

Overview of JANSI Annual Conference 2021

- Date: Wednesday, March 17, 2021 15:00~18:20 Online
- Participants: Approx. 600 (of which approx. 60 from other countries)



Report delivered on ongoing activities



Online panel discussion

【Opening Remarks】

William Edward Webster Jr.

Chairman, Japan Nuclear Safety Institute (JANSI)



First, under the circumstances of the global pandemic, I would like to thank you for your remote participation today. This Eighth Annual Conference is a time when we, the leaders of the nuclear industry, come together and reaffirm our commitment to relentlessly pursue the highest standards of nuclear safety. We hold our Annual Conference in March of each year as a means of remembering and reinforcing the lessons from the Fukushima Daiichi accident. As we mark the 10th anniversary it is a particularly appropriate time to reflect on what we have learned and accomplished, where we stand today and, most importantly, where we go in the future.

I would like to share with you my reflections on the accident at Fukushima Daiichi and the lessons that have been internalized by nuclear professionals around the world. It is important to note the many and substantial improvements in nuclear safety across the globe, and in Japan in particular. We have reconsidered the fundamental meaning of nuclear safety and safety culture; we have hardened our nuclear facilities to withstand extreme external events, established resilience in emergency response and training, and implemented voluntary safety programs such as the formal corrective action program.

I want to highlight the industry's extraordinary collective commitment to nuclear safety and firm resolve to never allow another such accident. This commitment begins at the top, the visible commitment of the most senior leaders in the industry. And most importantly is the commitment of the men and women on the front-lines of the industry, those at the nuclear stations and suppliers, that embrace industry programs for continuous safety improvement. The Japanese industry, as well as the global industry, has experienced a cultural transformation with respect to nuclear safety since the fateful day in March 2011.

I will provide a brief update on JANSI activities. JANSI's business operations were greatly affected by the COVID-19 pandemic. After a brief stoppage of JANSI activities, and with creative innovation by JANSI staff and strong support by the industry we have resumed our full array of safety oversight programs with new safety protocols to prevent the spread of COVID-19. We would like to thank the utilities for their cooperation, and we will continue to make improvements and carry out effective activities under all conditions.

Regarding the JANSI 10-Year Strategy approved in 2019, which summarizes the positioning and future direction of each JANSI activity in order to realize the ideal, we are seeing positive results.

With the support and active involvement of all of you, we are determined to make efforts by steadily accumulating wisdom and ingenuities as a self-regulatory organization. We are confident that the voluntary safety improvement will create a synergistic effect with national regulations and lead to the further improvement of nuclear safety. Under the slogan "Excellence Starts at Home," each and every one of JANSI will continue to strive for self-improvement including improving technical capabilities, and 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 understanding and cooperation in JANSI's business activities.

【Guest Speeches】

Shinsuke YAMANAKA

Commissioner, Nuclear Regulation Authority



This year marks the tenth remembrance of the accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station. A variety of organizations have been established out of tremendous regret for the accident. Founded in 2012, JANSI has been a driving force spearheading activities for enhancing nuclear operator safety so as to ensure the pursuit of safety in Japan's nuclear industry. JANSI is a private sector nuclear regulatory body comprised of professionals possessing very high-level practical nuclear capabilities. I believe it already has amassed a considerable track record of achievements compared to other organizations.

Nuclear Regulation Authority Chairman FUKETA talked about what sort of regulatory body JANSI should be in terms of priorities, readiness, relationships with non-regulators, risk information utilization, safety culture, and other areas in his address to the 2018 Annual Conference. The Nuclear Regulation Authority and JANSI both seek to improve the safety of nuclear facilities. Despite employing different methods, both are involved in regulating operators, and I also believe dialogue between these two institutions is crucial.

So, as part of setting that dialogue in motion today, I would like to discuss my impressions of and expectations for JANSI's activities.

First, I would like to talk about the Nuclear Information Archives or NUCIA. It is an important source of information about problems and other first-hand data and has been widely shared with the public. JANSI, which prides itself as a private sector regulatory body, analyzes and evaluates the data and presents nuclear operators with proposals for measures that effectively enhance safety. I would like to propose that JANSI showcase these activities. It is my hope that the results of such analyses and evaluations might be discussed during working-level dialogues with the Nuclear Regulation Authority and the Secretariat.

The next item that I would like to address is the continuous enhancement of safety. JANSI has also been engaged in reviewing nuclear operators and conducting regulatory activities in the private sector to assess and assist safety enhancement. Nevertheless, how exactly these review results have been reflected in operator safety improvement activities has not been visible. I am well aware that agreements have been concluded with international institutions and that information about specific operator reviews may not be disclosed, but I hope there will be greater transparency in the future, which will enable the fruits of such reviews to be more visible within the larger framework. My hope for JANSI is that it will engage in highly transparent private sector regulatory initiatives that will steer the nuclear industry.

Next, I would like to talk about the new oversight program that began in April 2020. Although we have faced very difficult circumstances during the COVID-19 pandemic, the new oversight program has gotten off to a good start. JANSI has already prepared guides for CAP and other areas as well as rolled out activities to encourage operators to enhance safety. CAP is a particularly vital element of the new oversight program, so I hope JANSI will continue to check that operators' CAP activities are functioning effectively. I hope JANSI will play a role in providing assistance so that arrangements and improvements may be shared by all operators. I also believe that cooperation with the Nuclear Regulation Authority will also be possible with this effort.

