

# Activities for enhancement of instrumentation system against the severe accident

May 21-22, 2012 at South Point Hotel, Las Vegas

IPPEI UEYAMA

Manager, Electrical Engineering Group

Nuclear Power Division

The KANSAI Electric Power Co., Inc.

# Summary

The Kansai has carried out the emergency safety measures, and evaluated these effects in our NPPs by stress test. Some of them were reported to Japanese regulatory agency “NISA”.

In addition, we submitted future plans to “Ministers of Economy Trade and Industry” of Japanese government. In this plan, we committed to install alternative D/Gs, filtered ventilation system, H2 re-combiners, **and committed to develop the robust instrumentation system** and so on.

Today, I’ll show you our activities about the development project of the robust instrumentation system for the severe accident in NPPs.

We had just started **the R&D project from this January in cooperation with all 11 Japanese utilities and 3 plant manufacturers “Hitachi, Toshiba, Mitsubishi Heavy Industries”**.

So, I would like to explain you about the scope, schedule and organization of the R&D project.

11 Mar, 2011 Fukushima-daiichi Accident

23 Apr, 2011 KANSAI decided to **supply the safety power to the existing SFP-level /temperature instrumentation system.**



We've done the upgrade at all 11 NPPs.

20-24 Jun, 2011 Japanese Government reported to the IAEA Ministerial Conference Section XII. Lessons Learned From the Accident Thus Far No.14) Enhancement of instrumentation to identify the status of the reactors and PCVs

12 Jul, 2011 US-NRC NTTF Recommendations (Then, it ordered on March 12)

21 Oct, 2011 KANSAI decided to **install the additional wide-range SFP level instrumentation system.**



We've done at 4 NPPs, others are on going

31 Jan, 2012 Kansai has **started the R&D project to develop the robust I&C system** in collaboration with all Japanese utilities, Hitachi, Toshiba and MHI.

