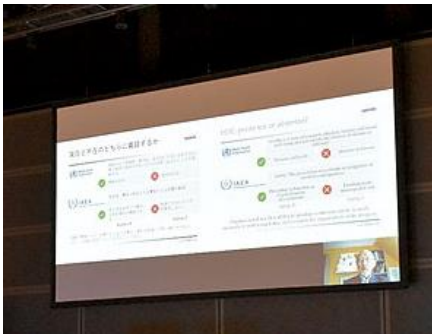


Overview of JANSI Annual Conference 2022

- ◆ Time & Date: March 23, 2022 (Wed), 14:00-17:00
- ◆ Venue: Tokyo International Forum Hall D7
- ◆ Format: Hybrid (also delivered via WebEx)
- ◆ Number of participants: Approx. 600 people



Keynote speech



Panel discussion

Opening Remarks

Chairman, Japan Nuclear Safety Institute (JANSI)

William Edward Webster Jr.



As Chairman of JANSI, I am honored to welcome you to the Annual Conference 2022. The Annual Conference is a time when the nuclear industry comes together and reaffirms our collective commitment earnestly to pursue the highest standards of nuclear safety. This Annual Conference is held every March with the aim of reaffirming the seriousness of the accident at Fukushima Daiichi Nuclear Power Plant and renewing the vow never to forget the lessons learned from the accident. While listening to the valuable lectures of the presenters today, we would like to take the lessons learned from the accident to our hearts again.

Before moving on to the program of this conference, I would like to give a brief update of the situation at JANSI. Since spring 2020, JANSI's business activities and other social activities have been greatly affected by COVID-19 pandemic. After a brief stoppage, however, we have continued with the evaluation and support activities related to nuclear safety while taking appropriate measures to prevent the spread of COVID-19 infection. This was accomplished through the innovative ideas of the JANSI staff and our counterparts in the industry. In the future, we will continue to make improvements and carry out JANSI's mission of evaluation and support activities even under adverse circumstances.

The JANSI 10-Year Strategy, approved by the Board of Directors in 2019, continues to provide firm direction for all JANSI activities. The Strategy summarizes the positioning and future direction of each JANSI activity to realize the ideal that we have put together with the utilities. We regularly check the progress of the Strategy, and we are making good progress as measured against our milestones.

Based on the environmental changes in the industry and the progress of activities, we

will continue strongly to lead the nuclear industry towards enhancement of self-regulation and with activities such as carrying out effective and efficient peer reviews including measures for WANO equivalency, continuing to monitor information on power plant performance between peer reviews, and providing support for the restart of units that have been in long-duration shutdowns and the initial operation of the JNFL reprocessing facility.

JANSI's progress as a self-regulatory organization is a journey and we are well on our way. With the support and active involvement of all of you, we are determined to boldly take on challenges and to make efforts by steadily accumulating wisdom and innovative ideas across the industry. We are confident that the voluntary safety improvement on which we work together will create a synergistic effect with national regulations and lead to the further improvement of nuclear safety for the utilities.

Under the slogan "Excellence Starts at Home," each and every employee of JANSI continues to strive for self-improvement including improving technical capabilities, and we will do our utmost to further improve the effectiveness of self-regulatory activities in close cooperation with our members. I would like to ask for your continued support and cooperation in JANSI's business activities.

Guest Speech

Chairman, Nuclear Regulation Authority

Toyoshi Fuketa



The Japan Nuclear Safety Institute (JANSI) and the Nuclear Regulation Authority are both entities that independently keep a close eye on the safety of nuclear facilities. As today's conference will focus on organizational culture that contributes to safety, I would like to talk about several aspects related to organizational culture.

First, let me introduce what we appealed vigorously within the organization immediately after the Nuclear Regulation Authority was established. That is to "identify yourself". We asked to first identify your name, not your job title, when you give a comment during a meeting. Your expertise is not attached to job titles such as section managers. Authority and responsibility may come with the job title but not expertise. By expressing scientific and technical opinions with your name, it specifies that expertise exists within the organization. The regulatory authority before the TEPCO Fukushima Daiichi Nuclear Power Station Accident often took a process that could be seen as an evasion of responsibility by saying that the decision was made by an external party with expertise, even though the substantive decision was made within the public office. Since the location of authority is clear, we believe it is necessary to clarify the name during the discussion process to make it clear that the decision will be made by the person who have authority and responsibility for it.

Another thing I have been repeatedly asking within the organization since becoming the Chairman is to "speak up". We insist that you are obligated to speak up if you have a question about your position. Not speaking up just because your colleague or manager has a different opinion is the same as an abdication of responsibility. The Nuclear Regulation Authority is aiming to become a workplace where everyone must speak up when needed.

Looking at safety in particular, what kind of psychology or mindset makes it difficult to speak up? One example is the mindset that having room for improvement means the status quo is inadequate. When something requiring improvement is pointed out to improve safety, it is regarded that the status quo is inadequate and claimed that the facility should be stopped until the improvement is completed. Such kind of claim can also lead to pressure to make people talk about the simplest and worst safety myth that all nuclear facilities are equally safe enough and have no room for improvement. Both excessive claims of safety and excessive claims of danger are dangerous elements that could revive the safety myth.

Another example is that the stance of the regulating side makes it difficult for the regulated side to speak up. When an operator proposes a good improvement measure, I think it is dangerous if the stance of the regulatory authority is to immediately incorporate the measure into the standards and make it a requirement. Any new improvement measure proposed is made a requirement by the regulatory authority and forced on all operators; this undermines the willingness of operators to speak up.

On the other hand, we are careful not to let the stance of the regulated side silence the voice of the regulating side. It is not necessarily limited to the regulated side, but often times when we make a decision, we make an extreme assumption and we take an approach that is ok if it is ok under such assumption. This is equivalent to ceasing to think when we make an extremely conservative assumption, which silences voices that seek the most probable value through understanding of the phenomenon. There may be unavoidable cases when we determine the requirement level and equipment specifications amid large uncertainties, but making an extreme assumption could seriously undermine the value of the assessment in the case of an impact assessment. The quality and quantity of gained information and the way it is trusted are different between giving leeway to take into account various uncertainties upon making efforts to seek the most reliable assessment result, and insisting that making an extreme assumption is ok because its result fits within the aimed range. Assessments with extreme assumptions signify ceasing to think about safety, which will never lead to trust.

Reviews and discussions on safety culture, nuclear security culture, organizational culture and other cultures should not take up themes with the expectation that they are unlikely to lead to concrete actions. If there are parties that do not desire new actions and parties that desire to maintain the status quo, the contours of the discussion are blurred with a large amount of incomprehensible or ambiguous information coming in, creating an impression that conclusions that lead to action are not immediately obtained. It is true that discussions around culture are extremely important, and, at the same time, difficult to derive a conclusion, but it is desirable to be moderately aware of connecting to actions while in the stage of discussion.

