



W A N O

# “Lessons learned WANO action to improve Nuclear Safety”

Laurent STRICKER  
WANO Chairman

WNU, Oxford 17 August 2012



# Organisations dealing with Nuclear Safety

IAEA 1957

OECD / NEA 1957

INPO 1979

WANO « 1 » 1989

JANTI « 1 » 2006

WANO « 2 » 2010 BGM

WANO « 3 » 2011 after Fukushima

JANTI « 2 » 2013 after Fukushima





To maximise the safety and reliability of nuclear power plants worldwide by working together to assess, benchmark and improve performance through mutual support, exchange of information, and emulation of best practices.




**WANO** mission

# WANO Governing Board

## WANO Chairman

Laurent Stricker (EDF) 

## WANO President

Vladimir Asmolov (JSC Concern Rosenergoatom) 

## WANO Atlanta Centre

- Bob Willard (INPO) 
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- Gary Gates (OPPD) 

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## WANO Moscow Centre

- Evgeny Romanov (JSC Concern Rosenergoatom) 
- Arvo Vuorenmaa (Fortum) 
- Yuriy Nedashkovsky (NNEGEC) 

## WANO Tokyo Centre

- Makoto Yagi (FEPC/JNO) 
- Dr. Shreyans Kumar Jain (NPCIL) 
- CHEN Hua (CNNC) 

***A stronger commitment to Safety to recover the Trust !***

**International Cooperation**  
**IAEA, WANO, INPO, NEA ...**

**Open mind to learn from each other**



**High level of Safety**



# ***Working together to enhance effectiveness !***



## Board of Governors General Conference

**GOV/2011/59-GC(55)/14**

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### **For official use only**

Item 3(b) of the Board's provisional agenda  
(GOV/2011/46)

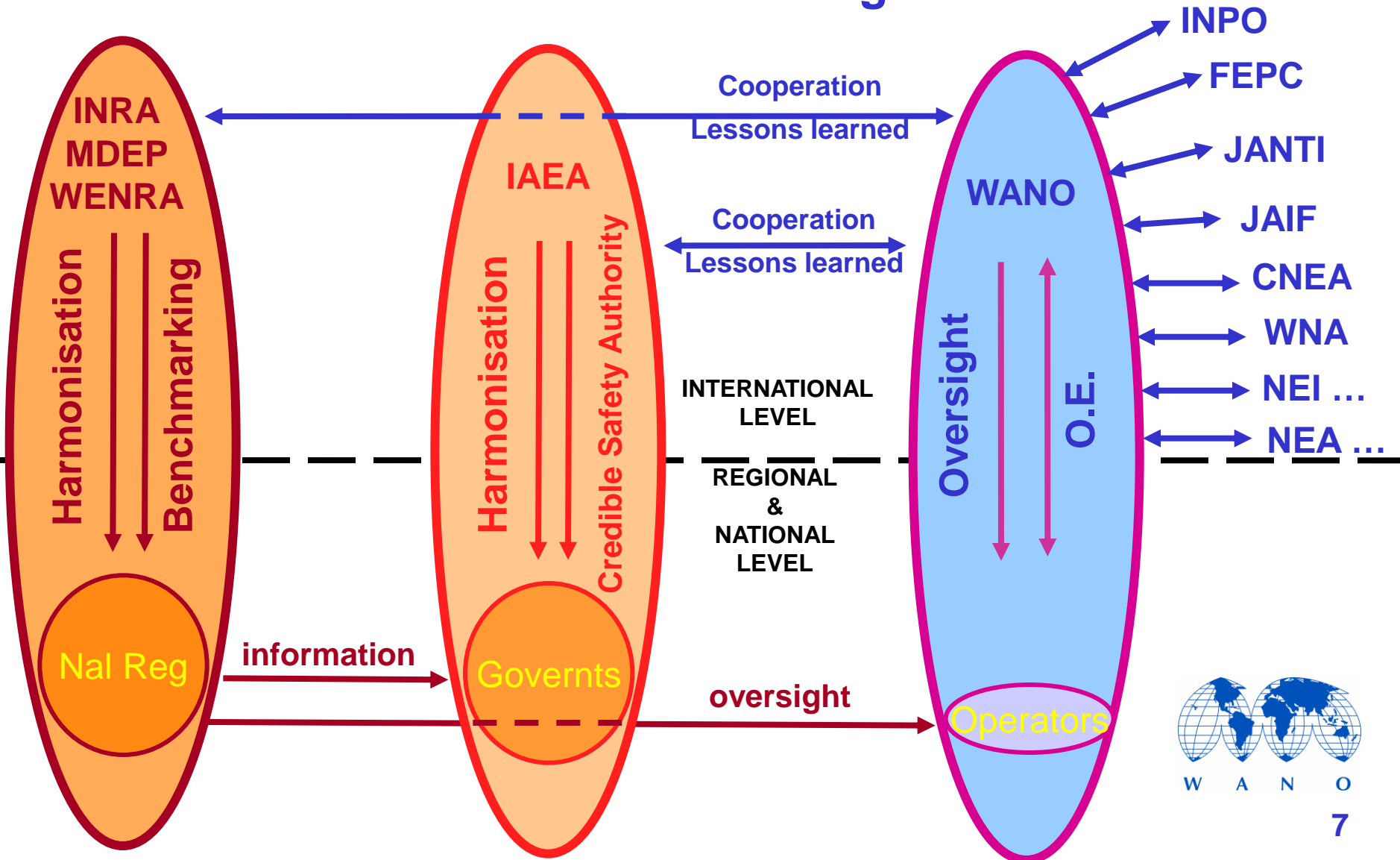
Item 14(b) of the Conference's provisional agenda  
(GC(55)/1; Add.1 and 2)