Lastly, I would like to talk about improving operators' management systems for enhancing nuclear safety as well as developing human resources in the nuclear power field. People give form to an organizational culture. Human resource development is the most important element for strengthening an organization. I hope JANSI will make an even greater effort to educate and train the personnel who will assume responsibility for nuclear safety in the future in Japan as well as improve operators' management systems. Moreover, I hope JANSI will be able to overcome the various barriers and engage in a dialogue with the Nuclear Regulation Authority and the Secretariat and that it will launch new activities as an organization open to society.

We at the Nuclear Regulation Authority and the Secretariat will more diligently examine nuclear regulations and endeavor to dialogue with a variety of stakeholders. There are differences between the private and public sectors, but I hope that we both aim to further bolster safety.

Tom Mitchell

Chairman, World Association of Nuclear Operators (WANO)



Even now, I can still clearly remember the images of the Great East Japan Earthquake ten years ago and the damage sustained by the nuclear power stations in Fukushima. Station personnel and operators of both the Fukushima Daiichi and Fukushima Daini responded bravely to these situations even as they were exposed to hazards never dealt with before. Still, they were bashed for the hydrogen explosion at Fukushima Daiichi. I am filled with deep admiration for the courage our colleagues displayed, and I strongly believe that we must never allow such a tragedy to happen again.

This accident prompted the entire nuclear industry to engage in reflection and contemplation and initiate a range of responses. In addition, this experience has also been an opportunity for us to verify nuclear safety fundamentals once again and employ our ingenuity to prevent accidents. Of these efforts, special mention should be given to plant protections against severe accidents, which are now the strongest they have ever been. Operators are humbler and wiser. This was a daunting experience, but we have certainly learned lessons from it.

WANO has also formulated and implemented a broad range of actions as well as improved the scope and coherence of programs. Our members around the world have implemented many thousands of individual safety improvement measures and the WANO Tokyo Centre has played a leading role in supporting these efforts. In addition, JANSI was established in 2012 in Japan. As a self-regulatory organization, it has coordinated closely with the WANO Tokyo Centre to encourage operators to voluntarily aim to the heights of excellence. Moreover, also based upon the lessons learned from the accident, the Nuclear Regulation Authority and its Secretariat were established in 2012 to serve as an independent regulatory agency.

In this way, although the nuclear industry had come to a standstill, it is continuing to develop and diversify by not just prolonging the service life of current reactors and constructing new plants at existing sites, but also realizing new nuclear technologies. In addition, countries have also emerged as new entrants to the nuclear industry. We nuclear operators have a mission not only to effectively share experiences we have accumulated, but also encourage these new entrants to comprehend the very special nature of nuclear technology.

Industry leaders have cooperated with WANO in the ambitious effort to create a future for nuclear power that is unfolding now. This effort is aimed at having all nuclear operators around the world achieve a certain level of excellence that is consistent. I myself want to cooperate with JANSI, the WANO Tokyo Centre, and operators in Japan to support all nuclear power plants in Japan in reaching and maintaining excellence.

William D. Magwood, IV

Director-General, OECD Nuclear Energy Agency (NEA)



The report entitled Ten Years On recently released by OECD/NEA includes many lessons learned since the accident. In fact, there have been a variety of changes. Nuclear power is more resilient and safer, and preparations have also been put in place to respond to extreme events. Moreover, Japan has committed tremendous resources, more than any other country, so that its nuclear power plants are able to operate safely even under a variety of conditions.

In addition, we have learned that the ability to recover from an accident is as important as the ability to prepare for an accident, that the human aspect is crucial for nuclear safety, and that issues such as safety culture are as important as the exceptional equipment installed at nuclear power plants. Everyone in Japan has truly made a great leap forward. That effort must continue in the future as well.

We are currently in the midst of the worldwide COVID-19 pandemic. During this crisis, nuclear power has demonstrated truly outstanding performance. Japan has headed that effort by quickly hammering out resolute measures to protect employees and staff. I would like to commend that wonderful progress and the leadership that JANSI has demonstrated over these ten years.

The journey over these ten years has been difficult. Japan's nuclear industry has faced many challenges along the way. In the future as well, many issues await that we will need to deal with. However, I hope that we continue to move ahead. Nuclear power is an energy indispensable for the future in terms of both the economy and our environment. The success of nuclear power is necessary for us to combat global warming, make our economies more resilient, and continue to use electric power. I am looking forward to meeting everyone personally next year to talk about what JANSI has accomplished over these ten years as well as our future endeavors.

【Part 1: Ongoing Activities Report】

Incorporating Lessons Learned From The Fukushima Daiichi Accident

Japan's Nuclear Regulation Transition made after TEPCO's Fukushima Daiichi Nuclear Power Station Accident

Toshiyuki KOGANEYA

Director, Oversight Planning and Coordination Division, Nuclear Regulation Authority



I would like to talk about what has been accomplished since the accident at the TEPCO Fukushima Daiichi Nuclear Power Station in March 2011. The biggest action taken was to establish the Nuclear Regulation Authority in 2012. Subsequently, New Regulatory Requirements took effect in July 2013 that reflected lessons learned from the Fukushima Daiichi accident. So far, nine nuclear power stations have successfully passed reviews to verify their compliance with the New Regulatory Requirements and resumed operation. Other nuclear power facilities also are steadily moving forward with their reviews. In March 2014, the Japan Nuclear Energy Safety Organization (JNES), an independent administrative agency, merged into the Nuclear Regulation Authority to strengthen the organization. That October, the Office for Nuclear Disaster Management was established within the Cabinet Office to unify and strengthen the government system for responding to a nuclear emergency.