JANSI and the Nuclear Regulation Authority are independent of each other and respectively seek to fulfill important missions. They do not depend on each other but communication between the two organizations will continue to be important.

Guest Speech

Chairman, Federation of Electric Power Companies

Kazuhiro Ikebe



As we see in the news every day, Russia's aggression against Ukraine continues. I hope the entire world can make diplomatic efforts to strive for a peaceful resolution. There were military attacks on related facilities of the Zaporizhzhia Nuclear Power Plant in the southeastern part of Ukraine. Such an attack could have a severe impact on the surrounding region and exposes the public to danger and anxiety. It should be severely condemned. I hope this situation gets resolved as soon as possible.

Today I would like to talk about our efforts as nuclear operators and expectations for JANSI. Under a strong commitment to never let an accident like the Fukushima Daiichi Nuclear Power Station

Accident occur again, we, nuclear power operators, have been autonomously and continuously improving safety beyond what is required in new regulatory requirements in recognition of the unique characteristics of and risks associated with nuclear power generation. We are also making further efforts to improve safety of nuclear power stations through collaboration with JANSI and other external organizations. The nuclear industry as a whole will continue to look for our weaknesses and challenges and make continuous improvements.

Last February, an incident related to nuclear security occurred at TEPCO Holdings. We took it very seriously that such an incident should not happen, and measures to address the incident promptly began among all operators. Specifically, mutual reviews are conducted among operators involved in physical protection work as an effort to learn from external parties and incorporate such learning into improvements, and safety culture fostering activities not limited to physical protection are continuously being improved. JANSI has assessed the effectiveness of the self-assessment process for safety culture at each operator in the efforts for continuous improvement of safety culture fostering activities. Based on this result, each operator is currently promoting autonomous improvement of safety culture fostering activities involving management. I would like to ask JANSI to continue to support these efforts.

As interest toward climate change is globally increasing, Japan's energy supply-demand structure is experiencing various changes in circumstances, such as increased frequency and severity of natural disasters, growing risks that threaten stable energy supply, and emergence of issues associated with the progress of electricity deregulation including risk of fossil fuel price rising and necessity of securing supply capacity. We need to overcome these issues. The 6th Strategic Energy Plan reaffirms the importance of realizing S+3E at the same time as the basic perspective of energy policies. In order to further promote S+3E which is the basis of energy policies in Japan, we nuclear operators need to regain trust from the siting region and the public and steadily advance restart and stable operation of nuclear power stations, by continuing to strive to autonomously improve safety and continuously reducing risks.

Today, we will be discussing the theme of improvement of resilience of nuclear safety as a new perspective in operating nuclear power stations. Resilience means being flexible, having recuperative powers and being responsive. I believe it is extremely important for the improvement of safety of nuclear power stations to continue making efforts with a flexible mindset instead of sticking to conventional ways. I hope to gain many insights through the keynote speech and panel discussions.

Lastly, JANSI has provided tremendous support including various recommendations through peer reviews, collection and analysis of operating experience information as well as development of various guidelines including CAP (Corrective Action Program) etc. I would like to ask for your continued cooperation in leading us nuclear operators to pursue the world's highest level of excellence and aim for untiring excellence.

Guest Speech

Chairman of WANO (World Association of Nuclear Operators)

Tom Mitchell



I would like to talk about how WANO is dealing with the situation in Ukraine and supporting our member operators. WANO is taking a steady but responsible approach and carefully watching over the situation of the Ukrainian member operators. There are two WANO member operators in Ukraine. NNEGC "Energoatom" is a Category 1 member and operates 15 Units. Specialized State Enterprise (SSE) Chernobyl is a Category 3 member and is responsible for the decommissioning and waste management at Chernobyl facilities.

Our goal is to support our member operators in all forms that are realistic. On the website for the general public and website for members, WANO has issued a message requesting there be no interference of any kind with the Ukrainian member operators' ability to safely perform their work. This message is entirely aligned with WANO's mission and focus on nuclear safety in operation. WANO's performance objectives and criteria (PO&C) provide high standards to guide nuclear plant operators worldwide on safe nuclear facility operation. WANO is concerned about external factors in Ukraine that may challenge these high standards of operation. For example, personnel not readily being rested could jeopardize fitness for duty, and there may be difficulties in providing necessary supplies and spare goods to power stations. There is also the risk of inadequate supply of electricity for stations due to loss of offsite power.

In such situation, WANO supports the seven principles for nuclear safety of IAEA. If these principles are properly observed, problems that threaten safe operation can be prevented. We welcome IAEA and Director General Grossi demonstrating their leadership in the global diplomatic efforts for this problem. WANO made a public statement to directly support the activities of IAEA. However, we will stick to our non-political position which is the key to the success of our mission.

WANO responded quickly in terms of communication. We established the Crisis Information Centre to directly provide updated information on the safety status of power stations and other nuclear facilities in Ukraine to the CEOs and CNOs of all members on a regular basis. Along with regular statements published on IAEA's website, such updated information is considered as an extremely reliable information source based on facts on safety at Ukrainian nuclear power stations.

WANO was established at the peak of the Cold War, 33 years ago. We pay great respect to the vision and courage of our founders. We would like to ask for your patience and commitment toward WANO's founding principle of operators supporting each other to achieve excellence. Since its establishment, WANO has closely cooperated with members around the world including Japan. We enhanced our internal process in response to the Fukushima Accident, and in recent times, we have taken measures against the COVID-19 pandemic. WANO became a stronger and more cohesive organization by having members come together to face these challenges.

And now, we are facing a similar or greater challenge in Ukraine. I hope that members around the world will unite to help us address this new challenge as an industry. I appreciate your support and commitment toward WANO's mission. For the next several weeks and several months, we will be facing various difficulties, but I believe in WANO's safety mission. Let us work together to continue fulfilling our safety mission in a cooperative, calm and professional manner, and we shall establish a strong structure so that we can continue to support all our members anywhere in the world.

Keynote Speech

**Professor Emeritus,
Linköping University, Ecole des Mines de
Paris, University of Southern Denmark**

Erik Hollnagel

“Healthy, Safe & Effective Organizations : A Systemic Approach”



What is a more effective, safer organization? I would like to talk about an approach that is different from a traditional approach.

What exactly is safety? For example, the World Health Organization (WHO) defines, “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” It is a definition that focuses not only on the absence of disease but also on the presence of health, in other words “being” healthy. On the other hand, various industries including nuclear power focus on safety, but its definition is “prevention of accident or mitigation of impact of accident.”