## IAEA Action Plan on Nuclear Safety



# International Safety organisations

## Coordination with IAEA and other organisations



***A stronger commitment to Safety to recover the Trust !***

**Nuclear acceptance shaken by Fukushima**

**Credibility of Regulators :**  
**Independence**

**Credibility of Operators :**  
**Skills & Transparency**



**High level of Safety**





***A stronger commitment to Safety to recover the Trust !***

# **CEO Responsibility / involvement**



**Send adequate & skilled Resources to WANO**

**→ Better use the WANO programmes (TSM,...)**

**Efficient programmes (PR, TSM, ...)**

**Performed by skilled Experts and Engineers**



**Accidents  
may occur  
Worldwide**



# Non Nuclear Accidents



# Plane crashes



# Challenger shuttle explosion 7 deaths

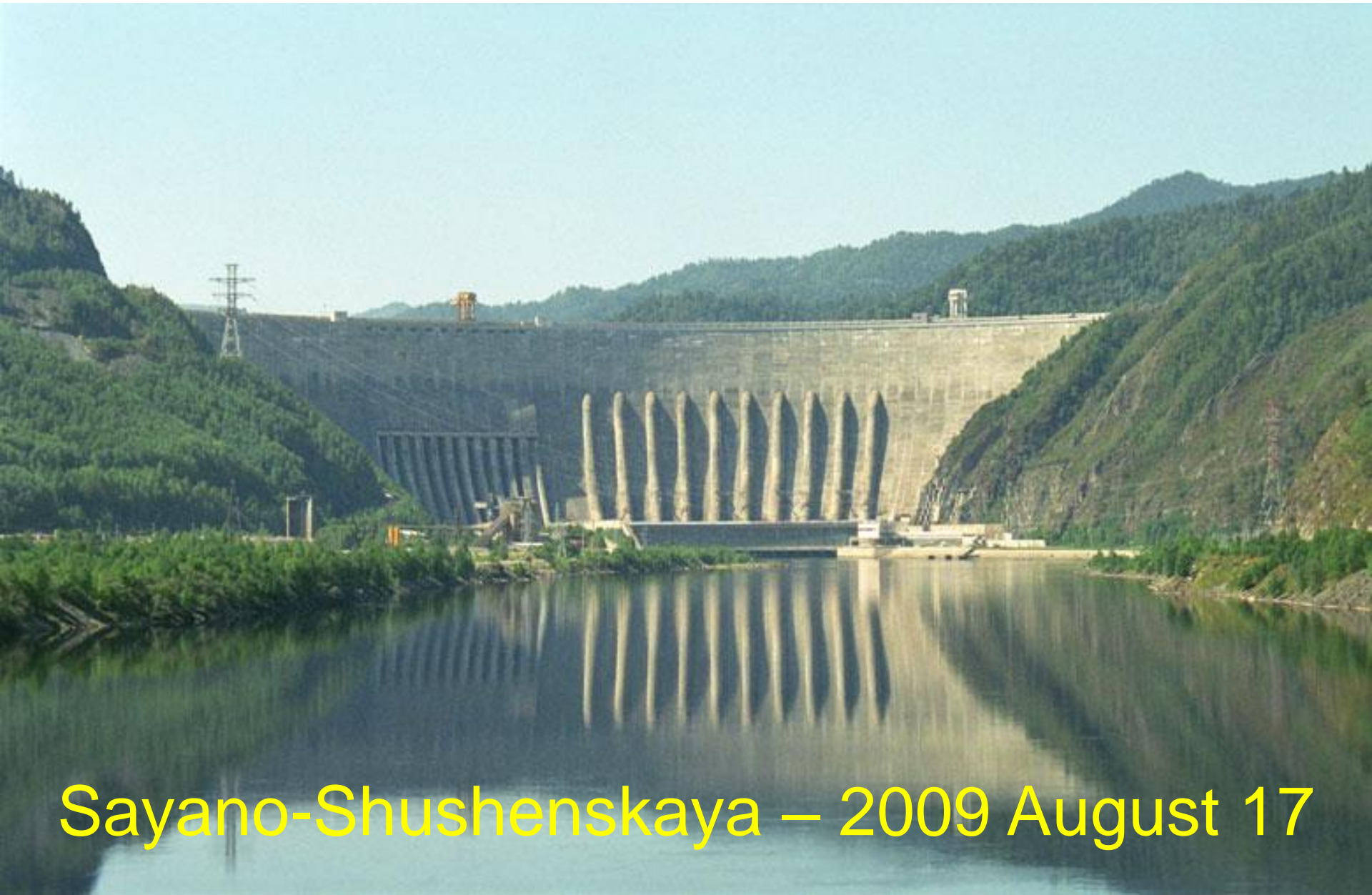


# BP Deepwater Horizon Oil Spill in the Mexican Gulf



USA – 2010 July & August

# Accident at Russia's Biggest Hydroelectric



Sayano-Shushenskaya – 2009 August 17

# Accident at Russia's Biggest Hydroelectric



Sayano-Shushenskaya – 2009 August 17



# Accident in US Big Hydroelectric



Taumsauk – 2005 December 15

# Pollution with Toxic red mud in Hungary from Aluminum plant



Hungary – 2010 October 04

# AZF in Toulouse 30 deaths



# Earthquake in Italy 6 + 10 deaths



Italy

22 & 29 05 12



# Kathrina hurricane, in New Orleans >2000 deaths & > 200 000 Homeless



**USA – August 2005**



# **Nuclear Accidents Worldwide**



# Nuclear Accidents

**29 September 1957**

**Cheylyabinsk / Mayak, Siberia**

**100 death (400 Irradiated)**

**Pyroradiological explosion (INES level 6)**

In the late 1940's, about 80 kilometers north of the city of Chelyabinsk, an atomic weapons complex called "Mayak" was built. Its existence has only recently been acknowledged by Russian officials. Mayak, bordered to the west by the Ural Mountains, and to the north by Siberia. In January of 1992 President Boris Yeltsin allowed the visit to foreigners. As a result, western scientists who studied the region, declared Chelyabinsk to be the most polluted spot on earth.