**< specifications >**

Range: from top of the fuel racks to NWL

Number: 1-channel

Power: class 1E

EQ: yes, boiling condition

Seismic: Category I





Sensor: Micro Wave type

# Scope & Schedule of the R&D Project

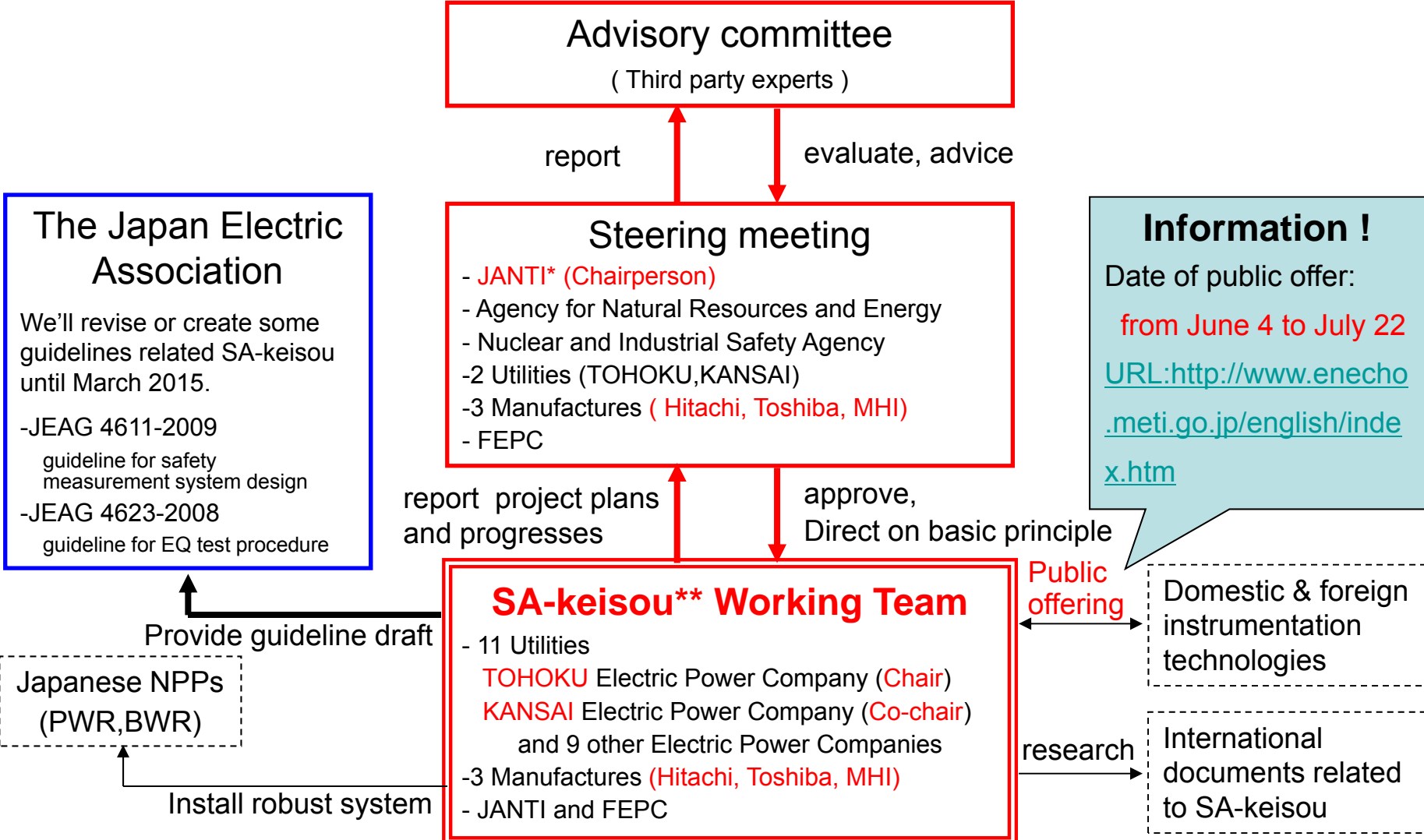
## Scope

- (1) Study for severe **accident scenario** and management
- (2) Calculation of the severe accident environment at a severe accident.
- (3) Selection of Measurement parameters to enhance
- (4) Study for enhancement items (**additional parameter, range, Environmental resistance, etc.** )
- (5) **Research** of instrumentation technology in the domestic and foreign
- (6) Determination of **development goals and required specifications**
- (7) **Development** of robust instrumentation system
- (8) **EQ test** in the severe accident environment
- (9) Creation **guidelines draft** about the design requirements and EQ test for the severe accident instrumentation

## Schedule

| Items   | Start | 2012   | 2013  | 2014 |
|---------|-------|--|---|------|
| (1)~(6) | ▼     |   |   |      |
| (7)     |       |  |   | ▼    |
| (8)     |       |  |  |      |
| (9)     |       |  |   |      |

# Project members & Related organizations



**Information !**  
 Date of public offer:  
 from June 4 to July 22  
 URL:<http://www.enecho.meti.go.jp/english/index.htm>

\*JANTI: The Japan Nuclear Technology Institute  
 \*\*SA-keisou means "the Severe Accident instrumentation systems R&D".

