

The background of the slide is a golden-yellow color with a dense, repeating pattern of various international currency symbols. These symbols, including the dollar sign (\$), euro (€), yen (¥), and pound sterling (£), are rendered in a three-dimensional, embossed style, creating a textured effect. The symbols are scattered across the entire background, with some appearing larger and more prominent than others.

Recent Good RP Activities in Japanese Utilities

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*Report from 2018 ISOE International
ALARA Symposium, Kyoko, Japan*

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- 1. 2018 ISOE International ALARA Symposium**
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1. 2018 ISOE International ALARA Symposium

- Date and Place: 24–26 Oct. 2018, Kyoto, Japan
- Number of Participants: 40s
- Number of Papers: 22 (10 papers from Japanese utilities)
- Contents: 5 Sessions and 1 Technical Visit to Fugen NPP
 - Session 1 Instrumentation & Monitoring
 - Session 2 Database Relevant
 - Session 3 Regulation Matters
 - Session 4 Decommissioning Matters
 - Session 5 Radiation Protection in Nuclear Power Plants
- **More information: isoe-network.net**

2. View Points of Cost Saving Improvements (1/2)

Theme: How ALARA and Good RP Practices can improve cost saving for the industry

- Fundamental Safety Principles (SF1, IAEA, 2006) ; The fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation.
- Final objective of ALARA in RP: Protect people and environments from harmful effects of ionizing radiation difficult to count in money
- Principal Methods of Exposure Reduction: Distance, Time, Shield, and Source Reduction
- Good practice in RP, in sights of Distance, Time, Shield, and Source Reduction can lead ALARA and should improve **further cost saving** for industry

2. View Points of Cost Saving Improvements (2/2)

Relevant Key Words

- **Consciousness** of high dose areas/points
- **Visualization** of radiation sources/ level of safety
- **Monitoring** of radiation sources using such as Compton camera
- Saving of working time as results of skill up by drills/training at the scene, **motivation to the radiation safety**
- Using of RP technologies; shielding, remote manipulation goods

3. Recent Good RP Activities in Japan (from 2018 Kyoto Symposium) 1/7

- Hokkaido EPCo. Tomari NPP
 - To emphasize communication among RP staff: 4 meetings in Tomari NPP; held periodically and whenever needed
 - Site ALARA Conference
 - Radiation Protection Conference
 - ALARA Meeting
 - Safety and Health Council
 - To install temporary shield for major common areas→ got 20–30% reduction effect of dose equivalent rate (see blue of the photo; temporary shielding of W mats)
 - To post labels classified by the dose equivalent level at worksites and common areas to visually draw attention of workers

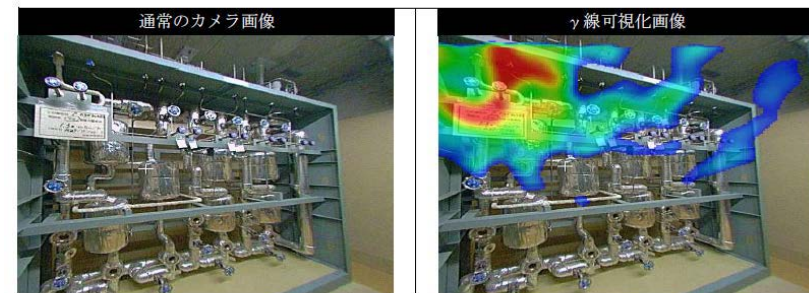


3. Recent Good RP Activities in Japan (from 2018 Kyoto Symposium) 2/7

- Tohoku EPCo. Onagawa NPP
 - Give workers more impressive radiation image to reduce radiation exposure
 - Method; using compton camera, posting the radiation visualization image near the work place
 - High dose points are very easy to understand
 - Improve workers consciousness on high dose areas/points
 - Making workers easier to bring exposure reduction measures before going work

ガンマキャッチャー撮影結果 環境・燃料部/放射線管理G

撮影場所：2号機 原子炉エリア B2FL 原子炉水サンプリングラック室
撮影日：平成29年12月5日(火)



【線量当量率】

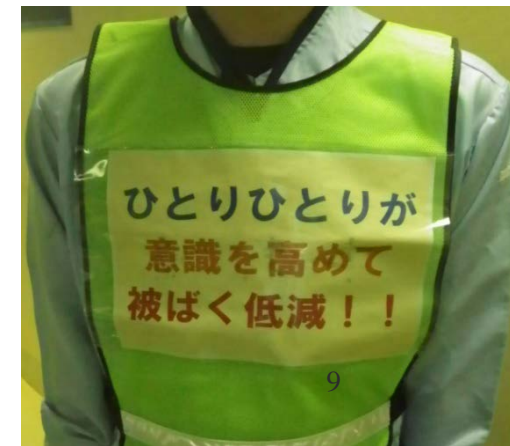
- 表面線量当量率 (可視化画像の赤色) : 1.30 mSv/h (最大値)
- 空間線量当量率 (可視化画像の色なし) : 0.02 mSv/h

