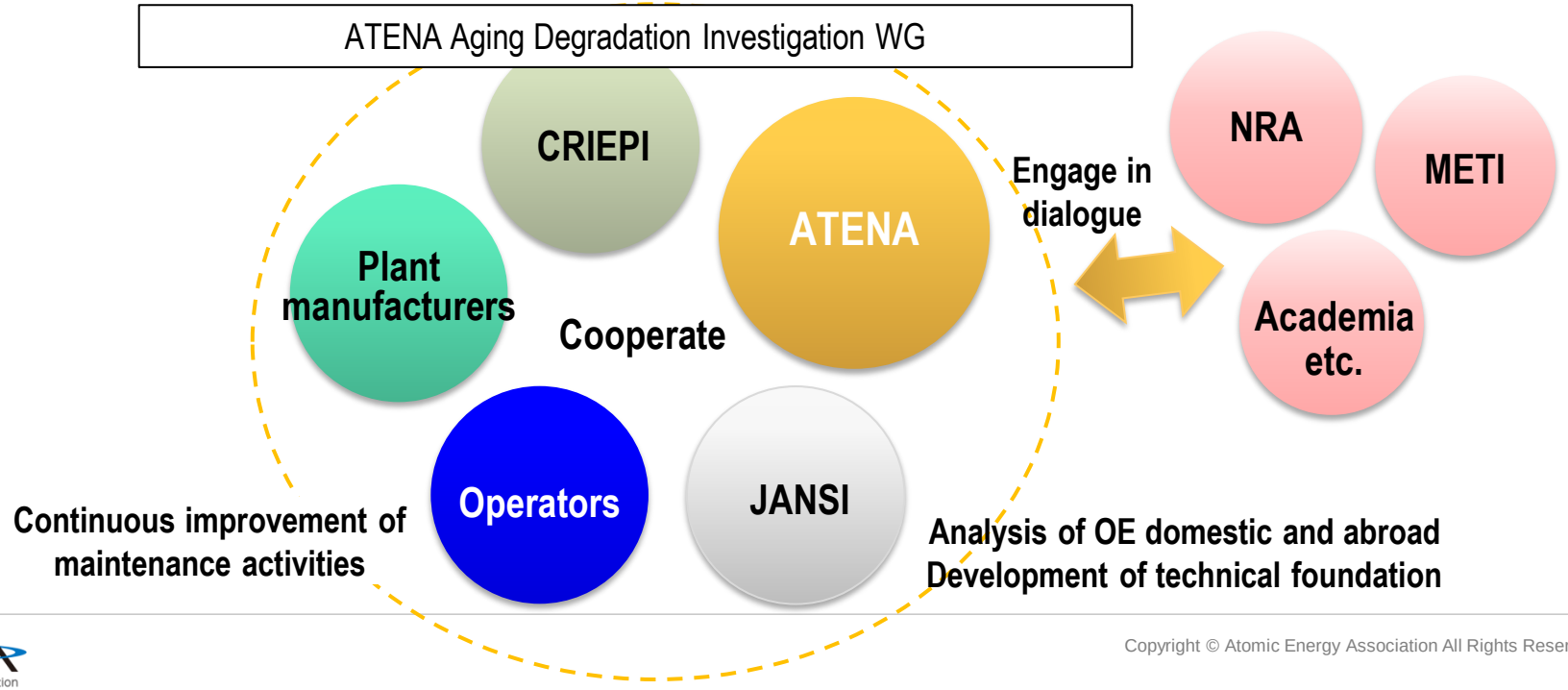
- **These incidents are rare in actual units and there is almost no data on intergranular cracking in similar conditions. ATENA identified this as a common technical issue to be addressed by the industry** to ensure safety and reliability of nuclear power plants.

