ISCN Newsletter

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Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (ISCN)

Japan Atomic Energy Agency (JAEA)

※This document has been translated from the Japanese version into English using translation software except articles 2-1 ~ 2-3.

Contents

1. Announcements

1-1 Update of "Trends in Nuclear Nonproliferation"

We have updated the "Nuclear Nonproliferation Trends" (Japanese version only) based on the status through February 29, 2024.

This edition includes a review of information on the IAEA Low Enriched Uranium (LEU) Bank and we newly added information on the Comprehensive Nuclear-Test-Ban Treaty (CTBT). The updated version of the Trends will be available at the following URL after March 6, 2024.

https://www.jaea.go.jp/04/iscn/archive/nptrend/index.html

2. Nuclear Non-proliferation and Nuclear Security Trends and Analysis

2-1 RUSI's report entitled “Atoms for Sale: Developments in Russian Nuclear Energy Exports”

Ms. Darya Dolzikova, a research fellow in Proliferation and Nuclear Policy at RUSI, published a report entitled “Atoms for Sale: Developments in Russian Nuclear Energy Exports" in February 2023. This 2-1 article briefly summarizes her report in Japanese. The report is available on RUSI’s web: https://static.rusi.org/RUSI-Russian-Exports-final-web_0.pdf

Report by Management and Policy Research Office

2-2 2024 Doomsday Clock: 90 seconds to midnight

On 23 January 2024, Science and Security Board of the Bulletin of the Atomic Scientists announced that they once again set the Doomsday Clock at 90 seconds to midnight because humanity continues to face an unprecedented level of danger.

This 2-2 article briefly summarizes the Bulletin of the Atomic Scientists’ article entitled “A moment of historic danger: It is still 90 seconds to midnight, 2024 Doomsday Clock Statement" in Japanese. The Bulletin of the Atomic Scientists’ article is available on its web: https://static.rusi.org/RUSI-Russian-Exports-final-web_0.pdf

Report by Management and Policy Research Office

2-3 Statement by Antonio Tajani, Minister for Foreign Affairs and International Cooperation of Italy in his capacity as Chair of the G7 Foreign Ministers’ Meeting at the Munich Security Conference (Nuclear nonproliferation and ZNPP related issues.)

On February 17, 2024, the G7 Foreign Ministers' Meeting was held in Munich and Chair’s Statement was issued after the Meeting. This 2-3 article introduces nuclear non-proliferation and ZNPP related issues expressed in the Statement.The Chair’s Statement is available on Ministry of Foreign Affairs of Japan’s web: https://www.mofa.go.jp/files/100622404.pdf

Report by Management and Policy Research Office

3. Introduction of Technology and Research related to Nuclear Non-proliferation and Nuclear Security

3-1 Development Status of Delayed Gamma-ray Spectroscopy

This report describes the development status of delayed gamma-ray spectroscopy, which has been carried out by the ISCN Technology Development and Promotion Office as part of the development of nondestructive analysis technology for nuclear materials. This technology was presented at the 44th Annual Meeting of the Institute of Nuclear Materials Management, Japan (INMMJ) held in November 2023.

Delayed Gamma-ray Spectrometry (DGS) is an active-interrogation technique for evaluating fissile nuclides within a mixed nuclear material sample. Neutrons are used to induce fission in^{235} U,^{239} Pu, and^{241} Pu, leading to the creation of fission products proportional to the fission yields and quantities (mass) of the nuclides. The resulting fission products decay over time to produce a unique gamma-ray signature that can be analyzed to determine the relative content of these primary fissile nuclides. Notably, fission products with half-lives of ≲10 minutes will emit gamma rays with energy ≥2650 Notably, fission products with half-lives of ≲10 minutes will emit gamma rays with energy ≥2650 keV, which can allow this signature to be observed above the shielding required for suppressing passively emitted gamma rays from high-radioactivity Specifically, irradiated fuel emits ~10^5 662-keV gamma rays from long-lived^{137} Cs for each gamma ray passively emitted from U and Pu. While this provides a measure of self-security from safety considerations, quantifying the nuclear material for safeguards verification becomes limited to Direct measure of the DGS signature can supplement the passive correlations to improve safeguard capabilities. Direct measure of the DGS signature can supplement the passive correlations to improve safeguard capabilities.