Following the IAEA IRRS Mission in January 2016, the Reactor Regulation Act was amended, and New Nuclear Oversight Program launched in April 2020. This program was modeled after the Reactor Oversight Process in the United States. Ordinarily, numerous inspections would have to be carried out piecemeal and within a limited time. However, the new oversight program created an integrated inspection system enabling inspectors to go and conduct inspections at any time and many kinds of activities.

Next, I would like to talk about the three features of the new oversight program. The first is “free access,” which allows inspectors to freely access activities and information about facilities that they wish to inspect. The second is “risk-informed and performance-based,” which has inspectors spending much more time inspecting significant safety matters and verifying operators’ actual activities on-site. The third is that regulators monitor all aspects of operators’ safety activities and facilitate improvement by pointing out safety issues. I believe that operators’ CAP activities will be particularly important in this regard and hope that the close connection between operators’ activities and our inspections will improve safety measures on-site.

Lastly, I would like to talk about our expectations for JANSI. The first is greater transparency. I hope an effort will be made to strengthen external communication about JANSI activities and share information with the Nuclear Regulation Authority. The second point is the contribution to improving the safety of nuclear operators. I hope that through NUCIA, peer reviews, and other activities, JANSI will offer effective proposals to nuclear operators and contribute to enhancing safety on-site as nuclear operators actually accept and implement those proposals. The third point is the continuous improvement of CAP. I believe that the best source of nuclear safety is when operators’ CAP activities function effectively, and they take the initiative to seek out and improve problems. Within our oversight system, we also want to properly examine such activities, but I hope that JANSI will also look at operators’ activities and be proactive in pointing out any points for improvement when improvements should be made.

Nuclear Safety Improvements based on the Lessons Learnt with a Focus on Human and Organizational Aspects

Jose Antonio Gago Badenas
General Manager & CEO, Asociacion Nuclear Asco-Vandellos (ANAV)



With regard to human performance, 80% of events are caused by human error and 20% are caused by equipment failure. 70% of human errors are triggered by underlying organizational vulnerabilities.

The question we should be asking now 10 years after the nuclear plant accidents in Fukushima is whether the nuclear safety cultures of all operators have substantially improved.

Each and every individual at a nuclear operator assumes a special role in nuclear safety. Effective monitoring and oversight are provided by utilizing knowledge and procedures, and incorporating these to conduct critical self-assessments. The activities of outside safety committees, oversight organizations, WANO, JANSI, and the IAEA correspond to those of third parties, and they must dig deep to identify vulnerabilities and defects inconspicuously lying in the background. Even if plants continue to produce good results, we must not let down our guard and avoid falling into a state of self-satisfaction.

Next, I would like to present the safety improvement measures that ANAV implemented after the Fukushima Daiichi accident at three PWR units we operate in northeast Spain. In our case, we had to implement all measures no later than December 31, 2016. The overhaul of some tangible equipment and similar tasks were quite difficult. One example was the installation of containment vessel filtered vents. I particularly want to emphasize our protection and mitigation strategy. We decided to improve human, procedural and training preparedness to build the capability to prevent extreme accidents as well as mitigate them. In a real emergency, these are the things that will actually pay off.

Ascó Nuclear Power Plant's two units are located near the Ebro river. There are two small dams as well as to a larger dam upriver. As part of our stress tests, we assumed that the latter one of these suffered a complete collapse. This would then also lead to the collapse of the two smaller dams and some of the plant's key areas would be flooded. To allow this water to run off, we constructed a 1.3-km water channel so that all safety functions will operate adequately.

Lastly, I would like to offer some personal conclusions about important lessons learned. First, operators must not merely prevent, but also consider both prevention and mitigation. This means always keeping in mind the three key nuclear safety functions: reactivity control, core cooling, and containment. A safety culture is the most important key, and we must be aware that it is the greatest liability resulting to a core damage accident. Personnel with a strong sense of self-awareness and experience must be stationed in the main control rooms, field, and offices. We must have an emergency response organization with a very high level of technical competence and training. It is also important to clarify the procedures and responsibilities of leaders and other positions in the chain of command. Risk is present in people. People are the key, and we must invest in people.

Reflecting on Lessons Learned from the Fukushima Daiichi NPP Accident

Shigenori MAKINO

Member of the Board, Managing Executive Officer, Tokyo Electric Power Company Holdings, Inc.



One of the root causes of the Fukushima accident was that we believed safety had been established and we were not sufficiently prepared for an accident. Therefore, we identified three elements: safety awareness, technical capability, and the ability to promote dialogue, and then formulated and implemented six countermeasures: management-lead reforms, strengthening of oversight and support for management, strengthening of the ability to propose defense-in-depth measures, developing of risk communication activities, strengthening of emergency response capabilities, and training of human resources that can improve nuclear safety.

In 2017, we developed a management model that consolidates the way in which work should be performed. We have also strived to imbue the “fundamentals” stipulating what we should endeavor to do in our daily actions. However, we believe that we should seriously take recent cases (of inadequacies in physical protection) , and struggle more.

Although we have promoted rigorous assessments of our own organization so that we might continuously improve, we are aware that improvements still need to be made with regard to assessment areas to cover and the severity with which judgments are passed. We want to respond properly to third-party assessments such as those conducted by JANSI and WANO, which we undergo at regular intervals, humbly learn from, and use to improve.