- ATENA formed a WG and broke down the challenge into three components:
  1) clarifying the crack initiation mechanism
  2) integrity assessment with crack
  3) improving inspection technology.
- **ATENA is studying the cause and prevention measures with the input of external experts.**

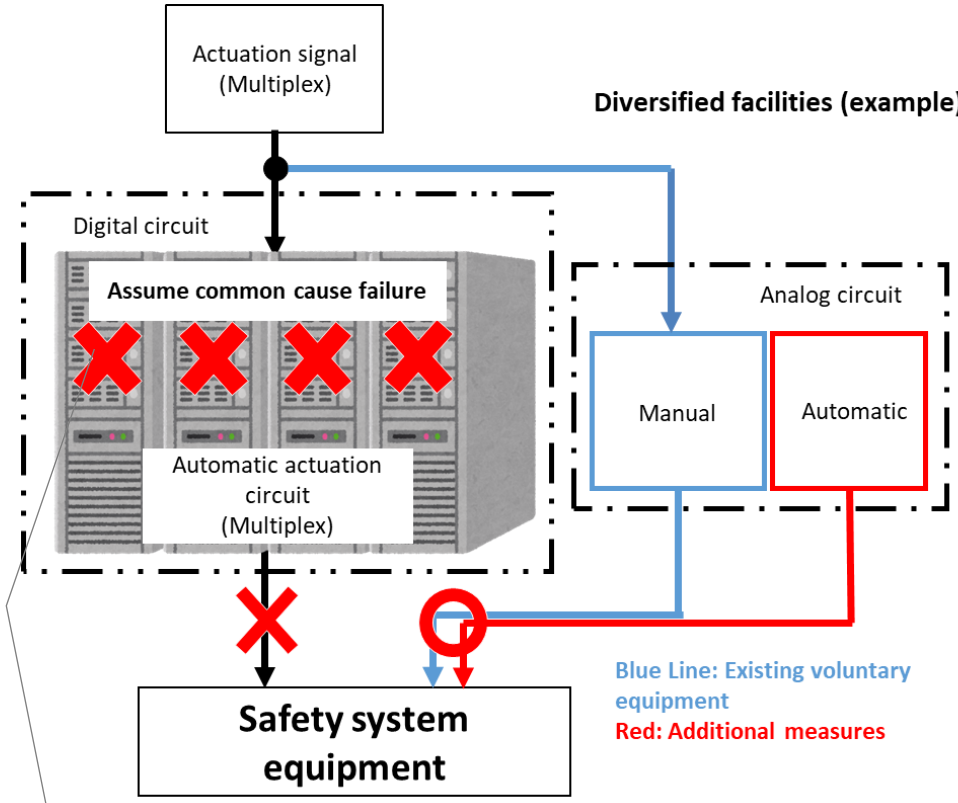
New initiatives on aging degradation led by ATENA

- There needs to establish the function that sets and implements directions and strategic goals based on the challenges identified based on the latest knowledge and OE to implement aging degradation management-related activities (R&D, formulating standards) in a strategic and systematic manner.

- ATENA will establish an Aging Degradation Investigation WG (as a meeting place for related organizations). This WG will collect and analyze the latest information on aging degradation management and OE information to formulate and implement activity plans (R&D plans, etc.).



Mitigation measures of software common cause failure of digital safety protection system