# Nuclear Accidents

**7 October 1957  
U.K. , Windscale  
Partial Fuel melt & Fire  
(INES level 7)**





# Nuclear Accidents

**17 October 1969**

## **Saint-Laurent des Eaux – France A1 Partial Fuel melt elements (INES : level 4)**

**First connection to  
the Grid :  
03/69  
MSI: 06/69  
Shutdown: 04/90**



# Nuclear Accidents

**22 February 1977**

**Bohunice A1 - Slovakia**

**150 Mwe Experimental reactor – Partial core melt  
(INES : level 4)**

**First connection to  
the Grid :  
12/72  
MSI: 12/72  
Shutdown: 02/77**



# Nuclear Accidents

**28 March 1979**  
**Three miles Island - USA**  
**Partial core melt**  
**(INES : level 5)**

**First connection to  
the Grid :  
04/78  
MSI: 12/78  
Shutdown: 03/79**



# Nuclear Accidents

**13 March 1980**

**Saint-Laurent des Eaux – France A 2  
Partial Fuel melt elements  
(INES : level 4)**

**First connection to  
the Grid :  
06/71  
MSI: 11/71  
Shutdown: 05/92**



# Nuclear Accidents

**First connection to  
the Grid :  
12/83  
MSI: 03/84  
Shutdown: 04/86**

**26 April 1986  
Chernobyl 4 - URSS  
Core melt  
(INES : level 7)**



# Nuclear Accidents

## 24 November 1989 Greifswald 5 - Germany Partial core melt (INES : level 4)

First connection to  
the Grid :  
04/89  
MSI: 11/89  
Shutdown: 11/89



Bundesarchiv, Bild 183-1960-0221-029  
Foto: Franke, Klaus | 21. Februar 1990

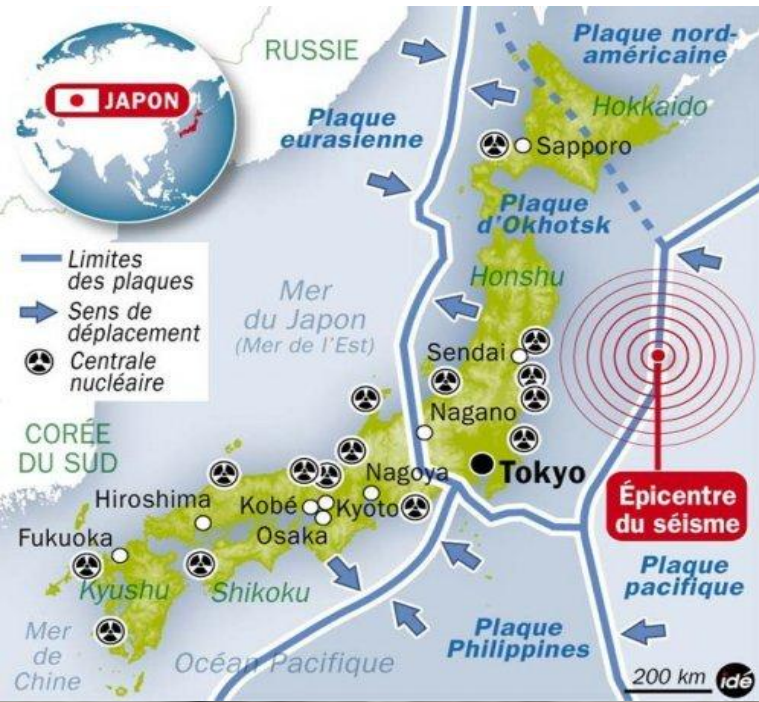


# Nuclear Accidents

**30 September 1999  
Tokai-Mura Repository  
Criticality accident in a settling tank**



# March 11, Earthquake and Tsunami



First connection to the Grid :  
11/70  
MSI: 03/71  
Shutdown: 03/11

First connection to the Grid :  
12/73  
MSI: 07/74  
Shutdown: 03/11

First connection to the Grid :  
10/74  
MSI: 03/76  
Shutdown: 03/11

First connection to the Grid :  
02/78  
MSI: 10/78  
Shutdown: 03/11

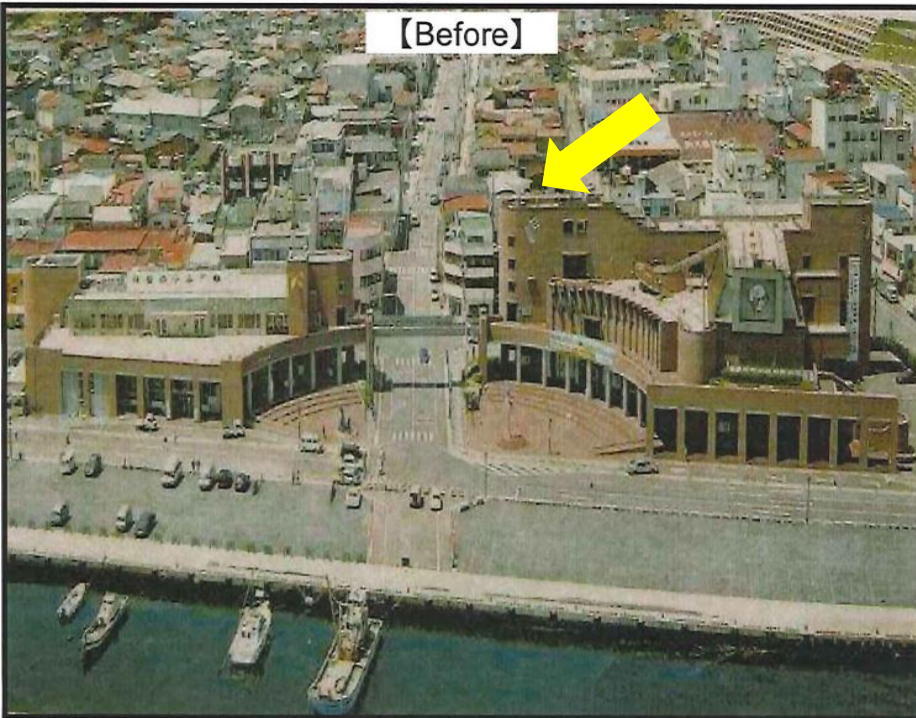


Population of Onagawa : 10,016 (February 2011)