Safety has two meanings. The conventional definition says it is the state of “no unacceptable risks”. However, when you think in the same way as WHO, it can also be defined as “being able to function as required under various conditions”. These are defined as Safety-I and Safety-II. From this perspective, organizational integrity is the ability to develop a common vision, work together to achieve it, and upgrade the organization in parallel.

When viewing a nuclear power station as one organization, it is divided into individual departments, sections and units, which are respectively responsible for different areas. This is referred to as stove-piped (silo), where safety, quality, human resources, maintenance, operation, engineering and outage planning, for example, are fragmented with their own specialists and budgets.

Exchange and coordination between departments are limited unless they are officially required. This comes from the thousands of years of our history of how we constructed our society. In activities related to safety and quality, our long history has seen safety becoming an issue first, then addressed, followed by the quality becoming an issue and then addressed. This resulted in a stove-piped situation where different sections were separately responsible.

On the other hand, when you want to increase the productivity of the organization, ensure safety and achieve all integrity, reliability, quality and sustainability, we must look at the big picture by combining all features, rather than looking at each of them individually. This is because each feature is interdependent and interrelated.

For example, should safety management, quality management and productivity management be regarded as different systems? We need to view them as a single system to manage a single organization as a whole. We need to understand this to resolve issues.

Humans tend to simplify a problem. However, solutions to complex problems will always be complex. If we present a simple solution even though the problem is complex, such as presenting safety culture as a solution to a complex problem, it is likely that such solution will not work out. Simplifying to explain is simply an illusion and keeps things from moving forward.

The traditional Blunt and Sharp End Model explains what determines the performance of people and organizations and why people behave in such a way. The Sharp End is also known as the coal phase, which refers to coal miners or people who cause or are directly affected by failures and breakdowns in the field. According to many research results on organizational accidents, factors of unsafe behavior include factors that are remote (spread out) from the field, such as workplace environment, organizational management, and traditions and culture unique to the industry. There are also cases of time lag, where a current problem could be the result of decisions that were made long ago. For example, regulation is done at the blunt end which is remote from the field, but its impact is felt at the sharp end (field).

Let us think about safety culture using this model. INPO defines safety cultures as “An organization’s values and behaviors—modeled by its leaders and internalized by its members—that serve to make nuclear safety the overriding priority.” This is an extremely simple definition that covers everything and seems to seek a simple solution to a complex problem. However, safety culture by itself will not solve the problem. In fact, it can worsen the problem by obscuring what is actually happening.

One way to describe safety culture is the idea of a safety journey. In other words, it is the idea that there are stages in safety culture. It starts with Basic (no safety culture), and travels through the steps Reactive (responding to a problem after it occurs), Compliant (complying with regulations), Proactive (taking the initiative) and Resilient. Necessary elements to promote and enhance safety culture, such as shared values, involvement of management, continuous learning, accountability and sustained support, are often seen as individual ideas. However, if we want to improve safety culture, we should ask ourselves three questions. The first is to know your current position. Where are you currently and how well is it going? The second is to know your goal. Where do you want to head? When you think about nuclear safety culture, you would certainly want to aim for resilience. The third is means. How will you reach your goal from your current position and what kind of changes will occur? In this mindset, it is clear that safety culture is not a practical solution. It is easy to say that we should move from complying with regulations to proactively acting on our own, but it is difficult to know how to get there including the speed to do so.

Therefore, we may get a better understanding if we change our perspective from safety culture to organizational culture. Edgar Schein identifies three elements in organizational culture. The first element is things that are created by people and are easily visible within an organization or by external individuals. The second element is basic assumption, or unconscious behavior that is taken for granted and underlies our culture. The third element is advocated value, which refers to values expressed by the organization, rules of behavior, and organizational goals. Schein says safety culture lies where these three elements overlap. Each element is not simple, and the part where those elements overlap (safety culture) is also not simple.

Next, I would like to talk about WANO's 10 Traits. WANO defines the traits as, "personal and organizational traits that are present in a positive safety culture. Conversely, shortfalls in these traits and attributes are a significant contributor to plant events." There is complexity in safety culture and more in its background. These are the 10 Traits.

WANO says, "Utility managers are encouraged to make in-depth comparisons between these traits and their day-to-day policies and practices, and to use any differences as a basis for improvements." This is where we need to clarify the current position, goals and means, which were mentioned earlier. Additionally, the 10 Traits are divided into three large categories: individual commitment to safety, management commitment to safety, and management systems. We need to consider how these three categories affect each other, how the 10 Traits relate to each other, and how changing one Trait will affect the others.

In the end, we need think about what performance is. In the traditional approach on safety, focus is placed on performance in the field. It means that performance is an action by someone when given a task. On the other hand, in the systemic performance approach, performance in the field is also observed but the perspective is different. We observe what enables performance and what is necessary to let people do what they need to do or want to do, rather than what determines performance. In other words, a systemic perspective is used, not a human perspective. For example, operators in the main control room do not work alone. This means to look at it from the perspective of what the organization as a system must be able to do, and what individuals and executives must be able to do.

In the systemic performance approach, instead of looking at only the field (micro), we think about what would increase the likelihood of getting the job done properly at all micro, mezzo and macro levels of the organization. We call this the systemic potential.

The concept of resilience engineering was introduced in 2004 and emphasizes not resilience itself but resilient performance. Resilient performance is that the organization can function as required even when faced with an unexpected situation. To do so, four things are needed as potentials. Namely, the ability to be flexibly respond to a situation, ability to externally and internally monitor what is happening, the ability to learn from both successes and failures, and the ability to anticipate long-term changes in demand and resources, as well as the effects of actions.

Taking the example of how Ukraine is defending themselves and how the Russian military is attacking, there is a big difference in their coping capabilities. Ukraine is more flexible in their response, while the Russian military has no oversight of what is happening in the field as their attacks are based on a plan that was formulated long ago. It is the same for the ability to learn and ability to anticipate. The entire world is anticipating what would happen, monitoring what is happening and trying to respond to this situation. The world is also trying to learn from what is happening right now. It is an extremely tragic and unfortunate situation, but we can think about the four potentials (responding, monitoring, learning, anticipating) from this case.

First we need to respond. If we cannot respond, we would leave both discussions and opportunities open, which will cause gradual loss of control. We also need to monitor, because if we cannot monitor, everything that is happening will become unexpected. The situation in Ukraine and the pandemic are no different. And we also need to learn. If we do not learn, we will end up taking the same action all the time, which is not good.

Resilience engineering advocates the need for the potentials to respond, monitor, learn and anticipate at all levels of the organization. It is not enough that only the operators should be able to do this. Middle managers, executives, the regulatory authority and the government must also have these potentials at their respective organizational levels. And each must respond, monitor, learn and anticipate.

