Summary of JANSI Annual Conference 2016

The text herein is not based on the consent of the speakers.

[Brief Overview of Conference]

Date: 9:30-18:20, Thursday, April 7

Place: Iino Hall

Number of participants: Approximately 320 (excluding panelists)

[Opening remarks]

Shojiro Matsuura, Chairman, President & CEO, JANSI

- ○ This third Annual Conference is convened to raise the profile of JANSI's undertakings both among JANSI members as well as parties involved in nuclear power. The Conference also looks to garner a wide-ranging feedback and apply them to JANSI's undertakings.
- ○ The topics this year are the two major issues of late. One is "Securing nuclear safety in the competitive environment," which is based on the full power retail deregulation that started this April. The other, in response to the restoration of nuclear power station operations, is "Ensuring nuclear safety during restartup."
- ○ With today's keynote speech and panel discussions, participants are encouraged to further their discussions on the nuclear industry's future efforts to achieve improved safety.

[Keynote speech] Securing Nuclear Safety in the Competitive Environment

Preston D. Swafford, President and CEO, Candu Energy

- ○ A transformation observed in the power market along with power deregulation is that power operators are required to reduce risks without raising electricity rates, in an effort to maintain their competitive edge. Investments previously recovered by electricity rates now might remain uncollected, and operators are in turn trying to cut back risks by signing a Contract for Difference (CfD) with retailers.
- ○ Looking at repercussions in the nuclear power front, the top priority is to consistently improve the efficiency of power stations to maintain competitiveness with such efforts as streamlining personnel deployment and improving outage processes. As renewable energy enters the market, nuclear power stations are increasingly likely to adopt load-following operations and would need training on operating skills.
- ○ Under a competitive environment, operators emphasize cost-saving and reassessments on strategy and technology; the regulatory authority therefore must engage in monitoring, supervision, and management with heightened awareness. Operators are required to put safety ahead of financial profits, and executives must consistently demonstrate how they humbly work to achieve safety. It is extremely important for regulators to strike a balance between reasonable safety regulations and needless safety requirements.
- ○ Economical competitiveness can stand together with nuclear safety. U.S. nuclear power stations saw a remarkable leap in its performance after experiencing the market reform of the 1990s. The reform brought a significant decline in costs, but key performance indicators (KPI), followed up by INPO, showed that unexpected plant shutdowns dropped over 90% from 1990 to 1996. Findings also showed that plants with high availabilities are exceptionally safe too.
- ○ The greatest threat to nuclear power down the road is natural gas prices, and the instability in the market could cause nuclear power to lose its competitive edge.

[Session 1: Securing nuclear safety in the competitive environment]

○Short speech

Makoto Yagi, President and Director, Kansai Electric Power

- ○ The key issue is to simultaneously achieve the "S+3E" concept under the national government's Basic Energy Plan. Nuclear power generation, which excels in all three "E"s and regarded as a critical base load power, must be secured to a certain extent on the basis of having its safety ensured.
- ○ Kansai Electric Power looks to restart its nuclear operations as soon as possible, while humbly responding to the Nuclear Regulation Authority's review and winning understanding from the local community and society at large. Under a competitive environment, however, one should make sure not to be obsessed with the pursuit of efficiency at the expense of safety, and efforts are needed to muster innovative approaches and ideas to both enhance safety and pursue efficiency at the same time. To this end, Kansai Electric Power will carry forward voluntary and consistent initiatives while working with such bodies as JANSI and NRRC that are designed to improve the safety of the entire industry.
- ○ Close ties with plant manufacturers are absolutely necessary to strengthen effectiveness. The key is to form partnerships based on the fields and roles of each manufacturer, and thereby establish a appropriate management structure for the industry.

Satoru Katsuno, President and Director, Chubu Electric Power

- ○ Nuclear power could have a grave impact in the wake of a major accident, but on the other hand, given that Japan is limited in its natural resources, ensuring safety and operating in a stable fashion would undoubtedly make a significant contribution to environmental suitability, economy, and the stable supply of electricity. Chubu Electric Power is working amid a competitive environment to achieve improved safety and reduce risks while giving its top priority to ensuring safety.
- ○ Examinations by JANSI and other such third parties serve significant roles in preventing safety-oriented initiatives from becoming self-complacent. Identifying one's weaknesses through peer reviews, monitoring one another by exerting peer pressure, and making improvements by harnessing a "shame-sensitive culture" concept, would lead to winning back confidence from the society.
- ○ The commitment by top management and having field personnel gain thorough understanding is critical

in Chubu Electric Power's unremitting efforts toward achieving improved safety. Managers of Hamaoka Nuclear Power Station's 32 sections and groups discuss with Chubu Electric Power's President in person on the significance of communication. Workplace communication is conducive to stepping up the overall ability and competence of individuals, as well as to enhancing safety.