As for risk management, it is important to obtain technical information from around the world, learn humbly, grasp as management layer promptly, and implement necessary mitigation measures or additional measures. We are aware of the particular importance of cases contingent upon or entailing a great degree of uncertainty. We want to set great value on the speed with which reports are made to our president and decisions properly rendered. To do this, I believe it is necessary to screen the many inputs of information available to discern valuable information and link that data to decision-making.

The CAP process demonstrates the tendency for the ratio of human errors to rise as equipment malfunctions are gradually improved. I believe that we will need to invest in measures stressing human error prevention as well as our human resources, including human resource development.

Over one-third of operators have no plant operating experience. Recognizing that untrained personnel trained cannot perform their duties when the crucial moment comes, we have thought about and worked on ways to have our personnel to accumulate experience of plant operation. Among other efforts, we have provided training on equipment and facilities, simulated experiences, offered training at thermal power plants and PWR plants in operation.

As for improving our ability to promote dialogue, I believe that we are finally on track in terms of communication and conveying notifications accurately. We are devoting ourselves daily to asking whether we have reached the point where information has truly been conveyed. We continue to listen to what local governments and communities say and reflect on their words. We will also strive for to better quality of communication.

Lastly, on the principle of cooperation with JANSI, we will pursue excellence and autonomously strive to enhance safety as a member of the nuclear industry and will work to more reliably implement initiatives based upon our three core values of safety awareness, technical capability, and the ability to promote dialogue. We have stated our firm resolution that “we must never forget the Fukushima Daiichi accident and we must be safer today than yesterday, and safer tomorrow than today, and be an operator that continues to create unparalleled levels of safety.” We will continue to maintain our resolve.

Reflecting Lessons Learned from the Fukushima Daiichi accident and on Future JANSI Initiatives

Masuhiko NAKANO
Managing Executive Officer, Vice President of Safety System, JANSI



I would like to address the regret felt for the Fukushima Daiichi accident and the lessons learned from it. The regret is in the pride felt that nuclear power plants in Japan were sufficiently safe and the stance of believing that all that needed to be done was follow regulatory requirements. We did not try to learn from what other countries had done nor did we progressively make use of new knowledge. The lesson learned was that we must not be constrained by regulation alone, but to always learn and incorporate the latest knowledge available in Japan and throughout the world as well as the good practices of other companies in our proactive pursuit of safety so that an accident like the one at Fukushima Daiichi never happens again.

It was upon such reflection and lessons learned that JANSI was established in November 2012, modeled on INPO in the United States to serve as an independent organization for driving nuclear operators to make autonomous improvements. JANSI has conducted peer reviews as well as other assessments and provided assistance in pursuit of the world's highest level of safety in addition to unrelenting excellence. When it was established, a decision was made that information would be shared, independence assured, and a basic philosophy shared, and negotiations have been carried out on the principle of cooperation.

In June 2017, visions were enacted that JANSI and operators would aim to achieve in order to realize self-regulation. To strengthen the commitment of operators' CEOs, the composition of the Board of Directors was amended in June 2018 to include in the membership the presidents of electric power utilities. In March 2019, a 10-year strategy was drafted to lay out that vision for the future as well as stipulated specific actions for getting there.

When JANSI was initially established, it was too conscious of its independence and thus too far outside the circle of operators. JANSI initiated many activities to make it a driving force and keep operators in check, but from outside their circle. However, as JANSI sought to effectively support improvement activities implemented by operators themselves, it became extremely important for JANSI, a self-regulatory agency, to be among the group of operators and provide support as a member of that community and associate as well.

First, we first lay out the vision and excellence that we desire to achieve. We then present that to operators and, when they are ready for improvements to be moved forward, JANSI conducts its assessment. We identify gaps in terms of excellence, show operators those gaps, and have them put that information to use in making improvements. Also, JANSI provides support so that operators' improvements proceed well. As we carry out this cycle, we will reach greater heights and improve performance.

Basically, JANSI's activities are to reflect on the lessons learned from the Fukushima Daiichi accident, assess safety measures of nuclear power plants in Japan and issue proposals for improvement, conduct training for operators incorporating lessons learned from the Fukushima accident, and conduct seminars and assistance visits to support companies' disaster prevention training. In December 2013, JANSI summarized approximately 350 lessons learned identified in 10 reports on the Fukushima Daiichi accident and consolidated these lessons into seven to be addressed. In issuing our report, we then summarized the efforts being made by companies based on these lessons. We have conducted reviews of restarted plants to determine whether such initiatives have been carried out and plan to conduct reviews of BWR plants that have prepared for restarting.

In the future as part of our support for restarting, we plan to conduct follow-ups of restarted plants to look at the progress made in reflecting the lessons learned. We want to move forward based on our Ten-Year Strategy to prevent memories of the Fukushima Daiichi accident from fading over time, using the lessons learned, reflecting new knowledge, and taking other action. Moreover, so that the lessons learned from the Fukushima Daiichi accident are reliably and continually made use of, we have prepared a collection of the lessons learned and getting ready to release them. This collection will make it easy to verify certain cases and matters that have been pointed out from among the massive number of reports released, and we hope that this will be made use of in both training and practice.

Yoichi HIRAOKA

Managing Executive Officer, Vice President of Planning & Administration, JANSI



I would like to thank everyone from the regulatory agencies as well as operators from Japan and other countries for their very valuable reports detailing initiatives and activities during Session 1. In addition, we also had a presentation by JANSI of its activities. JANSI would like to be a proper force driving operators so that they proceed with autonomous and continuous improvements. Industry self-regulation is something that JANSI is unable to accomplish alone, nor is it something that an operator is able to carry out alone, either. It is something that is achieved by a community where companies keep each other in check and learn good practices from each other. I also hope that JANSI functions as a catalyst for revitalization so that such industry self-

regulation and community regulation may advance.