One notable mixed nuclear material is irradiated fuel dissolution found within reprocessing plants. At this stage, the nuclear material is not contained within the assembly that can be counted as an item, but some of the liquid can be diverted more easily for the development of nuclear weapons. As such, the International Atomic Energy Agency applies two very precise and accurate analysis methods to determine the U and Pu content in small samples As such, the International Atomic Energy Agency applies two very precise and accurate analysis methods to determine the U and Pu content in small samples taken from the input accountancy tank [1]. First, Hybrid K-Edge Densitometry (HKED) utilizes x-ray transmission and scattering to determine the total mass of U and Pu elemental material within the sample. Next, Isotope Dilution Mass Spectrometry (IDMS) is applied to determine the relative nuclide content; the masses of^{235,238} U and^{238,239,240,241,242} Pu. However, due to the chemistry and dilution required for IDMS sample preparation, there are limitations to the technique, notably it extends the time to return a report However, due to the chemistry and dilution required for IDMS sample preparation, there are limitations to the technique, notably it extends the time to return a report [2]. As such, the JAEA/ISCN has been developing the DGS nondestructive assay (NDA) method to all

samples, like HKED, to increase the verification capabilities [3].

Within this scope, there are two primary goals for the JAEA/ISCN DGS development. First, a universal analysis method must be developed to quantify the Concurrently, instruments must be designed and characterized to optimally obtain the fission product signature for the analysis. Past experimental research in collaboration with the European Commission Joint Research Centre (EC/JRC) has shown Past experimental research in collaboration with the European Commission Joint Research Centre (EC/JRC) has shown significant dependence on the interrogation timing and the ability to distinguish ^{235}U and ^{239}Pu gamma-ray spectra [4] (see Fig. 1). Significantly, shorter irradiation times (T_I) and measurement times (T_M) have more complex spectra and uniqueness for the same ~1-hour interrogation Further, as noted in the $T_I = T_M = 300$ s spectra, the ^{235}U highest energy peaks shown swap intensity from the $T_I = T_M = 10$ s spectra and start having proportions similar to the ^{239}Pu pair.

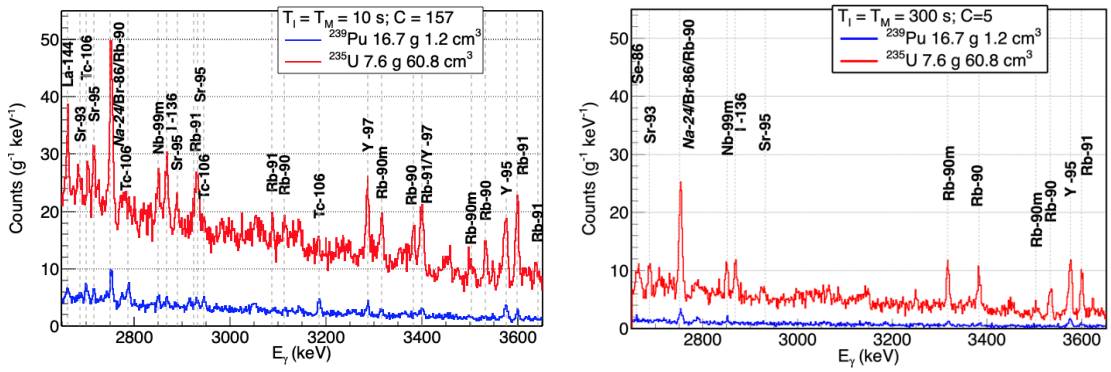


Fig. 1. Comparison of ^{235}U and ^{239}Pu fission product gamma-ray spectra for different time patterns.

In addition to the gamma-ray peak pattern, it should be noted that the relative intensity of the ^{239}Pu spectrum is significantly lower than the ^{235}U spectrum, even though the mass is almost double. Specifically, this excess is due to the uranium oxide sample having ~50x the volume of the plutonium-gallium alloy sample. Essentially, the geometry of the samples (include possible assemblies) is a primary factor of the signal strength, not the mass alone. However, we also demonstrated that the fissile mass can be evaluated from correlations to the integrated gamma-ray counts for a specific volume [5] (see Fig. 2), enabling not just composition, but content evaluation. However, we also demonstrated that the fissile mass can be evaluated from correlations to the integrated gamma-ray counts for a specific volume [5] (see Fig. 2), enabling not just composition, but content evaluation capabilities.