Shinichi Inoue, Deputy Chair, Japan Aircraft Pilot Association

○ Initiatives to ensure safety in the aviation industry include efforts to enhance aircraft reliability, training to address both technology- and human-related issues, and operation risk management. The aviation industry collects and analyzes information from the frontline of aircraft operations, identifies risk elements (i.e. hazards), and assesses risks to devise and implement measures that are in need.

○ What serves a key role in operation risk management is collecting and analyzing information. The aviation industry launched in 1999 the Aviation Safety Information Network (ASI-NET) as a mechanism to propose, request, and share information among relevant parties on events that might have affected the safety of aircraft operations. This mechanism, however, had a shortfall: its informers were limited to pilots. The year 2014 saw the establishment of the Voluntary Information Contributory to Enhancement of the Safety (VOICES), a system developed by the Ministry of Land, Infrastructure, Transport and Tourism with sights set on sharing information beyond the boundaries of operators.

○ Under the VOICES system, aviation-related individuals and organizations send reports to a third party. This information is communicated and shared after being compiled by a committee responsible for analyses. To protect the contributors, the information is concealed and is also applied in training and corrective measures subsequent to the committee's review. The VOICES system analyzes reports provided in a year and issues a proposal to call for improvement.

Sumiko Takeuchi, International Environment and Economy Institute Director and Chief Researcher

○ With the deregulation underway, the emphasis on cost reduction is increasing among nuclear power businesses, but what these businesses need is to contemplate how to carry forward safety measures. Rather than viewing safety and the pursuit of efficiency as two different issues, nuclear power businesses must, upon setting the deregulation as a steppingstone, draw up a system that creates an incentive for operators to proactively work towards strengthening safety.

○ Possible initiatives to incorporate efforts toward achieving improved safety are to collect or set nuclear damage compensation premiums and fees for the Nuclear Regulation Authority's reviews. Some of the most practical initiatives are scaling back the Nuclear Regulation Authority's review period or items, and similar cases to create incentive have been observed in the U.S.

○ However, a two-party relationship between regulators and operators make it difficult to properly implement these initiatives. These undertakings require systems in which JANSI, NRRC or other such organizations serve as an intermediary to evaluate and release information from a third party's perspective. Having manufacturers involved is an important factor for nuclear safety. The principle of the Atomic Energy Damage Compensation Law places full responsibility on the operator, which consequently renders it difficult to give, on the basis of this law, the incentive to manufacturers to improve safety. Hence, the contribution of JANSI, in which manufacturers take part in, becomes all the more significant.

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○Panel discussion

Moderator: **Koji Nagano,** Director, Socio-economic Research Center Central Research Institute of Electric Power Industry

Panelists：**Preston D. Swafford,** President and CEO, Candu Energy
Makoto Yagi, President and Director, Kansai Electric Power
Satoru Katsuno, President and Director, Chubu Electric Power
Shinichi Inoue , Deputy Chair, Japan Aircraft Pilot Association
Sumiko Takeuchi, Director and Chief Researcher, International Environment and Economy Institute

Moderator **Nagano**

○ Having top management commit to safety-ensuring efforts is of significant importance. In the aviation industry, top management specifies the approach towards safety in their respective company's safety report documents, and work to communicate through repeated top-and-employee dialogues. In North America, INPO points out issues in a first-hand manner to top management through CEO meetings, and management in response sets an example for their subordinates.

○ In North America, having the NRC's proposal as a regulator, and the ECP, under which operators voluntarily collect and interpret safety-related information, complement each other. This allows for winning the confidence of the society. This mechanism of gathering information and subsequently taking corrective steps might enable Japan to win the trust of its society at large.

○ Regarding the relationship between operators, i.e. the plant owner/operating party, and manufacturers, i.e. vendors, a critical issue for operators is to accurately identify reactor statuses and developing human resources capable of making responses in the wake of severe accidents. Operators should foster personnel in a first-hand fashion through drills and training, and secure human resources by publicizing nuclear power as an appealing business. One panelist stated that developing human resources require not only voluntary initiatives but the preparation of a mechanism as well.