3. Recent Good RP Activities in Japan (from 2018 Kyoto Symposium) 3/7

- Tokyo EPCo. HD Kashiwazaki–Kariwa NPP
 - “Dose and Radioactive Waste Reduction Program” was introduced in April 2018
 - To **continuously improve** radiation protection & radioactive solid waste management
 - Features of the program
 - **Strong involvement by the relevant Departments**; the Radiation Protection Department, the Operating Department and the Maintenance Department
 - **Set target dose values for annual and 3 years** for dose reduction in each dept.
 - **Set target amount values for annual and 5 years** for radioactive waste reduction in each dept.
 - Confirm the actual value at any time, take a review meeting with concerned people, and revise the targets if necessary.
 - Report to the meeting with the site superintendent at the top (called the ALARA Review Board :ARB); to approve target values, to evaluate annual RP performance.

3. Recent Good RP Activities in Japan (from 2018 Kyoto Symposium) 4/7

- Hokuriku EPCo. Shika NPP
 - Units 1 & 2 : shutdown since 2011
 - Concerns: decreasing worker's awareness/sensitivity to reduction of exposure and no experience of plant operation for younger utility supervisors
 - ALARA activities:
 - RP education, training and motivation; Issuing the “Radiation Control Newsletter”/ lectures and drills for utility employees and workers/awarding good practice on reduction of exposure/ conducting **field patrols wearing a best with advertisement of exposure reduction**...
 - Visualization of radiation source; posting dose equivalent rate map at the entrance of all rooms where there is high dose source/posting Hotspot labels with indication of the dose rate



3. Recent Good RP Activities in Japan (from 2018 Kyoto Symposium) 5/7

- Kansai EPCo. Mihama Unit 1,2 NPP
 - Units 1 & 2 : shutdown since 2011, decommissioning decision made in 2015
 - Radiological management during decontamination work... **successfully completed in units 1&2 in 2017 with no problems**
 1. Reduction of Exposures:
 - Temporary Shielding installed as much as possible; **80% of dose equivalent rate reduced**
 - Well-Established Access Control
 - Other measures: Remote Operation System, Remote monitoring cameras, area monitors
 2. Prevention of Physical Contamination
 - Contaminated water control: curing enclosure, drain cut-off weir...
 3. Reduction of Solid Radioactive Waste
 - Used resin for system decontamination for 2 Units: 14.45 m³ (1.4 times greater than expectation due to, may be, Fe and Ni on the inner surface of the system transferred to the system fluid in the form of oxides.

3. Recent Good RP Activities in Japan (from 2018 Kyoto Symposium) 6/7

- Shikoku EPCo. Ikata Unit 1,2 and 3 NPP
 - Units 1 & 2 : decommissioning decision made in 2016 and 2018 respectively
 - Unit 3: operation restarted in Aug. 2016
 - RP activities during outage
 1. Working Group for Dose reduction
 - Temporary shielding installation: thousands of lead blankets
 - Feedback from contractors: green houses to minimize exposure of preparation works
 - Remote monitoring system of Alarm Pocket Dosimeters used in high rad. area
 2. Suppression of radiation source (Co60) increase
 - Hexa plug installation & cleaning
 3. Sharing Information and RP improvement:
 - Weekly RP meeting & patrol
 - Competition of Dose reduction group on ALARA planning, processes and achievement



3. Recent Good RP Activities in Japan (from 2018 Kyoto Symposium) 7/7

- Kyushu EPCo. Genkai Unit 1 NPP
 - Unit 1: decommissioning decision made in 2015
 - The 1st stage of the decommissioning process: Preparation of dismantling for 6years
 - Activities of Dismantling Preparation
 1. Preparation works before system decontamination: shielding, portable dust monitor, ventilation in the cavity, continuous monitoring and recording of dose equivalent rate in the cavity...
 - Led 40%–80% reduction of exposure (man•mSv) against the planned dose
 2. System Decontamination
 - After decontamination dose equivalent rate reduced to 1% of that of before decontamination on the heat transfer tube of the SG
 3. Contamination Survey to estimate remained radioactivity before Dismantling
 - Facilities & generated rad. waste materials
 - Measurement and evaluation: **collecting samples from the building & equipment**
 4. Provide appropriate dismantling and removal techniques and procedures to minimize exposure



4. Conclusion

- Japanese utilities **make daily efforts** for reduction of radiation exposure to their staffs and workers.
- Current major concerns of utility are decreasing workers consciousness of radiation safety and no experience of plant operation for younger staff, due to long period of shutdown since 2011. Countermeasures are taken on these view points and are achieved with success.
- Among good RP practice, especially visualization of radiation sources/ level of safety and sharing information with relevant people, Departments (e.g. RP, Operation, Maintenance) influenced the staff and workers and brought good results to improve ALARA.