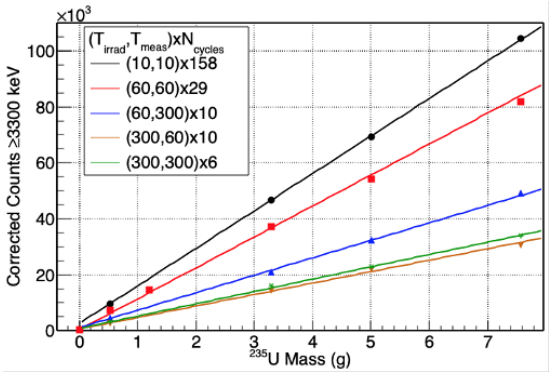


Fig. 2 Correlation of^{235} U mass to integrated fission product gamma-ray counts for various time patterns.

Recently the JAEA/ISCN developed the Fission Signature Assay Instrument (FSAI) as the next generation DGS instrument for small samples (see Fig. 3). Compared to DGTS, this instrument utilizes a deuterium-deuterium neutron generator that emits neutrons like^{252} Cf (~2.5 MeV) but can be turned off for safer handling. Also different from DGTS is the sample transfer system that was designed for use inside a hot cell. The hot-cell encasement would prevent contamination spreading from the samples, so a magnetic coupler was designed for testing the transfer without limiting the maintenance capability. However, a linear transfer system using a magnet coupler may disengage, so this novel rotational system was designed. Finally, as the name suggests, we expanded from using only delayed gamma rays to multiple fission signatures for improved mass correlation. Inside the irradiator, two^{3} He detectors are Inside the irradiator, two^{3} He detectors are used to measure the prompt neutron counts. Two more He detectors are placed under the sample transfer system in front of the gamma-ray detector shield to measure delayed neutron counts from fission signatures. These neutron signals, along with the integrated gamma-ray These neutron signals, along with the integrated gamma-ray counts, will be scaled to the^{4} He source monitor above the neutron generator. Compared to^{3} He that best measures thermal-energy range neutrons,^{4} He uses Consequently, the^{4} He detector will directly measure both source and fission neutrons but be able to distinguish them through the actual energy.

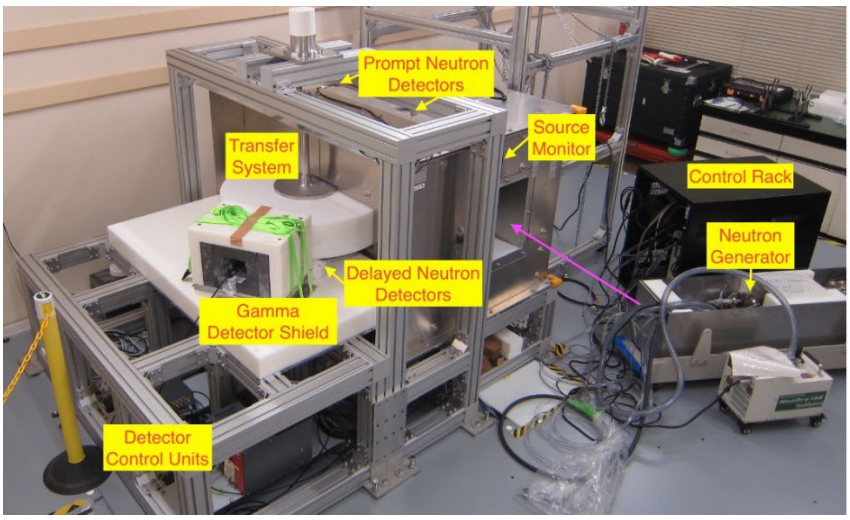


Fig. 3 The JAEA/ISCN Fission Signature Assay Instrument.