Risk of simultaneous loss of function initiated by software failure

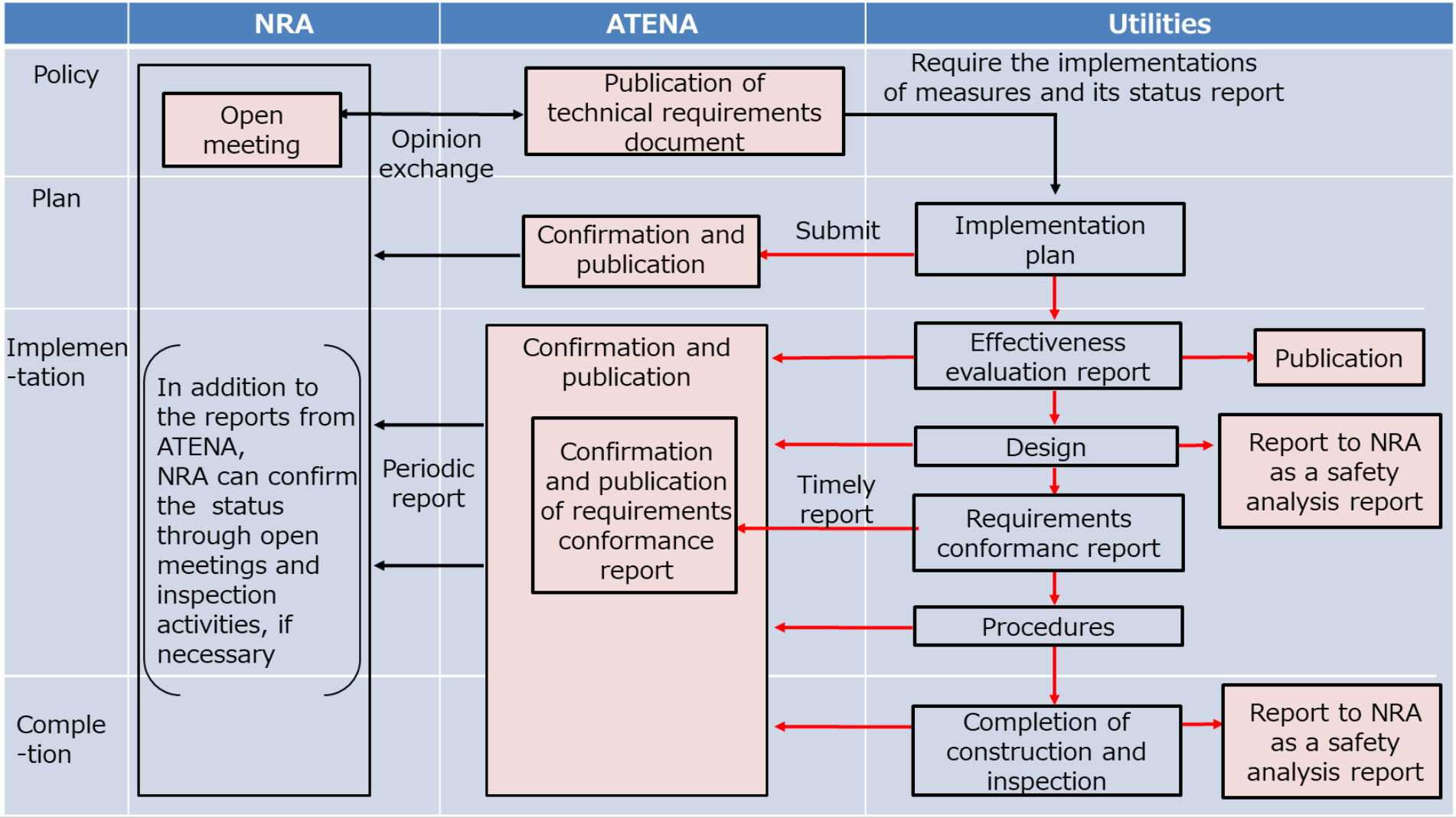
- Common understandings were shared with the regulatory authorities through technical exchanges of opinions on the digital safety protection system. In addition to existing voluntary equipment that takes into account software common cause failures, the conclusions were shared to introduce enhanced measures in consideration of the situation in other countries.
  https://www.nsr.go.jp/disclosure/committee/yuushikisya/digital/0700000 44.html

- WG was composed of experts from ATENA, manufacturers, and utilities, and additional safety measures are compiled in the Technical Requirements Document based on the latest knowledge of foreign countries.
- **In December 2020, a technical requirement document was published.** http://www.atena-j.jp/report/2020/12/atena-20me05rev0.html

- **Utilities began to examine necessary safety measures in detail in accordance with the ATENA document, and deploy those measures from fiscal 2023.**
- ATENA shall confirm the status of implementation of each utility and release it to the public.

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.



Pursue efficient and effective operation with appropriate consideration of importance classification of SA equipment (Improvement of LCO)

- 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

【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

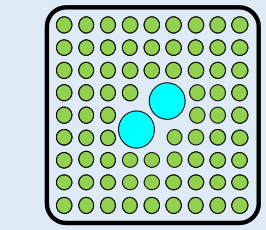
Check the soundness of SA equipment and SSF in addition to the remaining DG unit when entering LCO

Deployment of new fuel

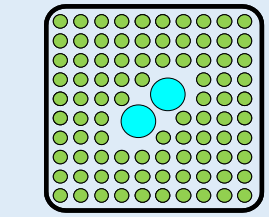
Deployment of 10 by 10 alley fuel assembly

<Characteristics>

- **Improve the safety and reliability of fuel**
  - Reduce the heat load per rod by increasing the number of fuel rods
- **Reduce the number of refueling assemblies (reduce the number of spent fuels)**
  - Increase burnup at replacement (From an avg. of 45G to 50G)
  - Increase the amount of loaded uranium per body



9 by 9 fuel assembly



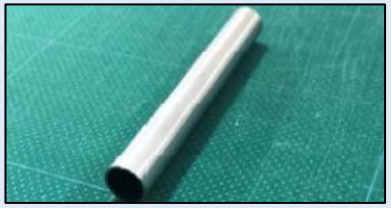
10 by 10 fuel assembly

- BWR owners in Japan are willing to introduce 10 by 10 alley fuel assembly, which has been already introduced in the US, to further improve reactor safety.
- ATENA helps this BWR owners' efforts by providing an idea for realizing efficient review process by NRA, through discussions with NRA at practical level.