○ As demonstrated in North America's case, competitiveness and efforts to ensure safety can stand together. One should not be afraid of competition (as Mr. Swafford put it) and carry its initiatives forward. The significance of nuclear power will remain consistent in Japan. While operators voluntarily maintain their untiring efforts to enhance safety, they also should work in solidarity in an industry-wide fashion. Efforts are needed to gain the society's confidence by having such third

parties as JANSI check and evaluate these initiatives.

≪Summary≫

○ Ensuring safety will serve as a shared societal benefit as observed in other industries (i.e. aviation). In order to solidify this effort, it is critical for every member of an organization, spanning from its top to bottom, to share a strong-willed spirit that makes uncompromised efforts toward achieving safety.

○ Do not fear competition. See the retail deregulation as an opportunity to bring nuclear power to the next level as a top-choice power and technology, both with regard to customers and securing exceptional human resources.

[Session 2: JANSI's activity results report for FY2015]

Kiyoshi Naruse, Director, Activities Management Office Manager, JANSI

○ JANSI's business is composed of two main pillars: (i) offering support, issuing recommendations and proposals, and assessing safety improvement measures; and (ii) offering support, issuing recommendations and proposals, and assessing nuclear installations. Another effort underlying these two domains is: (iii) foundational undertakings.

○ Six programs are in place to address the abovementioned initiatives (i)-(iii). Regarding undertaking (i), Mr. Naruse's report on activity results described severe accident measure assessments and fire protection undertakings as JANSI's program to enhance safety systems.

○ Regarding undertaking (ii), the report described the implementation of peer reviews (which were performed for three NPS in FY2015) as JANSI's program to assess nuclear installations. The report also gave safety culture and nuclear emergency preparedness support undertakings as JANSI's program to provide assistance.

○ Regarding undertaking (iii), the report described information analysis undertakings as a program to harness information, along with Operation Supervisor qualification and maintenance skill certification systems as programs to develop human resources. It also explained about assisting the development of consensus standards as a program to achieve stronger foundations.

○ As a new topic, the report referred to JANSI's effort of entirely revising the 5-Year Plan in response to the INPO gap assessment. The report also noted that JANSI set its "Goal as a Self-Regulatory Organization" and "JANSI's Code of Conduct" as new operating policies.

＜Poster session＞

○ JANSI's initiatives to voluntarily improve nuclear safety
○ JANSI's peer review
○ Building and administrating a system to comprehensively evaluate power stations
○ Assisting and evaluating the safety culture of nuclear operators
○ Integrating undertakings to analyze information on overseas operating experience
○ Technical assistance based on the preparation of consensus standards and maintenance technical foundations
○ Developing and running the leadership training program
○ Ensuring nuclear safety during plant restartups
○ JANSI's Code of Conduct, Goal as a Self-Regulatory Organization, revision of the 5-Year Plan

[Session 3: Ensuring nuclear safety during restartup]

○Theme-based presentation: Initiatives towards safe and stable operations at Sendai Nuclear Power Station Units 1 and 2

Michiaki Uriu, President, Kyushu Electric Power

○ The process that led to Sendai Nuclear Power Station's restartup involved company-wide, full preparations to safely and reliably put the station back into operation. Efforts include arranging station personnel-based response systems and establishing in the Head Office a Restartup Response General Headquarters with the President serving as General Manager.

○ With objective checks by third parties, e.g. JANSI, experts from other utilities, and WANO's reviews, Kyushu Electric Power garnered positive evaluation on the adequacy of initiatives that the company planned and implemented. This allowed the company to restart the plants with confidence.

○ Kyushu Electric Power actively transmitted information. This can be observed by how it notified in advance to the press about possible events and its countermeasures during the restartup, as well as the company's approach to the disclosure of information. After the reactors started operations, Kyushu Electric Power made daily issuances of plant conditions while the restartup was underway. Information on the plants, notably, were internationally communicated via JANSI.

○Short speech

Akihiko Mayumi, President and Director, Hokkaido Electric Power

○ Tomari Nuclear Power Station units have been under a full shutdown for nearly four years ever since Unit 3's shutdown in 2012. After the new regulatory requirements came into effect in July 2013, the station went through 77 review meetings. With the design-basis ground motion receiving general understanding late last year, Hokkaido Electric Power managed to enter a new phase.