Let us think about assessment of performance potentials. Each potential must be examined from a more specific perspective. Let us use anticipating as an example, which is the most difficult to do. It is thinking about what explicit or implicit models of the future look like, how far the organization is envisioning, and how much risk the organization is willing to take. We can grasp our current position by asking specific questions about each potential, such as whether we respond to a crisis after it occurs or whether we do it normally.

Systemic Potentials Management (SPM) explains the potential to respond, monitor, learn and anticipate, in detail, and raises detailed questions about each potential. Specific questions can be identified for a specific organization based on these detailed questions. The questions raised here are only general, so they need to be changed to questions that are more specific to the organization. And they must be more diagnostic and more formative. The answers to these questions can be used as a basis for making decisions about how to respond and what to do. When we think about a question, we must be able to do something with the answer. If we are not going to take action from that answer, it is meaningless to ask the question in the first place.

Answering these questions will represent the current situation. For example, questions about the potential to respond include a list of events to see what kind of events can be addressed, as well as important items such as whether there is a rule about when to stop addressing an event, whether they were verified and whether they can be addressed for a long period. Other questions include how quickly an event can be addressed, how many measures are prepared, what the threshold for addressing the event is, what the appropriateness of the action is and what the background is. These questions will receive detailed answers, which are plotted in the radar chart. By asking the same questions after a while and creating another radar chart, it lets you see where your current position is and how it has changed from the previous chart. It also lets you determine if the change is headed in the desirable direction. It means you can use the radar chart as a basis to grasp your current position and determine how you should change.

It can also show the goal you want to reach. After showing what the current situation is, managers and executives can indicate how far they want to go and how far they want to stretch the organization about the same item.

People may dislike complex answers, but we need to acknowledge that we need to prepare complex solutions for complex problems. I have seen actual examples at many organizations for many years. We can do something about organizational performance and build a safe organization. However, to achieve this, it is not enough with the conventional view that “safe equals accident-free”.

I introduced the concept of resilience engineering, which is the ability to perform the required actions in any situation. “The Systemic Potentials Management” report is about air traffic control and not nuclear power, and is available at the SKYbrary website (<https://skybrary.aero/sites/default/files/bookshelf/32380.pdf>). Please take a look when you have a chance.

Panel Discussion

Theme:

**“Enhancement of Resilience in Nuclear Safety
- New Perspective for Plant Operation -”**

Chairperson:

Kyoko Oba: Deputy Chief Engineer, Japan Atomic Energy Agency (JAEA)
Associate Professor, Nagaoka University of Technology

Panelists:

Erik Hollnagel: Professor Emeritus, Linköping University, Ecole des Mines de Paris, University of Southern Denmark

Jacques Regaldo: Senior Vice President, EDF
Former Chairman of WANO (World Association of Nuclear Operators)

Kazue Nakajima: Executive Director, Japan Organization of Occupational Health and Safety
Visiting Professor, Osaka University Faculty of Medicine

Keisuke Nagai: Director and President, Shikoku Electric Power Company

Hiromi Yamazaki: President & CEO, Japan Nuclear Safety Institute (JANSI)



Chairperson:

**Deputy Chief Engineer,
Japan Atomic Energy Agency (JAEA)
Associate Professor,
Nagaoka University of Technology**

Kyoko Oba

The theme of this panel discussion is “Enhancement of Resilience in Nuclear Safety - New Perspective for Plant Operation -”. Resilience engineering has been discussed since 2004, mainly by Dr. Hollnagel who just gave the keynote speech, and was published in 2006. It was introduced to Japan, thanks to the efforts of Emeritus Professor Masaharu Kitamura of Tohoku University and Professor Akinori Komatsubara of Waseda University. The viewpoints and importance of this concept have been shared due to the Fukushima Daiichi Nuclear Power Station Accident that was caused by the Great East Japan Earthquake in 2011. However, I think it is a common perception that there is still a long way to go in terms of whether it has reached the point of implementation based on this concept and understanding of importance. Today, I hope we can give participants something to take home by asking for your opinions from the perspective of resilience engineering toward achieving a higher level of nuclear safety while facing the current situation.

Short Speech:



Senior Vice President, EDF Former Chairman of WANO (World Association of Nuclear Operators)

Jacques Regaldo

Today, I would like to explain defense-in-depth of organizational and safety culture at EDF. Since the Three Mile Island Accident in 1979, EDF has adopted various programs, and has considered non-technical aspects or human factors in doing so. One of these is the establishment of an independent safety department. This has taken root as organizational culture for several decades and enables efficient monitoring of safety culture to this day. Additionally, experts on human factors are stationed at power stations, who analyze human factors and safety culture.

From around 2019, we decided to systematically implement further activities at each power station. This is because safety culture may be one answer but is too simple to become the answer to a complex problem, as Dr. Hollnagel has also said. Therefore, we developed a multi-year safety roadmap four years ago, and adopted the action of diagnosing safety of each power station on-site every year and discussing it with Head Office.

In creating the roadmap, we take into account internal and external input. For internal input, a safety awareness survey is normally conducted every two years in odd-numbered years. This is based on WANO'S 10 Traits. The survey is subject to all station staff, sometimes including permanent contractor personnel, and can grasp both positive and negative trends at the power station. In even-numbered years, self-assessment is conducted for managers at the power station. This focuses on three categories: leadership, development and involvement with staff, and management and sustained improvement. The received feedback identifies the strengths and weaknesses of the power station. We create a roadmap with such input, and each action indicated in the roadmap is put into practice after decision-making. Additionally, the safety diagnosis is implemented every year. The power station and Head Office hold discussions at the executive level based on this diagnosis. They discuss the results of internal assessments and internal reviews and also discuss how they can be utilized in the roadmap.

Opinions from external parties are also utilized. For example, data from experts on human science, as well as other external sources, are taken in. There is also an internal organization that conducts an audit known as nuclear inspection. Each power station undergoes an internal comprehensive safety evaluation and WANO peer review every four years, and their differences are also discussed. In this way, EDF is working to increase resilience in safety culture as an organization, while also making use of opinions of external parties including WANO.



**Executive Director,
Japan Organization of Occupational Health
and Safety
Visiting Professor,
Osaka University Faculty of Medicine**

Kazue Nakajima

I am going to talk about how psychological safety and teaming are necessary for an organization to demonstrate resilient performance. Today, resilience is a topic of interest in healthcare in Japan, particularly in safety and quality management as well as team or organization management.

How a complex system is controlled varies among workplaces. For example, in the automobile production line, the company builds the work environment with a top-down approach to pursue work efficiency, where people demonstrate standardized performance. On the other hand, health care settings have constant changes and many constraints, characterized by unpredictability and uncertainty. People demonstrate bottom-up, autonomous, goal-oriented and flexible performance through agility and teamwork. Many workplaces are located somewhere between these two ends. More important is that any business is a complex adaptive system that functions in the changing environment under constraints.