For the final phase of our development, the JAEA/ISCN will perform experiments to characterize the FSAI and perform interrogations with^{235} U foils. Additionally, we will improve the DGS Additionally, we will improve the DGS capability by improving the quantification of^{235} U short-lived fission product yields through the gamma-ray spectra. Recent studies showed a difference between multiple DGS simulation codes compared to experimental spectra collected in collaboration with the Pulsed Neutron Interrogation Test Assembly (PUNITA) at EC/JRC-Ispra (Italy) [6]. While the average peak count showed agreement within 10% for short interrogation times, the peak variance was ~40-50%, which indicated the peak This will factor into the ability to perform composition analysis, so variance We will then improve the JAEA/ISCN DGS Monte Carlo for better efficiency within the scope of our inverse Monte Carlo. We will then improve the JAEA/ISCN DGS Monte Carlo for better efficiency within the scope of our inverse Monte Carlo analysis method.

The final step of our development will be to evaluate the capability for other sample form factors. Specifically, we will simulate the interrogation of irradiated fuel assemblies that have complex geometries, but also Gen-IV fuels, like Accelerator Driven System (ADS) and High-Temperature Gas-cooled Plans are also under discussion to use mixed-oxide fuel in EC/JRC as a possible final demonstration of the capability. capability.

[1] IAEA, "Safeguards Techniques and Equipment, International Nuclear Verification Series, Vol. 1 (Rev. 2)", 2011.

[2] Itoh, T. et al., "Enhanced Cooperation Between SSAC and IAEA through Joint Operation of On-Site Laboratory for Safeguarding Rokkasho Reprocessing Plant (RRP)", IAEA-CN-184, 2010.

[3] IAEA, "Department of Safeguards Long-Term R&D Plan, 2012-2023," STR-375, 2013, Topics 5.1, 5.3.

[4] Rodriguez, D.C. et al, "Evaluation of high-energy delayed gamma-ray spectra dependence on interrogation timing patterns ", Nucl. Inst. and Methods A 997 (2021) 165146.

[5] Rossi, F. et al., "Correlating the fissile mass of standard uranium samples with delayed gamma-rays from fission products ", Nucl. Inst. and Methods A 977 (2020) 164306.

[6] Rodriguez, D.C. et al, "Optimizing Fissile Nuclide Content Analysis for Delayed Gamma-ray Spectroscopy Nuclear Safeguards ", IEEE Nuclear Science Symposium, Conf. Rec. 1216, 2022.

Report by Rodriguez Douglas Chase, Technology Development Promotion Office

4. ISCN's Activities Reports

4-1 ISCN-WINS Workshop “Mitigating Insider Threat to Enhance Nuclear Security”

The ISCN-WINS Joint Workshop (WS) is held to foster a nuclear security culture as part of the human resource development support program funded by the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT) under the Subsidy for Nuclear Security Enhancement Promotion Program. The ISCN has been co-hosting this workshop every year since FY2011 with the World Institute for Nuclear Security (WINS), an international NGO established for the purpose of sharing best practices in nuclear security.

The main feature of this workshop is that it adopts a "theater-style session. AKT Productions, a British theater company with a proven track record in theater-based training in various fields, including the nuclear industry, will perform a nuclear security case that corresponds to the theme of each session of the workshop, and the facilitator will present discussion points on the case to the participants. The facilitator will present the discussion points to the participants, who will then engage in group discussions in a unique and highly interactive format.

The theme of this year's 12th edition, titled "Mitigating Insider Threat to Enhance Nuclear Security," was insider threat.

In Japan, the threat of terrorism against critical facilities such as nuclear power plants has been increasing due to the international situation in recent years. The purpose of this workshop was to provide participants with an awareness of the importance of insider threat countermeasures and how to utilize them.

Based on the theme of this WS, the play is set in a fictitious nuclear power plant, where a small fire is intentionally started by a contractor who is dissatisfied with the facility where he works, and the subsequent series of responses by nuclear security personnel and other facility personnel, including identification of factors, remedial measures, and reporting to regulatory authorities, is the scenario ISCN, WINS, and AKT.

After watching the play, which was divided into four parts according to the scenario, the participants had a group discussion led by the facilitator, where they actively discussed the problems they noticed in the play, identified the background of the problems, and discussed how to improve the situation. In the last part of the play, a session simulating a press conference was held, in which the participants played the role of reporters and asked the facility (AKT and WINS) whether the analysis of factors and improvement measures taken by the facility after the incident were sufficient, whether the press conference was held at the right time, whether there was any intention to conceal information about the incident, etc. The participants were asked to respond freely to the questions and answers. The participants freely asked and answered questions such as whether the analysis of factors and improvement measures taken by the facility after the incident were sufficient, whether the press conference was held at

the right time, and whether there was any intention to conceal information about the incident.