○ The restartup carries risks associated with (i) extended shutdowns; (ii) modifying and installing new equipment; and (iii) the society.

○ For instance, extended shutdowns entail risks of reduction in skills and field morale. To address these risks, Hokkaido Electric Power has been performing training in a flexible manner by using its on-site maintenance and repair training facility and operation simulator. Management members including myself are also communicating to the field the necessity of restarting nuclear power. Regarding societal risks, the company prepared readily understandable material based

on opinions provided by the nuclear safety advisor, who was arranged by the Hokkaido government, for the interest of activities to gain a better understanding from local communities. Hokkaido Electric Power in turn plans to carry out over 60 briefing sessions for local areas.

○ Hokkaido Electric Power will strive to ensure safety when restarting plants following the extended shutdown. This will be achieved by leveraging both information compiled by JANSI and results from Sendai and other plants that already returned to operation.

Ei Kadokami, Executive Vice President/Senior General Manager, Nuclear Energy Systems Division of Energy & Environment Mitsubishi Heavy Industries

○ As manufacturers producing PWR plant models different from that of Fukushima, Mitsubishi Heavy Industries embarked upon explorations shortly after the earthquake for severe accident, tsunami, and earthquake measures. The company, in turn, has been communicating with utilities and further enhancing its explorations. Over 3,700 members including Mitsubishi Group company personnel are supporting utilities in the stages of new regulatory requirement compliance evaluations, safety reviews, constructions, pre-service inspections, and restartup preparations.

○ In coping with new regulatory requirements, Mitsubishi Heavy Industries performed per-plant safety measure constructions, developed a database on issues that are common amongst PWRs, and in turn provided concepts by drawing on this database. Sharing concerns and countermeasures through regularly held liaison meetings with PWR owners allowed Mitsubishi Heavy Industries to smoothly carry out its operations.

○ The pre-service inspection for Sendai Nuclear Power Station saw an increase in requirements and inspection-subject equipment, but unifying Mitsubishi Heavy Industries' communication contact with Kyushu Electric Power allowed for preventing information mix-ups, and this resulted in swift and accurate information sharing. In the pre-startup comprehensive check, Mitsubishi Heavy Industries specified concerns through Mitsubishi Group's internal review meetings and eliminated these matters by field walkdowns. Mitsubishi Heavy Industries sees maintaining the morale of employees as critical when assisting plant restartups, and the company also made sure to raise safety awareness with patrols and instructions provided from executives.

○ Mitsubishi Heavy Industries believes that achieving higher safety levels and boosting up plant performance serves to the recovery of trust, and as manufacturers, the company seeks to maintain initiatives that highlight this fact.

Junko Ogawa, 4th WiN- Global President/Lifelong Director

○ I can relate to what JANSI's Chairman Mr. Matsuura stated to the effect that nuclear safety is an accumulation of untiring training and a process of endless pursuit. One can never achieve perfection in Nihon Buyo (classical Japanese dancing) or tea ceremony (which are artistic activities representing Japanese culture). Culture is composed of behavioral patterns repeated in a daily fashion; in a similar manner, I believe routine-basis practice is the only way to mold "nuclear safety" into "safety culture." As with martial arts or tea ceremony, I expect nuclear safety to be enhanced to a philosophy that accompanies action.

○ I hear concerns through conversations with colleagues and elementary/junior-high school students. In terms of bringing nuclear plants back to operation, they ask why plants must be restarted when no power shortage is experienced under the absence of nuclear power, and whether it is possible to avoid being affected by nuclear emergencies in Japan--a quake-prone and small-sized country. The key to addressing these worries is employing concise words that grade schoolers can comprehend and will also convince concerned individuals. I would like engineers to handle small talk well.

Masuhiro Nakano, Operations Officer/Sendai Restartup Assistant Team Leader, JANSI

○ Mr. Nakano described JANSI's assistance toward the restartup of Sendai Nuclear Power Station, along with details and processes leading up to the assistance. He also presented plans for providing support to subsequently restarting plants.

○ The CNO (Chief Nuclear Officer) meeting in April 2015 reached a decision to assist Sendai Nuclear Power Station as an industry-wide effort under JANSI's leadership. JANSI thereby made arrangements with Kyushu Electric Power and finalizing when and what issues the assistance would entail. In a drive to render the restartup smooth and to maintain stable operations, JANSI built a communication mechanism with experts from utilities, performed utility expert-led walkdowns, dispatched staff from the restartup phase, and identified postulated troubles based on information on troubles experienced in Japan.