There are two approaches to understanding how a complex system functions. An analytical approach attempts to understand the parts of a complex system (biological system, for example) by reducing it to its components. A synthetic approach attempts to understand and reconstruct what characteristics of the whole system arise from interactions among its components. In safety management, an analytical approach was conventionally used, where a failure that occurred in a system such as a team and an organization was explained by the performance of its components, specifically by adding up poor performances of individuals or machines (Safety-I). In contrast, a synthetic approach based on resilience engineering theory unravels the mechanism of resilient performance by a team or organization by focusing on interactions between individuals or systems to make things go well (Safety-II).

Resilience refers to the characteristics of a system that can successfully adapt to and continue to function in a disturbed and constrained environment. It can be called sustainable adaptability. In a resilient system, flexibility, autonomy, efficiency, and extensibility are observed. In a resilient organization, teaming is often demonstrated. Teaming means that people who do not usually work together gather across departmental and professional boundaries to collaborate and improvise teamwork according to the situation, unlike teams that train together with the same members like a sports team. Psychological safety and someone who bridges boundaries, known as a boundary spanner, are essential to make this happen.

Let me give you an example of teaming in a hospital setting. A patient suspected of aortic dissection and urgently admitted to cardiovascular surgery developed severe anaphylactic shock during a contrast-enhanced CT scan. Even worse, the patient went into difficulty securing the airway necessary for lifesaving measures and was finally saved and treated. A few days after the medical intervention, aortic dissection was suspected again. Another contrast-enhanced CT scan could cause the same critical situation. There was a high possibility that he could not be saved in that case. On the other hand, when the scan was not provided, an appropriate treatment plan could not be developed to save his life.

The attending cardiovascular surgeon consulted the patient safety doctor, who was familiar with the hospital resources and specialized in emergency medicine. He proposed to perform the CT scan in the emergency department, not in the CT room of the radiology department for planned CT scanning, with support from a radiologist and nurses of the emergency department and an anesthesiologist and a pharmacist in the operating room. However, everyone hesitated. Then, he asked the radiologist, the nurses, the OR pharmacist, and the anesthesiologist what they were concerned about and how they were truly feeling, and acted to mitigate these concerns. This process fostered to form psychological safety, leading to teaming. They were confident that they just had to perform their tasks as usual within their scope of responsibility, which resulted in achieving the goal safely.

Psychological safety does not mean a comfortable and friendly atmosphere. It is a workplace environment where each staff member can speak up without hesitation to voice concerns or different opinions, ask for help and openly discuss failures. It is kind of a catalyst for a chemical reaction known as teaming. Psychological safety is an essential requirement for teaming because it promotes collective learning. To take risks and challenge a goal in unpredictable and uncertain high-stake situations, everyone should share their opinions and wisdom, find robust solutions, and make corrections while doing. These interacting processes bring about effective team performance.

The role of a leader is vital in shaping psychological safety. In particular, work should be framed as "a place for team learning." Work is not routine operations in a fixed manner. The leader also needs to encourage team members to speak up by asking various questions to avoid staying quiet. In this clinical case, the patient safety doctor connected various departments and experts in the hospital as a boundary spanner and resolved actual concerns and questions of the people involved, thereby generating psychological safety.

Fostering interactions between people and departments are needed to demonstrate resilient performance and the integrated strength of a team or an organization, while conventional staff education focuses on improving individual performance and competency.

In FY2020, being so busy and stressful during the COVID-19 pandemic, the Department of Nursing at Osaka University Hospital conducted training incorporating resilience engineering theory in nursing management. The purpose was to change the mindset of nurse managers. The goal was to understand how people achieve their work under changes and constraints to enhance the resilient performance of a team, rather than identifying the poor performance of individuals in failures and improving compliance. Based on the cases brought by each nurse manager, group discussions were held focusing on how their work was achieved, paying attention to disturbances and constraints in their work environment, looking at the system broadly, and having interests in interactions between the people or the departments. Then they shared findings in their discussions and exchanged their opinions. The post-training questionnaire found many positive words in the free comment, such as ties of people and relationships between departments, change in the mindset of safety, pride for the organization, joys in work, etc. That may indicate that the purpose of the training was achieved.

In summary, the formation of psychological safety and boundary-spanning leadership can enable the team and organizational learning, leading to demonstrating team and organizational resilience.



Director and President, Shikoku Electric Power Company

Keisuke Nagai

I would like to introduce our initiatives to enhance organizational resilience at Ikata Power Station. Currently at Ikata Power Station, Units 1 and 2 are in decommissioning and Unit 3 is in operation. Ikata Unit 3 restarted its operation in August 2016 after achieving conformity with the New Regulatory Requirements. It is now in its 3rd cycle after restart. In October 2021, use of specific major accident response facilities began, which completed the series of development of hardware and software for the New Regulatory Requirements. This means we have shifted from the phase of achieving conformity with the New Regulatory Requirements to the phase of enhancing organizational resilience upon brushing up past developments. Today, I would like to introduce three initiatives deeply related to “Anticipating” capability which is one of the four basic skills of resilience.

The first initiative is the utilization of enterprise asset management (EAM). In order to optimize overall equipment maintenance work such as daily maintenance and outage, Ikata Power Station introduced EAM for all of its group companies in FY2008 ahead of other companies. This allowed various information related to work management and other station operations to be shared in a timely manner with everyone involved and drastically improved the transparency and reliability of work. Activities to widely collect problems that may affect the quality, analyze causes and take corrective actions (CAP) are developed using EAM, and any employee or group company employee is able to input findings from the field into the system. In the daily screening meeting, input information is determined whether it will affect nuclear safety (CAQ), and activities are implemented accordingly. Highly transparent work execution and information sharing through utilization of this system are the basis of organizational resilience at Ikata Power Station.

The second initiative is the establishment of the Process Control Section. This is an organization whose purpose is to review work plans developed by the section in charge from an independent standpoint and check its validity. Rather than simply double-checking work procedures, the Section conducts reviews focusing on risk-critical work from a risk management perspective that examines what kind of action should be taken if an accidental failure during work or other unexpected situations occur, and proposes improvements as necessary. This contributes to improving and enhancing anticipating capabilities.

The third initiative is top leadership. Since assuming the position of President, I try to visit Ikata Power Station and other field offices for opportunities to directly talk with our employees. We exchange opinions in small groups to share safety awareness through two-way communication where I listen to the honest feelings of the employees and I share my thoughts. Knowing the situation of the organization in real time increases anticipation capabilities, which is also necessary for demonstrating top leadership.