The workshop was attended by 31 participants from nuclear operators, regulatory authorities, universities, and other related organizations in Japan, and the group discussions provided opportunities to share information on issues and good practices at each other's facilities, and were effective in promoting information exchange among participants involved in nuclear security.

In addition to the theater session, three experts invited from Japan and abroad gave keynote speeches at the WS. Mr. Hiroyuki Sugawara, Specialist in International Nuclear Security, Nuclear Regulation Authority, Japan, introduced the characteristics of insiders and the regulatory requirements for insider threat countermeasures, as well as actual insider threat cases that have occurred in Japan. Mr. Jonathan Price, Head of Nuclear Security, EDF Energy, UK, spoke on the design and implementation of an effective insider threat mitigation program in the UK. In addition, online participation was provided by nuclear security expert Lisa De Laet, inspector at the Belgian Federal Agency for Nuclear Control (FANC), who presented on evaluating the performance of insider threat mitigation measures.

In a survey of participants conducted after the conclusion of this WS, all participants indicated that they were satisfied with the content of the WS and that the knowledge and information gained in the WS were useful in their workplaces. They also said that the WS was a very valuable opportunity to learn about nuclear security, and that it was a meaningful place to gain new insights and knowledge.

Finally, we would like to thank WINS and AKT for their efforts in organizing this WS, and would like to make further improvements for future WS.

Theater

Report: Takuya Kobayashi, International Capacity-Building Support Office

4-2 Regional Training Course on Non-Destructive Assay of Nuclear Materials

ISCN held a regional training course on Non-Destructive Assay (NDA) of nuclear materials from February 5 to 9, 2024, at the Nuclear Science Research Institute in Tokai-mura, Ibaraki Prefecture, as part of the human resource development support program funded by the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT) under the Subsidy for Nuclear Security Enhancement Promotion Program.

This course aims to contribute to the improvement of the quality of State Systems of Accounting for and Control of Nuclear Material (SSAC) and to the smooth implementation of safeguards verification activities of the International Atomic Energy Agency (IAEA) in the countries that promote nuclear energy utilization and development by providing the basic principles of NDA technology, points to be considered in measurements, and examples of application in actual facilities. This course is a follow-up to the International Training Course on SSAC organized by ISCN[1] , which has been held at the European Commission Joint Research Centre (EC-JRC) Ispra Institute until FY 2019, and is being held in Japan from FY 2022 as a new course with a revised curriculum for Asian participants. It is available at[2] .

Participants are those who are in charge of safeguards and accountancy at nuclear regulatory authorities or nuclear facilities in Asia. Last year, the first session, the number of participants was limited to Japanese nationals because of the difficulty of coming to Japan from overseas due to the effects of the new type of coronavirus infection.

This year, as in the previous year, the IAEA Tokyo Regional Office (TRO) dispatched two active inspectors as lecturers and received cooperation from a number of experts within JAEA, and one lecturer was invited from Los Alamos National Laboratory (LANL) in the United States.

Table 1 provides an overview of the curriculum for this course. The course is unique in that, in addition to lectures on NDA technology, it incorporates many participant-driven exercises.

In order to allow sufficient time for exercises, e-learning materials for the gamma/neutron measurement lecture were developed, and participants were asked to complete them before the course started. In the exercises, the participants were encouraged to operate the detectors and software used by the IAEA for inspections under their own initiative, and to measure uranium samples, etc., based on what they learned in the lectures.

In addition, in the part on NDA technology in the research reactor (JRR-3), TRO/IAEA inspectors served as instructors and measured nuclear materials handled in the actual facility at the spent fuel pool, new fuel storage, and the top of the reactor pool.