【Part 2: Panel Discussion】

“Establishment and Development of Autonomous & Continuous Safety Enhancement Initiatives”

Chairperson

Akira YAMAGUCHI Professor, Nuclear Professional School, School of Engineering, The University of Tokyo

Panelists

Fumihito OGATA Representative Director, Executive Vice President, Head of Railway Operations, West Japan Railway Company

Jeffrey B. Archie Former Senior Vice President and Chief Nuclear Officer, South Carolina Electric & Gas Company (SCE&G)

Yutaka FUJII President & Director, Hokkaido Electric Power Company

Kazuhiro IKEBE President & Chief Executive Officer, Kyushu Electric Power Company

Hiroshi YAMAZAKI Representative Director, President & CEO, JANSI

Short Speech

Establishment & Development of Autonomous & Continuous Safety Enhancements

Akira YAMAGUCHI (Chairperson)

Professor, Nuclear Professional School, School of Engineering, The University of Tokyo



In May 2014, the Working Group on Voluntary Efforts & Continuous Improvement of Nuclear Safety under the Advisory Committee for Natural Resources and Energy at the Agency for Natural Resources and Energy of METI engaged in discussions on a risk governance framework and crisis management. In considering how Japan as a whole should address risk management during national crises in general, it is common understanding that a risk governance framework would be effective. Accordingly, the central government including regulatory agencies, local governments, nuclear operators and other entities identify the core capabilities that each should be equipped with in order to respond to a crisis while engaging in appropriate mutual risk communication, and pursue greater resilience in the face of unknown risks. It was against this backdrop that the autonomous and continuous efforts to improve safety got their start.

The Working Group discussed 10 points. (1) Departure from the 'myth of safety.' (2) Enhancement of management for confronting nuclear-specific risks. In response, operators established proper risk management systems. (3) Proactive introduction of new findings available domestically and overseas. This point included discussions on a framework for operators to properly assimilate knowledge that have adopted and to reflect this knowledge in their operations. (4) Thorough awareness of achieving safety levels higher than required by regulation. (5) Institution of guidelines that contribute to continuous safety improvements. This is not just limited to satisfying regulatory requirements, but also the adoption of a stance of thinking for oneself, specifying the level of safety that one should achieve, and rising to that level. (6) Comprehensive and continuous risk assessment of plants. Following this, efforts have been enhanced for research as well as entities conducting risk assessments. (7) Implementation of appropriate risk communication. This point aimed to restore society's trust in nuclear operators. (8) How operators should approach nuclear safety. (9) Framework necessary for voluntary and continuous safety improvement. In fact, there were discussions about what sort of framework would be best. Based upon an awareness that operators need an organization that would exercise self-regulation, the discussion went so far as to state that JANSI should be established. (10) Effective implementation of safety research.

These points were discussed when autonomous efforts and continuous improvements in safety first began, and I think it may also be said that they are the starting point of JANSI's establishment.

Safety Initiatives Since the Fukuchiyama Line Derailment

Fumihito OGATA,

Representative Director, Executive Vice President, Head of Railway Operations, West Japan Railway Company



In 2005, West Japan Railway Company caused a very serious railway accident. I would like to present how our company reflected on that accident and how we have sought to enhance safety.

Since the accident, we have strived to imbue mechanisms for ensuring safety throughout our organization as well as an awareness that safety is the top priority. At the time of the accident, we believed based on the long history of the railway business that safety could be assured by working to prevent recurrences of past accidents and thoroughly complying with rules and manuals. We were unable to anticipate that a train driver would exceed the designated speed by such a margin. Having allowed this accident to happen has made us painfully aware of the need for prevention efforts that predict risks and address them before an accident happens. We have worked assiduously to make these a reality.

Nevertheless, in 2017 as these efforts were ongoing, a major incident occurred with the Shinkansen. This event was not one for which risk had been predicted, even in past accident cases, to prevent such an event. Therefore, we decided to also implement risk-based safety management in addition to the previous rule-based safety management. Moreover, we also needed to be more proactive in preventing accidents, so we launched initiatives to encourage our personnel to take the initiative to think and raise the level of efficacy by, for example, contemplating how to creatively raise effectiveness to prevent mistakes and applying these methods while, at the same time, referencing outstanding efforts in the industry and other workplaces. Our current Safety Think-and-Act Plan emphasizes rule compliance and endeavors to conduct risk assessments, in addition to having each and every individual consider risks concretely.

To prevent major accidents, we need to collect first-hand information about concerns and small accidents, analyze this data, and adopt effective countermeasures. It is important that employees report facts without hiding anything, even personally inconvenient facts. We decided to obtain information from employees about matters that only they might know and use that information to prevent accidents rather than negatively evaluating our personnel based on what they reported as part of our effort to make it easy for our employees to come forward.

Although we have always had drivers stop their trains when they sensed danger, we decided to allow our employees to stop trains as well as work when there is a middle zone between danger and safety or, to put another way, when they are unable to verify that it is safe. Initially, employees were tentative about doing this. They tended to think that they would be hounded later on about the train delay if it turned out that they stopped for nothing. So, JR West's President declared, "It is all right if it turns out to be nothing. Your decision is also the President's decision." Now, we praise our employees for having the bravery to stop the train even if it turns out to be nothing.