There are two points for enhancing anticipating capability. The first is being able to appropriately collect many findings and information, and the second is being an organization that can flexibly make decisions focusing on nuclear safety at all levels. Even if the decision comes up empty, I think the culture which values the action is important. I would like to brush up these activities and continue to enhance organizational resilience.



President & CEO, Japan Nuclear Safety Institute (JANSI)

Hiromi Yamazaki

Based on the lessons learned from the Fukushima Daiichi Nuclear Power Station Accident, industries in Japan and JANSI have worked to establish a culture of organizational management and continuous improvement that not only satisfy national regulations but also learn from domestic and international knowledge and make continuous improvements upon identifying problems on its own.

After listening to Dr. Hollnagel's keynote speech, I thought about again how we can make the most of our past efforts to establish self-regulation and autonomously improve safety.

In addition to Safety-I, which analyzes the causes of infrequent accidents and events to prevent their recurrence, Safety-II or resilience, which focuses on what is going well for the majority, that is, the ability to notice fluctuations in daily performance and maintain functions through the management structure and appropriate human response, gave us a new perspective.

Improvement initiatives at nuclear power stations and JANSI's support activities are considered to have already taken in the perspective of Safety-II and resilience, but more consciously focusing on what is working well and the importance of resilient organizations may give us more hints for safety improvement. We may also realize that what is working well on the surface just happened to work and find ourselves in unexpected pitfalls. It is also important to have the perspective to focus on and improve performance and the four core skills.

We organized the initiatives in nuclear power station operations and JANSI's activities that support them into the four core skills. In the future, we would like to focus on what is working better than ever in each activity, and focus on perspectives that ensures individuals, management and the organization effectively function as a system as a whole in each activity. We shall start out with further improvement of the effectiveness of our activities by adding new perspectives to existing activities, rather than starting a new project.

What we need to be careful here is that the mentioned activities do not just fit into one of the four core skills. For example, CAP (Corrective Action Program" is an activity to report and share events that are even slightly out of the ordinary at a low threshold, nip problems in the bud, prevent equipment failure and human errors, and identify and address trends of deterioration of performance by analyzing the vast number of registered events. This is an activity involving not only the skill of learning but all skills of monitoring, anticipating and responding. If we add new perspectives here, we can learn something new about near-miss cases registered in CAP by regarding them as successful cases that did not lead to an accident based on not only its cause but also why it was just a near miss.

Improvement of resilience requires an organization to both effectively function as a system and appropriately maintain safety culture as its base. In particular, it is important to view people as a factor for working well by appropriately responding under changing operating and environmental conditions, and not just as risk factors that cause human errors. I believe it is important to have an environment where each person can feel as the main character and an open atmosphere where everyone can communicate without division.

Discussion:



○**Chairperson Oba** The four panelists introduced their experiences and initiatives in their organizations in line with the keyword “resilience”. First, we would like to ask Dr. Hollnagel for his comments, and then proceed to discuss. In the second half, I would like us to think about improvement of resilience in nuclear safety and new perspectives of plant operations, using the keyword of psychological safety which was pointed out by an independent review committee for the incident on nuclear material protection occurred at TEPCO Holdings last year.

Then, Dr. Hollnagel, were the initiatives of each organization in line with “approach of systematic performance” which you address? Can you evaluate each initiative by specifically pointing out what was good and what needs to be improved, while linking them to current position, objectives and means which you raised as challenges of creating and managing safety culture?

○**Dr. Hollnagel** Extremely interesting initiatives were introduced. Everyone clearly understood that they need to change their perspectives. While the traditional approach was to focus on weaknesses and risks and reduce or eliminate them, Safety-II focuses on strengths and seeks what can be done better. I think the initiatives introduced by everyone are conducive to this. Focus on strengths and strengthen what is working well to make it even better. Doing that systematically and systemically is what resilience engineering advocates. Its potentials are responding, monitoring, anticipating and learning. However, this does not mean that we should just introduce this as one package. It is not a simple solution but a change in our approach to establish a new perspective.

The importance of anticipating was pointed out by several people, but the future is uncertain and no one can anticipate what the future will turn out to be. The word roadmap was also mentioned several times. It is meant to be a map that shows the way forward, but this is too simple in some aspects. For example, when you draw a path for safety and production or long-term maintenance and servicing, there is no map that shows the future. That is because situations constantly change. A roadmap is based on the assumption that the situation will not change.

Anticipating is of course necessary, and developing plans for the future are also necessary. However, the road to the future is not on land but on sea. We must assume that we do not know what the sea conditions will be like. There are no signposts. We always have to know where we are, know the sea conditions, and think about how we can move forward.

○**Chairperson Oba** The road to the future is on sea. This is quite intense and very different from our perception, but it made me realize that we must think as such and prepare for it. I would like us to enhance our performance and potential to be able to take better actions in any situation from here on, so I would like to cut into some of the barriers and problems to do so. Mr. Nagai, what did you think of what Dr. Hollnagel said?

○**President Nagai** We have taken on conventional approaches, such as awareness surveys, oversight, and trend analysis of CAP, and we can evaluate the qualitative improvements made by them, but we have had difficulty connecting them to quantitative results and it has been a problem that we are unable to make concrete improvements. In particular, there is a challenge of how to evaluate the actual effect of top leadership initiative. After listening to Dr. Hollnagel, I thought SPM would be an effective tool. I would like to ask for your suggestions on how we can apply this to nuclear power.



○**Dr. Hollnagel** SPM is a systematic method. Since it is not commercially available to be used as is, it must be adapted to individual conditions and organizations. The important thing is to do things systematically. Therefore, management documents must show that a systematic approach is properly taken. It would likely be a guideline, and it needs to be tailored to your organization and in the context of nuclear power when you use it.

○**Chairperson Oba** I know that JANSI is making various efforts, but I would like to ask you if there are any areas that you feel are lacking in order to increase resilience in nuclear power sector in Japan or if there are any areas that you have noticed that need to be strengthened, through this conference.

○**President & CEO Yamazaki** The Japanese industry is working to ensure that autonomous continuous safety improvement activities take root, based on the reflection of the Fukushima Daiichi Nuclear Power Station Accident, and the mindset of not only management but also the field is changing considerably. By adding the perspectives of resilience and Safety-II to these activities, I hope for the activities to further contribute to the improvement of safety

However, the concept of Safety-II and resilience in normal times itself is new to the nuclear industry, especially in the field at power stations, so it is premature to apply it to any new project or package. I believe that the ideas of resilience and Safety-II are already part of our daily activities, so we should start by being aware of them and thinking about them from a different perspective. On top of that, it would be good if our daily improvement activities could change into initiatives that improve core skills.