Dead or Missing : ~1,000

Destroyed Houses : ~3,300

## Downtown of Onagawa



Video shot by Mr. Hara is

[http://www.yomiuri.co.jp/stream/m\\_news/vn110421\\_2.htm](http://www.yomiuri.co.jp/stream/m_news/vn110421_2.htm)



# Delay between Start-up and accident

Greifswald 5: Grid: 04/89 - MSI: 11/89 - accident: 11/89	<b>few days</b>
TMI : Grid: 04/78 - MSI: 12/78 - accident: 03/79	<b>3 months</b>
St Laurent Grid: 03/69 - MSI: 06/69 - accident: 10/69	<b>4 months</b>
Chernobyl : Grid: 12/83 – MSI: 03/84 – accident: 04/86	<b>2 years</b>
Bohunice A1 Grid: 12/72 - MSI: 12/72 - accident: 02/77	<b>4 years</b>
St Laurent Grid: 06/71 - MSI: 11/71 - accident: 03/80	<b>9 years</b>



# New plants and new Entrants :

China, India, Korea, Japan,  
Russia, Ukraine, ...

## New companies :

China, India, UK, ...

## New countries :

UAE, Jordan, Belarus, Poland,  
Vietnam, ...



# The nuclear Landscape

**430 NPPs under operation worldwide**

**62 NPPs under construction**

**Hundreds more proposed**

**→ Importance of WANO's role**

**→ Pre start-up office in Hong-Kong**



# **A stronger WANO**

## **More efficient**

## **More visible**

## **More Credible**



# WANO Members Obligations

**WANO is a voluntary organisation  
however**

**every Member has obligations :**

- Provide a senior corporate executive as the Member Rep on WANO Reg. GB
- Make available the information to support WANO monitoring of the safe and reliable performance
- accept inputs from WANO and other Member CEOs regarding the need to improve performance
- Support the WANO peer review programme
- Host WANO peer reviews
- CEO participation in WANO peer review exit meetings
- Host WANO support missions
- Host periodic focussed corporate peer reviews
- Implement an operating experience programme
- Apply operating experience shared by WANO such as SOER Recommendations
- Report complete and accurate performance indicator information to WANO
- Provide speakers and participants at WANO workshops and seminars
- Maintain close contact between the Member and WANO
- Support WANO activities to engage and assist new Members
- Supply resources to support WANO



# ***Nuclear Safety Responsibility***

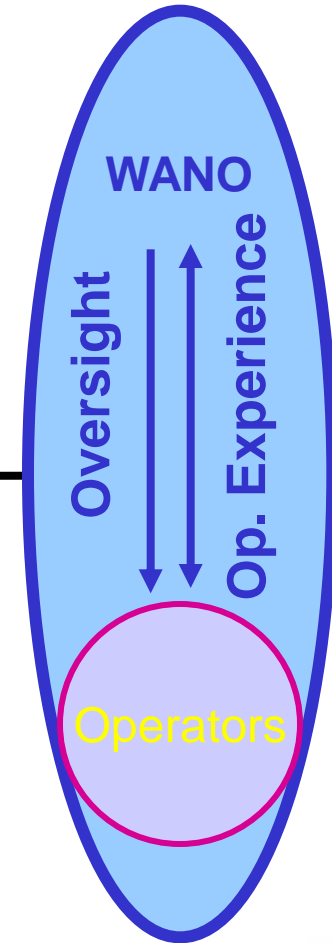
## **Collective Responsibility**

INTERNATIONAL  
LEVEL :



NATIONAL  
LEVEL :

## **Individual Responsibility**



# Nuclear Safety Responsibility

You are the future top managers  
of the nuclear industry :  
Each of you has to be personally  
involved in the Safety of his  
own fleet but also in the Safety  
worldwide





# Additional piece of advice

Make sure that :

- No one is isolated
- No one ignores the events happening elsewhere
- No one deals with a problem without the solution, if it exists elsewhere



# Additional piece of advice

Risk of loss of trust by the public :

→ Transparency & confidentiality policy

Risk of loss of trust by nuclear workers

Risk of complacency of some operators



# **Last piece of advice**

**Never forget that  
transparency and  
communication are the main  
pillars for nuclear safety and  
reliability**

**This seminar must help you to  
know each other**



# Thank you



**W**

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<http://www.wano.info>