When a mistake occurs because personnel did not verify something, it is often the case that the opposite countermeasure is adopted of making sure that the something is verified. However, with such measures, another mistake is going to happen sometime. We have been aiming to delve deep into the elements and reasons leading to why something was not checked and to implement essential and continuing measures even if it takes time.

There is no end to accident prevention. We will persist in our efforts to pursue safety so as to never allow an accident like the Fukuchiyama line derailment to happen again.

Achieving Good Performance through Effective Collaboration

Jeffrey B. Archie

Former Senior Vice President and Chief Nuclear Officer, South Carolina Electric & Gas Company (SCE&G)



The performance of power plants in the United States has improved at a constant pace since 2012, and the entire nuclear industry has demonstrated the highest level of performance ever.

The Institute of Nuclear Power Operations (INPO) in the United States drafted a document of principles entitled *Staying on Top*. It is subtitled *Advancing a Culture of Continuous Improvement*, which may be understood as looking at the question how power plants are able to maintain high levels of performance.

I would like to discuss why cooperation between industry and INPO has been successful. With only the industry, the entire scope of performance is not necessarily visible, and the role of INPO is to bring a comprehensive perspective to industry performance.

Also, a unified strategy is necessary for maintaining outstanding performance. That is why it is important that INPO and industry keep in step with each other.

The United States has a very strong culture of continuous improvement. Some examples of voluntary improvement efforts are the creation of a forum for dialogue between upper management and power station executives to discuss performance in a variety of areas as well as the creation of a forum for talks between power station executives and people supervising workers on the front lines so that leaders across a broad spectrum from top to bottom of the organization are able to commit with the CNO himself probing deep into assessments of gaps in performance.

JANSI plays a role that is very similar to that of INPO. JANSI is positioned to drive efforts to find solutions to problems for the benefit of Japan's industry. For JANSI to succeed, it is necessary that these efforts move forward with the full participation also of industry leaders. Therefore, the industry and JANSI must cooperate.

Further Autonomous and Continuing Activities for Enhancing Safety

Yutaka FUJII

President & Director, Hokkaido Electric Power Company



The Hokkaido Eastern Iburi Earthquake, which struck on September 6, 2018, led the Hokkaido Electric Power Company to experience a large-scale blackout and the Tomari Nuclear Power Station losing off-site power. Based upon this ordeal, we formulated an action plan for large-scale blackouts. It is broadly divided into four parts.

The first point is taking into account Hokkaido's regional characteristics and the readiness for winter when there is heavy snowfall and severe cold. Daily, we practice behavior that pays great attention to these regional characteristics as we wear non-slip boots and equip vehicles with studless snow tires to drive over frozen road surfaces. Moreover, in preparation for a severe accident during midwinter, we conduct training exercises on how to use our equipment to respond and secure access routes as well as supply feedwater and power at night and during a snowstorm. In addition, we have installed deaerators on secondary systems and other large equipment indoors.

The second point is the formulation of our Business Continuity Plan (BCP) to ensure that operations continue. To prevent cluster outbreaks of infections due to COVID-19, we have implemented measures so that employees, with the exception of those on duty, are strictly segregated into two teams that are not allowed to have any contact with each other.

The third point is the improvement of communication abilities necessary for disseminating and sharing information. On a daily basis, gaps, even trivial information, between our current level and the ideal are compiled in Condition Reports (CR). A tool (dashboard) has been adopted that consolidates the CRs recorded daily so that changes in plant performance may be viewed at a glance. A culture has been created where personnel check the status of improvements daily on their own PCs and take a variety of opportunities to be aware of a range of risks.

The fourth point is our activities to maintain and improve engineering succession and motivation. Since the accident at the Fukushima Daiichi Nuclear Power Station, Tomari Nuclear Power Station has been in a prolonged shutdown, so there are more and more employees each year without any experience in operations or maintenance at an operating plant. Along with passing on know-how and deploying personnel to thermal power plants or other operating facilities, we had mid-career and younger employees take the lead in formulating our Mid-to-Long-Term Vision for the Nuclear Power Division and consider the vision for the Nuclear Power Division so as to relieve concerns among our personnel about the future.

In the future as well, we will continue to advance initiatives to enhance safety and not allow the lessons learned from the large-scale blackout in Hokkaido to fade from memory.

Establishment & Development of Autonomous & Continuous Safety Enhancement

Kazuhiro IKEBE

President & Chief Executive Officer, Kyushu Electric Power Company



Kyushu Electric Power Company has two nuclear power stations with four units currently operating (producing approx. 4,000 MW). This accounts for approximately 23% of our total capacity for power generation facilities and approximately 35% of total power generated.

We believe that we can take up the challenge of creating a sustainable society because we first have a foundation of trust that our customers, communities, and wider society have placed in us. So that this is imbued in each and every employee involved with nuclear power, I, as president, first presented the ideal safety culture and expressed my thoughts on nuclear safety and developed a quality policy. It is the mission of electric power operators to never cease our efforts for enhancing nuclear safety and work so that the lessons learned from the accident at Fukushima Daiichi Nuclear Power Station do not fade over time.

Based upon our philosophy setting nuclear safety as the top priority in our quality policy, we have worked to improve safety autonomously and continuously, and employ risk management as the principal means of doing so. In order to encourage our personnel to be more safety consciousness, management and employees in the field also need to think together, so I visited our power stations twice last year to exchange ideas with power station personnel and contractor workers.