○ JANSI also provided assistance to Takahama and Ikata NPS, which are to subsequently restart operations, by drawing on the experience from activities at Sendai NPS.

○Panel discussion

Moderator: **Shojiro Matsuura,** Chairman, President & CEO, JANSI

Panelists: **Michiaki Uriu,** President, Kyushu Electric Power

Akihiko Mayumi, President and Director, Hokkaido Electric Power

Ei Kadokami, Executive Vice President/Senior General Manager, Nuclear Energy Systems Division of Energy & Environment Mitsubishi Heavy Industries

Junko Ogawa, 4th WiN- Global President/Lifelong Director

Masuhiro Nakano, Operations Officer/Sendai Restartup Assistant Team Leader, JANSI

○ One panelist stated that the culture of employing a self-regulatory organization has yet to gain a foothold in Japan. Regarding the perception on these organizations, while the general public looks at the organization as a body offering assistance when operators deal with regulators, operators see the organization as a respect-worthy counterpart to collaborate and discuss with.

○ To what extent should safety measures be implemented against earthquakes and tsunami? Efforts are needed to consistently engage in the pursuit of safety preservation and make untiring endeavors upon gaining the latest knowledge from around the world. The “Untiring Pursuit of the Highest Standards of Excellence” is the mission that JANSI embraces.

○ One panelist stated that for manufacturers, the path for nuclear power to win the trust of society starts from providing highly reliable equipment. For operators, trust from the society leads to motivating their engineers, which will in turn boost up safety levels. The key issue is how to address engineers/individuals.

○ Regarding the roles played by such institutions as regulators, regulators requested communications to be made in an intelligible manner. Operators, meanwhile, stressed the importance of the trust-based relationship between regulators and operators, that preserving safety is a concept shared by both parties, and also the importance of both parties to disclose information and to discuss in frank terms.

≪Summary≫

○ Assisting the restartup of Kyushu Electric Power’s Sendai Nuclear Power Station was the first case in which the company became united as a team and worked in solidarity with regulators and other utilities. JANSI will make sure to take advantage of this experience for future initiatives.

○ Plants that are subsequently restarting seek to repeat safety-oriented drills and different innovative approaches, learn humbly from preceding cases to win the confidence of the society, and thereby embark on restartups.

○ Boosting morale is of importance in terms of constructing equipment that is geared towards ensuring safety.

○ By collaborating and cooperating with operators, JANSI will continue working to achieve restartups in a safe manner.

○ In an effort to win the trust of society at large, safety culture should be enhanced from a “culture” to a “philosophy” of nuclear safety through continued practice.

[Closing remarks]

Shojiro Matsuura, Chairman, President & CEO, JANSI

○ Mr. Preston D. Swafford presented in his keynote speech how nuclear safety is being ensured under a competitive environment in the U.S., a country in which progress has already been made in power deregulation. He also made a vivid remark in the panel discussion “not to be afraid of competition.” Presidents of utilities presented their strong resolve to continue making every effort towards ensuring nuclear safety amid the conditions rendered difficult by power deregulation.

○ Regarding plant restartups, which is another major subject on par with power deregulation, today’s participants pointed out that utilities and JANSI should work together to restore the confidence of the society. I hope that today’s discussions will be fully taken advantage of to continue plant restartups, and that this would result in maintaining safe nuclear operations.

[Questionnaire results]　120 responses were collected

・ By and large, participants seem to have comprehended and been satisfied with the sessions and panel discussions, but on the other hand, many responses stated that the agendas were excessive and poorly addressed.

・ Many responses appreciated the two topics arranged this year, “Securing nuclear safety in the competitive environment” and “Ensuring nuclear safety during restartup,” stating that they were timely themes.

・ Many responses stated that in Session 1 the initiatives in a different industry, i.e. the aviation industry, was informative. On the other hand, many responded that they expected more in-depth discussions on the initiatives of other industries and the incentive for safety-related undertakings.

・ Many responses appreciated how in Session 3 they gained an understanding on concrete and practical initiatives for plant restartups.

・ Numerous responses stated that the presentation on JANSI’s undertakings was given in a readily understandable fashion, but many others stated JANSI should place a stronger emphasis on topics and both internal and external opinions.