It is a wonderful idea to learn more from what is working well. However, we are not usually aware of what is working well, so we must consider how to find and identify it. For example, we regard near-miss cases not as something negative but as successful cases, think about factors that prevented further deterioration in the analysis of the causes of accidents, and JANSI has a bird's-eye-view of performance of each power station in Japan. Thus, I think it is important to start with details, such as taking up what went well and not just what went wrong, by introducing activities that are better than others and reflecting daily work in the field at power stations.

○**Chairperson Oba** To focus on the things that went right, which is one of the activities after the Fukushima Daiichi Nuclear Power Station Accident, is extremely important in properly assessing what we have now and knowing our current position as Dr. Hollnagel pointed out.

On the other hand, there is a significant gap between normal times and emergencies in nuclear power. It is extremely difficult to judge under which circumstances and situations resilience should be demonstrated. Dr. Nakajima, I think that even in the medical field, it may be quite difficult in some areas to actually change people's behavior even if the conditions are right or we know that this is necessary. What do you think about this?



○**Dr. Nakajima** The initiatives at Osaka University Hospital that I told are not an intervention led by someone in a top-down way. The head nurses were doing their best every day, but they tended to focus on the incidents and issues and introduced many rules to solve them. They have been wondering whether this is the right thing to do. In such a situation, Dr. Hollnagel visited our hospital in 2013 to give a lecture, which led us to think that resilience might fit nursing management and inspire them to learn more about it and implement it even though it is difficult. The head

nurses at Osaka University Hospital generally scored high in psychological safety measurements but felt a little uneasy in nursing management. Head nurses thought they should know correct answers to issues raised from everyday clinical work, providing them to the staff. In fact, there is no absolute solution, and anyone, even a leader, cannot make a proper decision alone because things are often uncertain and unpredictable in the medical field. Instead of working by the book, people in the team should learn together through their work, feeling their growth. The learning program in the Nursing Department is an autonomous movement by those who are attracted by resilient performance, and we are in the middle of learning, growing and evolving.

○**Chairperson Oba** Dr. Nakajima mentioned earlier that psychological safety is never simply comfortable. In addition to psychological safety, boundary spanners, people who bridge boundaries, are catalysts for a chemical reaction called teaming, which results in increased resilience. In Mr. Regaldo's experience, was there a power station that was aware of psychological safety? If so, I would like you to share with us from when that was and what kind of effect it had.

○**Mr. Regaldo** Psychological safety is obviously important, regardless of how you describe it. It has become recognized within the business community that it is important that all team members work under trust and that any questions or concerns need to be reported. The concept is also covered extensively in WANO's 10 Traits as "Questioning Attitude," "Respectful Work Environment," and "Environment for Raising Concerns." For example, EDF's power stations accept safety awareness surveys and WANO peer reviews and incorporate the results of these evaluations into our roadmaps. In this context, it is observed whether deviations and near misses are properly reported. This is necessary in order to anticipate unfavorable events and implement preventive measures.



○**Chairperson Oba** Next, I would like to ask Mr. Nagai. We can report what has occurred, but at the stage where we have a concern, while we do not know if it will actually occur, it is difficult to discuss concrete measures to prevent it. In particular, Japan is originally known to be a society where it is difficult to express one's opinions, but how conscious is Shikoku Electric Power Company of psychological safety?

○**President Nagai** We often say "an open workplace." Having an atmosphere where people can frankly confide any concerns or worries they may have will lead to improvements and squashing any budding risks. However, it is extremely difficult to put this into practice.

Ikata Power Station implements very muddy activities. For example, in order to foster a sense of unity and create an environment where people can frankly discuss issues, we engage in volunteer activities and friendly activities altogether by those who work at the station including members of subcontracted companies. In addition, in order to resolve the situation of being difficult to confide problems, the Ikata Forum is regularly held where executives and the younger generation freely exchange their opinions. When I also visit the field to talk with young workers, I have station executives leave their seats so we can have a frank interaction. In any case, since everyone at nuclear power station works under a very high tension, I think it is very important to create an atmosphere where people can release this tension and say one's opinion candidly each other to prevent failures caused by people.

○**Chairperson Oba** Dr. Nakajima, from your perspective as someone who engages in resilience in medical field, what did you think about the initiatives at nuclear power stations described by Mr. Nagai?

○**Dr. Nakajima** Exchanging opinions between senior management and front-line people, which Mr. Nagai showed in his presentation, can be a place for collective learning and a valuable opportunity to enhance the potential for resilient performance in the organization. I am very impressed that you have cherished and nurtured what we cannot see. And when solving systemic problems, changing information or material

flows rather than intervening individual behavior can be workable as system thinking suggested. Implementing the integrated information monitoring system, a system that allows everyone to see the information just in time rather than just a few people is an excellent intervention to change the organization's behavior.

For one more thing, Dr. Hollnagel seems skeptical about implementing predetermined or static approaches such as programs or packages for safety management. I think that the nuclear industry is not a simple system that everything would go right as long as you do this and that. Things do not proceed in a deterministic manner. Instead, the nuclear industry is a dynamic system, not static, and demonstrates safety because people in the systems make performance adjustments under various constraints and disturbances. In that sense, it can be better to adopt approaches in safety management, considering the dynamic nature of your system.

○**Chairperson Oba** I would also like to ask Dr. Hollnagel. I understand that medical or other fields and nuclear power have many differences in their original situation, but I would like to hear from you if there is anything you would like to see deepened or if you would like to reiterate this point of view, among what you have heard so far from the nuclear side.



○**Dr. Hollnagel** Psychological safety can also be described as anticipation and certainty. What is the probability of something occurring? For example, if it can be assumed that a certain thing is bound to happen in a relationship, then it is a safe relationship. If you can be sure that nothing unexpected will happen with that person and that the other person will not react in a way that you do not know how to react to, then you have psychological safety.

Nuclear safety is certainty. You ensure that problems do not occur at a plant. The same goes for medical care. The goal is to ensure that the treatment does not result in a bad situation, that proper care can be given to the patient, and that the disease is cured. Various activities are carried out and people work at all levels for this. Whether it be senior management, the president, maintenance personnel, or a worker, each of them tries to understand what is going on and increase certainty by their own actions. This gives them psychological safety and allows them to work with a sense of peace and serenity as individuals. When you are psychologically unsafe, you are unable to relax, are stressful and unable to concentrate, and have to be on constant alert. Therefore, how you achieve psychological safety becomes extremely important.

Also, the concept of safety culture was mentioned many times, but we always miss the concept of time when we talk about safety culture. There is no perspective on how much time we need to change the culture. To be honest, no one knows that, but the culture will not change unless it takes 10 years, 15 years or 20 years, not half a year, several months or two years. Therefore, there is still no simple solution. It is because a simple solution should not take so much time.