CAP activities are the foundation of risk management at power plants. We have created a database, into which items or matters that everyone working at the power station notices during their duties is entered. The recorded data is sorted into major risks and other information and appropriately addressed. Also, when making decisions, we ensure that risk information is also systematized and incorporated. We are working to use probabilistic risk assessment methods to quantitatively ascertain high and low risks for a world which used to be just ones or zeros. To manage risks, it is important we increase our sensitivity to risks each day. We are promoting awareness by having our personnel affix stickers to equipment where important work is being performed as well as have personnel keep watch while holding a sign so that they will take greater notice of risks.

We have been communicating interactively on a face-to-face basis with community members and have rolled out activities company-wide to empathize with people's concerns and questions.

Establishment and Development of Autonomous & Continuous Safety Improvement

Hiromi YAMAZAKI
Representative Director, President & CEO, JANSI



First, I would like to explain JANSI's Ten-Year Strategy. Ever since JANSI's founding, we have worked to provide better peer reviews, support activities, operating experience analyses, safety culture diagnoses, leadership training, and other programs. However, we were always aware of the need to put together our vision and strategy, which we did in the formulation of our Ten-Year Strategy in March 2019. This strategy defines the industry vision as "the industry continuously improves through autonomous safety improvement initiatives implemented by operators" and JANSI's vision as "JANSI drives initiatives for autonomous safety improvement as the self-regulatory organization in the nuclear industry." The Ten-Year Strategy's main actions are divided into five categories comprising a total of 20 actions. Many of these are previous activities that have been given new status. New initiatives, such as strengthening daily monitoring of plant performance, have also been incorporated.

Although a framework is currently being constructed for autonomous safety enhancement programs such as risk management, CAP, and configuration management, we still have work ahead of us to establish this in the field, have it practiced, and make it more effective. Although companies are earnestly working to build up their technical and emergency response capabilities, one issue that has come to light is the enormous amount of labor required for emergency response training. Companies have been agonizing over how to balance this with training that provides their personnel with technical capabilities for use during normal times. I believe that companies need to make a greater effort to increase their capability for self-assessment. I believe that those on the front lines in the field continue to be very busy and that a mindset geared toward continuous improvement is still taking hold among everyone in every corner of the front lines in the field, but that we are still only about halfway there.

To recap the current state of operators as they aim to achieve their future vision, they have made progress in creating a framework, but I believe that they still must establish this among personnel in the field and increase its effectiveness. I hope for the operators to reach to a state where the industry vision is achieved and a mindset of continually improving has broadly taken hold throughout the entire organization. JANSI will be developing actions in accordance with the Ten-Year Strategy so that we may soon achieve the industry vision and reach a state soon where we are able to talk about "staying on top." We want to work closely with industry support organizations both here in Japan and throughout the world.

Panel Discussion



○Chairperson YAMAGUCHI: I would like to explain the issues that will be addressed during the panel discussion. As indicated in the documentation, I would like to cite a few examples of what has been accomplished so far and what needs to be done in the future.

I would like to propose the first question to President Fujii and President Ikebe. Regarding the 10 points when the autonomous safety enhancement activities have been initiated, I think that a substantial portion of these have been improved from the viewpoint of nuclear operators. I would like to ask for your views on what you think are some of the areas that are still lacking.

○President FUJII: Currently, in our situation, particularly because the Tomari Nuclear Power Station is not operating, our daily efforts are crucial for motivating station personnel, maintaining their technical capabilities, and raising their safety awareness. I think motivation is very important when addressing the 10 points and having personnel work with each other to keep their motivation high is an important task as well. With the support of the driving force JANSI, I hope that we can raise the level of our benchmarking so that we may serve as a model operator. Moreover, it is also essential that nuclear power be even more transparent.



○President IKEBE: Fortunately, we have restarted four units and many of the items listed in the 10 points have pretty much taken root. However, regarding the “implementation of risk communication,” although the face-to-face communication that we have carried out in the areas around where our plants are located has, I believe, improved the level of understanding at a certain extent, there are probably some areas where we are still lacking in terms of disseminating information throughout Kyushu as well as Japan as a whole. I hope that we are able to address this together with the nuclear industry, JANSI, and ATENA.

○Chairperson YAMAGUCHI: Executive Vice President Ogata, can I ask you to point out anything, if there are any, that you have noticed or areas where nuclear power is lacking from your perspective as a railway operator?



○Executive Vice President OGATA: There are currently two things that we are concerned about. The first is how can we make use of the accident in the future. As time passes, there are fewer and fewer employees who were with our company at the time of the Fukuchiyama line derailment and more than half of our current employees joined after the accident. So that the memory of the accident does not fade over time either, we provide explanations and training about the reasons why the accident happened, what happened exactly, and summarize the lessons learned and how these results have been put to use in measures that are currently

implemented. By doing this, we are trying to enhance the effectiveness of these measures.

The other thing is raising the level throughout the organization. We used to work to increase the level of individual employee’s competencies, but we felt that we needed to further increase the level of our entire organization. For example, let’s assume a 400-meter relay. Even though each of the individual runners is running faster, the question remains whether the way they are handing off the baton and synchronizing their breathing are sufficient. They may not be. Furthermore, imagine that we are changing the length of the baton handoff zone, now one person does not have to run 100 meters, but may run 150 meters or 50 meters, depending upon the circumstances. We have not yet worked out this kind of flexible and resourceful capability, so I feel that this is something that we need to enhance.