[1] ISCN Newsletter No. 325 https://www.jaea.go.jp/04/iscn/nnp_news/attached/0325.pdf#page=19 (January 2024)

[2] ISCN Newsletter No. 307 https://www.jaea.go.jp/04/iscn/nnp_news/attached/0307.pdf#page=39 (July 2022)

Table 1 Curriculum Outline

schedule		morning	afternoon	lecturer
in advance	**E-learning**	lecture Principles and measurement of gamma radiation, basics of neutron radiation measurement, coincidence method, etc.		Analysis Section, Reprocessing Decommissioning Engineering Center, JAEA, ISCN Technology Development Promotion Office, LANL, U.S.A.
Day 1	**Gamma-ray measurement part**	lecture Basics of Gamma Ray Measurements and E-Learning Follow-up	exercises Measurement/analysis using HPGe semiconductor detector, MGA/MGAU software [3] for enrichment, etc.	Analysis Section, Reprocessing Decommissioning Engineering Center, JAEA, LANL, USA, ISCN Technology Development Promotion Office, ISCN International Capacity -Building Support Office
2nd day		exercises NaI(Tl) scintillation detector, CZT detector, measurement/analysis using HM-5 [4], enrichment analysis using MCAT and NaIGEM software [5], LaBr3(Ce) detector measurement demonstration		
3rd day	**Part on Neutron Beam Measurements**	lecture Neutron-beam measurement, neutron coincidence method	exercises Neutron dosimetry and neutron coincidence method using the He-3 detector [6]	Nuclear Material Control Section, Planning and Management Section, Plutonium Fuel Technology and Development Center, JAEA, ISCN Technology Development Promotion Office
Day 4	**Part on NDA technology in research reactor (JRR-3)**	lecture Verification technology for research reactors using NDA, JRR-3 research reactor overview	exercises Verification of spent fuel, fresh fuel, etc. at JRR-3 using ICVD [7], IRAT [8], HM-5	TRO/IAEA, JAEA Nuclear Science Research Institute JRR-3 Management Section, Research Reactor Technology Section, Nuclear Material Control Section, Nuclear Human Resource Development Center
5th day	**Lecture/Visit**	lecture History of NDA and Technical Cooperation between LANL and Japan	Virtual Reality Tour Fuel pool verification, fuel fabrication facilities, C/S	LANL, USA; Safeguards Analytical Chemistry Research Group, JAEA Nuclear Science Research Institute; ISCN

[3] (Reference: Japan Isotope Association, https://gradin.jp/product/1514.html/ (October 2019))

[4] Handheld gamma-ray measuring device used by IAEA inspectors

[5] Both MCAT and NaIGEM software are used by IAEA inspectors to analyze enrichment

[6] Instruments sensitive to neutron radiation

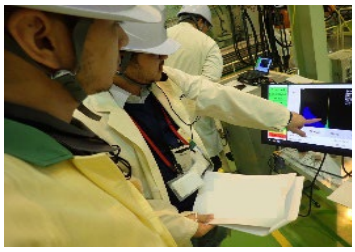
[7] ICVD (Improved Cerenkov Viewing Device)

[8] IRAT (IRradiated fuel Attribute Tester, a detector to measure gamma radiation from irradiated fuel)

		Facility Tour CLEAR[9]	technology[10]	International Capacity-Building Support Office

Discussing gamma radiation measurement results with the instructor

A view of the explanation pertaining to the configuration of the neutron beam measurement system



Checking the spectrum of spent fuel measured by IRAT (JRR-3)

In a participant survey at the end of the course, all participants indicated overall satisfaction with the course. Below are some of the comments received from participants.

- This course is very comprehensive and very effective in the way it is delivered.（Government Official）
- Use the NDA procedures learned in this course to improve the use of NDA at m own institution.（Research Institution Staff）
- I think it will be very useful to work with IAEA inspectors to facilitate inspection activities. (Regulatory agency official)
- Thanks to ISCN for their proper planning and support.（Government Official）

This year, the second time the course was held, we welcomed participants from the Asian region and were able to discuss and share knowledge from more diverse perspectives among participants and lecturers. We would also like to take this opportunity to express our deepest gratitude for the cooperation of the TRO/IAEA inspectors, LANL lecturers from the U.S., and numerous experts from JAEA, which enabled us to successfully complete the course as in the previous year. We will continue to strive to

[9] CLEAR: The Clean Laboratory for Environmental Analysis and Research, one of the IAEA Network of Analytical Laboratories.
(Reference 1) Nuclear Regulatory Commission document https://www.soumu.go.jp/main_content/000456594.pdf（March 2014)
(Reference 2) International Atomic Energy Agency https://www.iaea.org/sites/default/files/safeguardslab.pdf（October 2012)

[10] Cameras, electronic seals, and other technologies used by the IAEA for containment and surveillance (C/S)

provide better courses based on the needs of the participants.