○**Chairperson Oba** After hearing what everyone has said, I would like to hear Mr. Yamazaki's opinions on actual examples of various initiatives and current problems, from the perspective of improving psychological safety of station personnel or safety culture.

○**President & CEO Yamazaki** Psychological safety is essential not only for resilience but also for an organizational culture that contributes to safety.

As Mr. Regaldo said, psychological safety is not a single item, but a combination of various factors, such as leadership, communication and work environment, that ensure psychological safety.

JANSI provides opportunities for just CEOs or CNOs to gather and discuss their efforts and concerns about fostering safety culture. When we had a discussion among CNOs the other day, there was something that made a lot of sense to me. While knee-to-knee

discussions with the person in charge at the power station can be effective in increasing psychological safety, we should not just listen to it and end it there. Feedback, where you organize the opinions that come up, communicate your thoughts, and take immediate action on those that need to be addressed, increases psychological safety. Conversely, not doing so feeds learned apathy.

Additionally, the system for psychological safety must be designed to reinforce it in the work done in the field. For example, in the CAP, you are asked to report various items that you notice. You need to clearly indicate to station workers and contractor staff that it is the station's expectation to immediately report it and share it within the power station if they notice anything out of the ordinary. It is also important that the system is designed so that those who give the report are recognized and appreciated, even if it is a failure or human error event as reporting them contribute to improvement. Feedback is important here as well, and if appropriate action is taken, such as commending the reporter for an important report and making it visible that the reported content, including its details, is utilized for improvement, it will increase the staff's sense of participation and foster psychological safety.



○**Chairperson Oba** Lastly, I would like to ask Dr. Hollnagel, Mr. Reglado and Dr. Nakajima to give a word of encouragement to the Japanese nuclear industry in its pursuit to increase resilience. Followed by Mr. Nagai and Mr. Yamazaki to say a few words of their determination to pursue enhancement of nuclear safety.

○**Dr. Hollnagel** I feel that changes are evidently occurring right now. We found that the essence of resilience engineering, which is to take a good look at what is going well and well done and move in the direction to further enhance them, rather than just focusing on failures and what is not going well, is not only recognized but actually used in a very practical way.

○**Mr. Regaldo** Nuclear safety, safety culture and psychological safety, which we discussed today, are not new concepts, but they have made very significant progress. For example, after the Three Mile Island Accident, we understood that human errors can accumulate, and we have tried to address human factors and find answers. Later, the term "safety culture" emerged and tools were developed to measure it. This is because it will lead to improvement if it can be measured. This is a good trend and I think we are moving in the right direction.

However, we want to reduce uncertainties as much as possible, and progress still needs to be made. In my experience, it is a very meaningful and useful discussion to go in depth and raise objections when there is a discrepancy between a plant's self-assessment and WANO's peer review observations. There is no end point to these efforts, but I think we have seen a great deal of progress over the past 10 years or more.

○**Dr. Nakajima** I learned a lot today. As Dr. Hollnagel pointed out, conventional safety management viewed humans as dangerous beings that cause human errors, but new safety management by systemic approach views humans as sources that produce resilient performance of the team or organization. This is what we exactly saw in the response to COVID-19 by us in the medical community.

It was important for everyone's performance to be well synchronized without dissonance. The first thing that supported this was the morale of the staff in the field. The second was that various experts in various departments were teamed up across boundaries, with psychological safety and a clear goal to save patients' lives. The third is inconsistency. Generally it is thought to be a bad leadership, but implementation of anticipating, monitoring, responding and learning as mentioned by Dr. Hollnagel today, had to be done under the inconsistent conditions responding to COVID-19. I believe these three things is an important aspect that is common across varieties of industries for resilient performance of organization.

○**President Nagai** Ikata Power Station has completed the series of actions for the New Regulatory Requirements and has entered a new stage. In order to further increase safety and security, I realized the importance of strengthening organizational resilience, lowering psychological barriers and incorporating Safety-II in addition to Safety-I to address safety in a more relaxed manner. Since it is not easy to do this on our own, we would like to have JANSI and other third parties come to the site and give recommendations, so that we can enhance our existing efforts to further address safety and security.

○**President & CEO Yamazaki** Resilience and Safety-II, which we discussed today, are still new concepts for the Japanese nuclear industry. Rather than aiming to implement them in the field right now, I think we should start out by using today's discussion as an opportunity to take another look at our work from this new perspective and focus on what is working well with the four core skills as keywords.

Lastly, in the workshop for head nurses presented by Dr. Nakajima, there were very positive comments from the participants saying, “We may be able to find a different improvement measure under Safety-II,” and “It makes me happy to hear about examples that are going well.” I felt that the perspective of focusing on what is going well, rather than only on the failures, provides new insights in the field.

○**Chairperson Oba** For those of us who are used to thinking of nuclear safety in terms of implementing hardware measures, fostering safety culture is a difficult task, but today I could understand once again that we must not seek simple solutions but rather work with the assumption that it will take time. We also conduct various questionnaires and interviews to try to understand the state of safety culture, but from the viewpoint of whether we are giving feedback, furthermore, asking specific questions, requesting specific answers and leading to specific actions based on them, we need to rethink it. This is a new perspective of station operations.

I would like us to focus again on psychological safety and properly evaluate what we are doing now. New good activities might be found when viewed from the perspective of Safety-II. I hope we can apply them to our future safety enhancement including these points.

Closing Remarks

President & CEO, Japan Nuclear Safety Institute (JANSI)

Hiromi Yamazaki



In today’s conference, we focused on organizational culture that contributes to safety, held discussions with domestic and international experts and deepened understanding, and envisioned future activities to improve resilience of nuclear power stations. The conference was unfortunately held mostly in online style due to the recent COVID-19 circumstances. In such a situation, we had overseas guests who gave a lecture or participated in the discussions early in their morning, we had panelists who came to the venue despite the COVID-19 circumstances, and we had approximately 600 participants in Japan and from overseas. I would like to thank everyone for all of this.

Ideas of Safety-II and systemic approach, which were introduced in the keynote speech and discussions, are very attractive as it gives us a new perspective, but I believe we in the nuclear industry are still in the process of developing a concrete theory. I hope today’s keynote speech and panel discussion became an opportunity for you to gain many new insights to improve nuclear safety and organizational resilience. I hope they will be utilized in your own way.

JANSI will continue to lead autonomous continuous improvement activities of operators and respond to their requests as a self-regulatory organization in the industry. As the organizer, I would like to express my deepest gratitude to everyone who participated in this conference.

This document was prepared under the responsibility of Japan Nuclear Safety Institute (JANSI). Honorifics have been omitted.