# Goals of the project (still under debate)

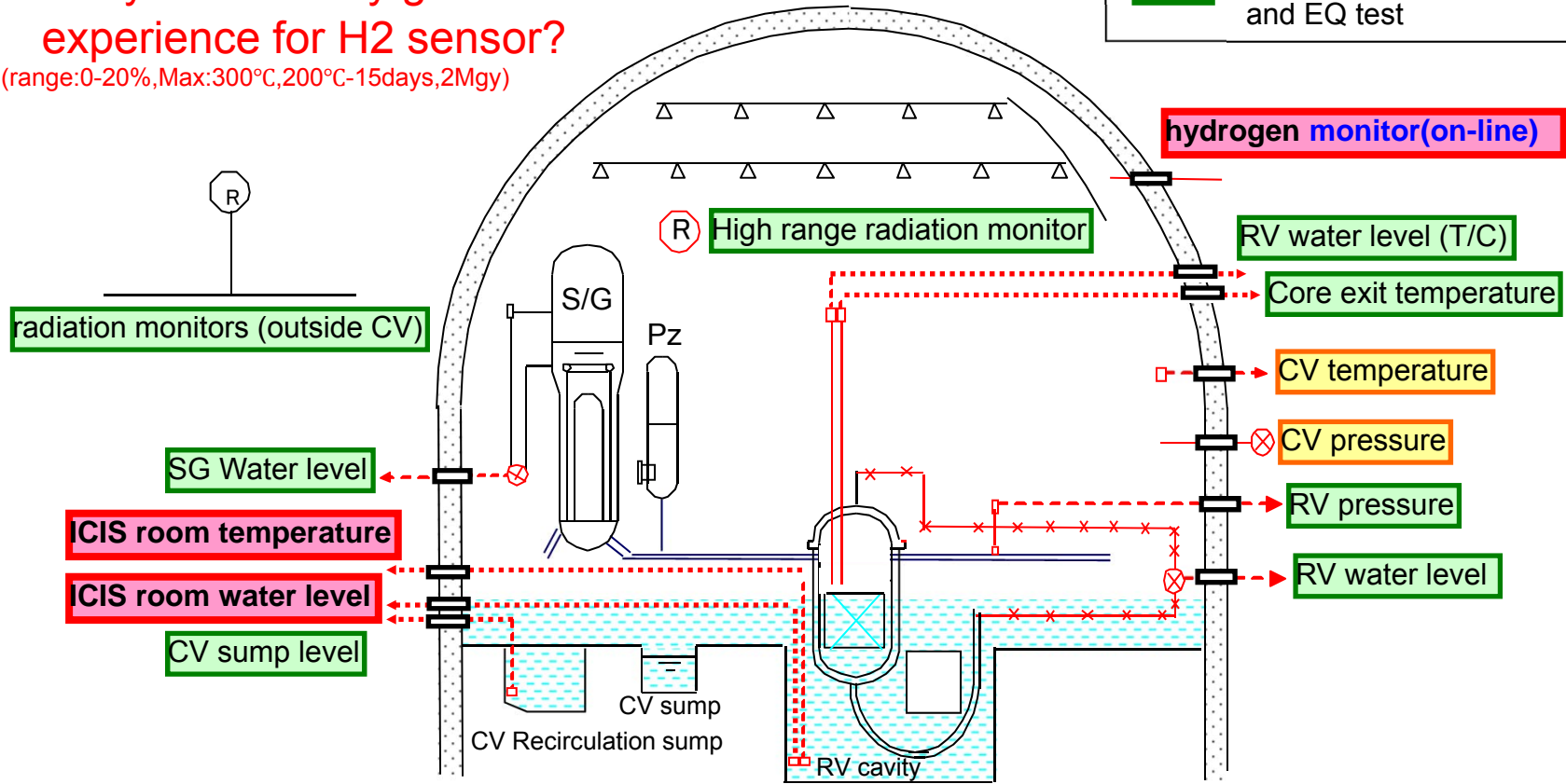
We are now considering to enhance about 20 parameters in PWR plants in Japan. ( The following figure is just sample.)

We think that most challenging item is to develop the hydrogen concentration monitor (H2 sensor) for SA.

→ Do you have any good ideas or experience for H2 sensor?

(range:0-20%,Max:300°C,200°C-15days,2Mgy)

|  |  |
|--|--|
| <span style="display:inline-block; width:15px; height:15px; background-color: #FF69B4; border: 1px solid black;"></span> | : new additional parameter                 |
| <span style="display:inline-block; width:15px; height:15px; background-color: #FF8C00; border: 1px solid black;"></span> | : replace to the robust sensor             |
| <span style="display:inline-block; width:15px; height:15px; background-color: #90EE90; border: 1px solid black;"></span> | : enhancement the cable splice and EQ test |



SA-keisou Working team is now studying the following items. And we 'd like to lead Japanese concepts of this R&D project to acceptable one in the U.S., IAEA, etc. Therefore we 'd like to discuss with you. At the next San Diego meeting, our SA-keisou member will present you about what's going on this project.

- Is the ISLOCA (CV-bypass LOCA) assumed in the severe accident scenario?
- Is the valve status (open-close) included in the SA parameter?
- What values are required about accuracy and response time?
- Are the independence and separation from existing safety system required for the SA instrumentation system?
- Are the EQ tests required?
- What values (temperature/pressure/radiation) are required about environmental conditions?
- Are the pre-ageing tests required?
- How long is it required for monitoring the SA parameters after the accident? 100 days? If it's after 100days, can we access and repair the SA instrumentation systems with the environment survey robots?
- etc,

**Thank you for your attention!**

Please don't forget "SA-keisou"