Deployment of Accident Tolerant Fuel

<Characteristics>

- **Improve safety in accidents**
  - Reduce the amount of hydrogen generated
- **Improve reliability in normal operations**
  - Increase reliability by improving corrosion resistance



Cr coating cladding tube

- PWR owners in Japan are willing to introduce Accident Tolerant Fuel (ATF), which is about to be commercially used in the US, to further improve reactor safety.
- ATENA is going to coordinate the industry-wide efforts to realize efficient process of developing and introducing ATF.

② Proactive Dialogue with NRA

- **Opinion Exchange Meeting between NRA and CNOs of major utilities**

  ・Discussions on the general issues of nuclear regulation between the NRA Commissioners, CNOs and ATENA executives. (about two or three times a year)

- **NRA's open meetings and technical opinion exchanges meetings**

  ・Exchange of opinions on specific technical issues at the practical level between experts of NRA and the industry

  e.g., aging management, electromagnetic compatibility (EMC), new inspection system, software common cause failure of digital safety protection system, working team meeting of reinforcement of regulations by investigating Fukushima Daiichi accident

- **Regular administrative meetings**

  ・Daily communication on common technical issues (themes) between the Director of the Nuclear Regulation Planning Division and the ATENA Secretary General (approximately once a week)

Dialogue with NRA (major results)

< Meeting for Exchange of Opinions on Inspection System > (Full Year) 28

At the meeting at the beginning of the fiscal year, NRA presents yearly schedule of discussions, so the discussions can be prepared systematically. In addition, both sides present drafts of the materials, and confirm in advance the discussion points at the public meeting on the day. These practices enable constructive and efficient discussions at the public meetings.

< Design basis ground motion formulated without specifying seismic sources > (FY2019)

ATENA proposed the industry's thought on grace period of the backfit at the NRA's open meeting. As a reasonable conclusion, only the deadline for the installation permit was indicated, and the deadline for construction approval and completion of construction work would be set later.

< Software common cause failure of digital safety protection system > (FY2020)

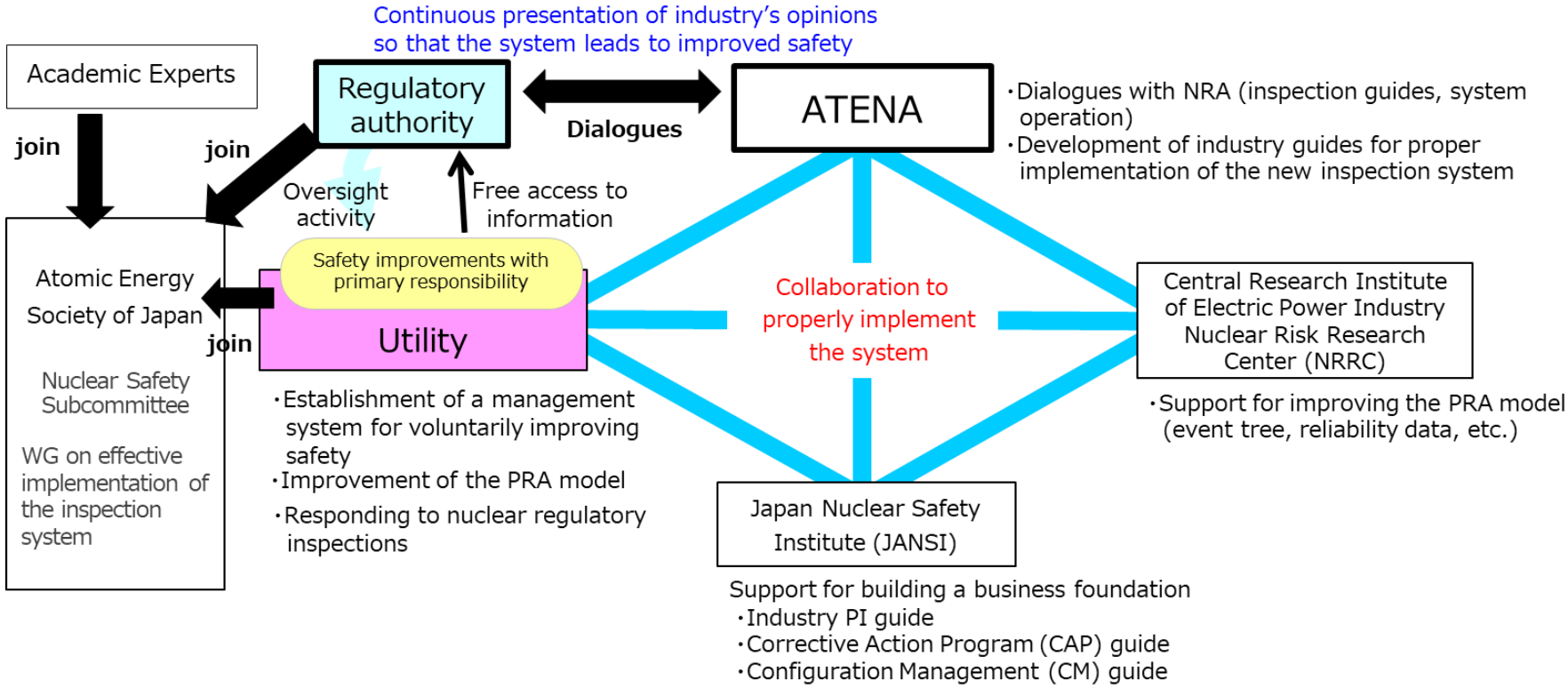
ATENA prepared a technical requirement document and promoted the implementation activities by utilities. This approach was considered by NRA as a test stone to leave the industry's voluntary efforts without backfitting by regulations.