○Chairperson YAMAGUCHI: Nuclear power also faces the same issue. For example, even though time passes, it is still important to establish such capabilities as part of the culture. Devising ingenious ways to do that is part of the effort of continuously enhancing safety, I believe.

I think Mr. Archie's in his presentation put a strong emphasis on leadership of top management, while President Fujii and President Ikebe put a little more stress on respect for those in the field. I feel that the ideas presented by Mr. Archie and those by Presidents Fujii and Ikebe seem to be a little different. Mr. Archie, I would like to ask, from what you have seen, what the points are that need to be improved and what some of the differences are vis-à-vis the United States.

○Former Senior Vice President Jeffrey B. Archie: I believe that we need leadership, in other words the involvement of those at the top, in order to improve. It is leaders that spearhead improvement. I think it is necessary for leaders to march in step so that an environment can be created where employees are able to succeed.

I believe it is important that JANSI and Japan's nuclear industry continue to learn the best practices as well as learn and share how they can cooperate. I think leaders need, as they convey their experience to their juniors, inspire them so that an appropriate culture is created within the organization. Leadership is valued quite highly in the United States, and I think this is also the same in Japan, so I would hope that this area would be emphasized.

I think that JANSI and Japan's industry are moving in the right direction. However, as it is same in the United States, I believe we are still only halfway, so I would hope that we can move forward together.



○Chairperson YAMAGUCHI: I completely agree with you. Next, there are some questions from conference attendees. The first I would like to pose to President Ikebe of Kyushu Electric Power Company. The question is: "What do you think Japan's industry should do to gain public trust and acceptance of nuclear power generation? Please share your thoughts about what should be done in the short-term and medium-term" (Question from the Director General of the WNA). As I also indicated earlier in the 10 points, I also personally believe that securing the public trust is an issue that needs to be addressed.



○President IKEBE: Over the short-term, in the case of our company, it is important that we stably and safely operate the four units currently in service. As we persist in that effort, we will earn a reputation that "nuclear power is safe if these people operate it." Eventually, this will extend from our company to the entire nuclear industry and lead to the restoration in trust in all nuclear operators. Over the medium- and long-term, I believe it is important that we be steadfast in telling the world that nuclear power is the best technology assuming plants are stably and safely operated and that has been commercialized and is technically feasible for combating global warming and making us carbon neutral.

This year, a severe cold wave hit Texas in the United States. In Japan as well, we have also experienced conditions where we wondered if there would be sufficient electricity in January. I believe it is vital to have everyone understand how important nuclear power is in terms of our energy security and that efforts are needed to have people accept nuclear power from the standpoint of safety and necessity.

○Chairperson YAMAGUCHI: We have one more question from a conference attendee. The question is: “I think that excellence means to excel or to be superior. Could you please tell us specifically what is excellence and what sort of state does that entail? (Question from an individual associated with Tokyo Bosai). President Yamazaki, could I ask you to respond?”

○President YAMAZAKI: Excellence in terms of how the word is used in industry or operation management at a power station is a common standard worldwide. The WANO “Performance Objectives & Criteria” gives specific definitions of “what a state of excellence is” in 15 areas, including operation management, maintenance, radiation control, chemical control, engineering divisions, organizational management, and safety culture.

These are not statements of idealistic theory as to how something should be, but definitions taking into account previous problem cases that have occurred at power plants. These definitions were prepared based on

many types of accumulated lessons in order to stipulate that this level of excellence is what we must achieve to prevent these kinds of problems and that such problems are unable to be prevented only by meeting national regulatory requirements.



《Panel Discussion Summary》

○Chairperson YAMAGUCHI: In their presentations, both Chairman Mitchell and Director-General Magwood pointed out the importance of safety as well as the ability to recover, and valued what Japan has achieved so far. In addition, they also talked about how safety has improved considerably, not only in Japan but throughout the world. Furthermore, I think it was very important that both speakers pointed out that nuclear power makes a great contribution to world economic growth and development.

Although the amount of nuclear power generated in Japan has fallen since the earthquake, it has increased nearly 20% globally between 2012 and today. I see this as evidence that people are aware of nuclear power’s value, and I sincerely hope that this will make everyone confident of the efforts that they have made so far. Moreover, as President Ikebe stated, I hope that everyone will scrupulously build up achievements and send out that information. That is precisely what will result in gaining people’s trust. This will be the end of Part 2 Panel Discussion.

【Closing Remarks】

Hiromi YAMAZAKI

Representative Director, President & CEO, JANSI



In marking the 10-year point since the accident at Fukushima Daiichi Nuclear Power Station, we have reflected on the lessons learned from that accident, looked back on our activities so far, and taken a look into the future.

In the keynote presentations, our three guests indicated their expectations for JANSI, their expectations for cooperation between WANO and JANSI as well as Japan's industry, and, moreover, their expectations that Japan's industry will overcome the difficult situation it faces and be able to move forward.

In Session 1, the four presenters gave reports on the current situation of "Incorporating Lessons Learned From The Fukushima Daiichi Accident" from their respective standpoints. In Session 2, with the facilitation of Chairperson Yamaguchi, presentations were given and a panel discussion conducted on the topic of "Establishment and Development of Autonomous & Continuous Safety Enhancements." I hope that this conference provided many insights for both industry and JANSI.

As an industry self-regulatory organization, JANSI will continue to lead operators in implementing autonomous and continuing improvement initiatives and undertake the mandate bestowed on it by operators.

JANSI is responsible for the preparation of this document (honorifics omitted).