Report by Takaharu Tatsuno, International Capacity-Building Support Office

5. Column

5-1 ISCN newcomer series ～HIROE Jun～

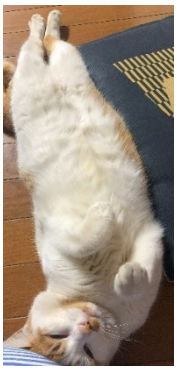
My name is Jun Hiroe and I have been working in the Planning Management and Policy Coordination Office since last November.

I live in Hitachinaka City. I live with my husband, my second son and a cat.

-Biographies

A long time ago, I worked as a temporary employee at the Naka Research Center during my days at the Japan Atomic Energy Research Institute (JAERI), where I supported researchers, including drafting foreign business trips, in the ITER (experimental nuclear fusion reactor) Development Office and the JT-60 (critical plasma test device) Analysis Office. After a period of staying at home to raise my children, I worked part-time in the Finance Division and then in the International Affairs Division, where I was in charge of coordinating the application procedures for foreign nationals who visit the institute and the logistics of the International Relations Committee.

-What I like to do...



I love going to art museums. When I was a student, I did my practical training at Art Tower Mito to qualify as a curator. I was really moved by the process of creating contemporary art in person. That experience has brought me closer to visiting art museums. Now, in addition to visiting every special exhibition at the Ibaraki Prefectural Museum of Art, I also visit art museums in Tokyo, so I think I visit art museums 7 to 8 times a year.

I also have a brown tiger cat. she used to be a stray cat, but she is gentle and sweet on my lap. Playing with the cat is my healing time.

-Having been to Vienna recently...

Last October I traveled to Vienna for a week with my second son, a college student. While working in the International Affairs Department, I had always wanted to visit a city with an overseas office.

In Vienna, we stayed in an apartment rather than a hotel. We were impressed by the simple and easy-to-use facilities of the residence, which was fully equipped with a kitchen, washing machine, and central heating.


At St. Stephen's Cathedral

At the Museum of Art History, I was able to take my time to admire Raphael's magnificent tapestries and paintings by Bruegel and Archimboldo, which I had longed to see.

During our stay, we had a problem with our second son who developed a fever. We did not have a thermometer with us, so we used an app on our cell phone to take his temperature, which read 39 degrees Celsius, and we were very upset. I called the Vienna office, and they advised me to go to the hospital.
It was very reassuring to hear from you. I would like to express my gratitude to Mr. Suda, the director of the company.
He delivered thermometers, Japanese bento lunches, Pocari Sweat, etc. to our apartment. I was so happy that I could not help but cry at the thoughtfulness of their kindness. Since I had insurance, I was able to visit a local hospital and return home safely. (Actually, I had a slight fever in the 37 degree Celsius range due to exhaustion.) I could see firsthand how reassuring the Vienna office is to business travelers visiting the area, and since many people at ISCN go on business trips to Vienna, the fact that I made my own arrangements and traveled on my own has been useful to me in my work.

Last but not least, I am happy to be assigned to the vibrant ISCN. I am looking forward to learning the job quickly so that everyone can work smoothly and be of service to everyone. I look forward to working with you.

Report: Jun Hiroe, Management and Policy Research Office

editorial postscript

March has come early in the year 2024. As someone who does not like cold weather, I am glad to see the temperature rising, but there is a drawback: hay fever rages during this time of year. It is estimated that at least one in three Japanese suffers from cedar pollinosis, making it a problem for the entire country. Replanting with less pollen-pollen-pollen-laden varieties seems to be underway, but it will take more time for this to be effective. We hope that continued efforts will eliminate the problem of pollen allergy. I am also looking forward to the blooming of the cherry blossoms.

(Y.M.)

If you have any questions or comments about the ISCN Newsletter, please send them to the following address

E-MAIL: iscn-news-admin@jaea.go.jp

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