< Efforts for Safe Long-term Operation> (FY2020)

It took some time to share the ideas about the objectives of ATENA Guidelines, their positioning, and the intent to exchange opinions. After sharing these ideas, exchanges of opinions were conducted efficiently, including prior confirmation of materials. Finally, NRA issued a position paper on the operation period.

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.



Collaboration structure in the industry

Dialogue with NRA：Areas for improvement

- There was a case in which it took some time to reach common understandings on such as the objective and the intention of the discussion between NRA and the industry, then fruitful discussions were not accomplished in the early stage of a series of meetings.

- There was a case in which sufficient communication between NRA and ATENA was not initiated on what kind of discussions is necessary at the initial stage of ATENA's technical review. As a result, when ATENA presented a draft report at the open meeting, NRA thought it difficult to discuss on it at the time of the meeting.

In order to implement a fruitful discussions, it is necessary for both NRA and ATENA to share understandings on the objective and appropriate timing of discussions on specific issues from early stage of the issue identification, then to plan necessary meetings in strategic and timely manner.

Communication with various stakeholders

○Hosted the ATENA Forum

・Held in February every year as a public event

・In the 2022 Forum, panelists discussed on the trust between the regulatory bod and the nuclear industry

＜Forum in session＞

○Presented ATENA activities in academic conference

・Planning session of the Fall Meeting of the Atomic Energy Society of Japan (AESJ) (September 2021)

○Interviewed by newspapers and magazines

・Journal of Japan Society of Maintenology: Guest message at cover page by CEO of ATENA (November 2021)

・Industry Newspaper “Denki Shimbun”: Publication of articles related to the Guide for discontinued products (July 2022)

○Meetings with executives of organization overseas

・Online meeting with the Nuclear Energy Institute (NEI) (July 2022)

・Online meeting with the Nuclear Energy Agency, Organisation for Economic Co-operation and Development (OECD/NEA） (November 2021 and July 2022)

・Meeting with EDF (January 2023)

○Mail magazine

・Started to deliver ATENA mail magazine (January 2023)

1. Outline of ATENA

2. Past Activities

3. Challenges

Challenges

○Further promotion of communication with the NRA

- ◆We have to gain the regulators' confidence in ATENA through continuous communication on the forthcoming issues to be discussed.
- ◆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, implementation schedule of each issue.

○Review on ATENA's Roles (Scope of Operations) in consideration of recent situations

- ◆Since the establishment of ATENA, we have been mainly focusing on short-term initiatives to produce actual output, but it is time to review what ATENA should really address hereafter.