

Communication- a vital ingredient of the Safety Infrastructure



**International Symposium on Earthquake, Tsunami and Nuclear Risks after the
accident of TEPCO's Fukushima Daiichi Nuclear Power Stations**

**Kyoto University, Kyoto, Japan
International Seismic Safety Center**

What this talk is about

- 1. Advent of Nuclear Power**
- 2. The Accidents**
- 3. Elevates Public distress- Lack of Communication**
- 4. Safety or Risk Communication**
- 5. A Proposal**
- 6. Items to dwell on**



The Fear



Devastation

10/27/2014

Samaddar

Aftermath



**Lives lost
and
memories that can
no longer
be shared with
future generations**





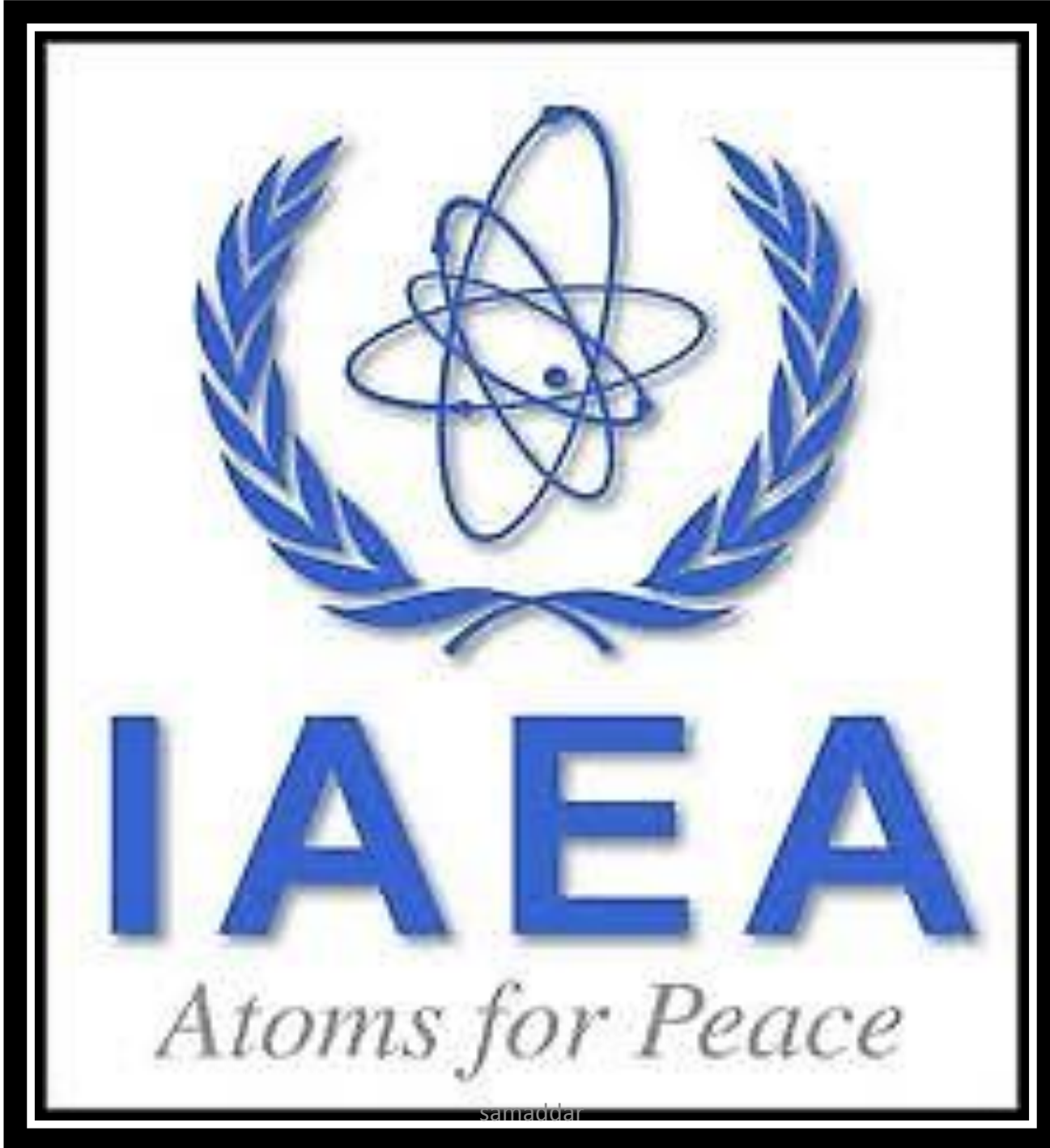
**Thus born out of war and conflict
nuclear energy was always fraught by
a public perception of fear**



Advent of Nuclear Power

- Atoms for Peace- birth of IAEA
- Period of growth
- Accidents
 - Three Mile Island
 - Chernobyl
 - Fukushima



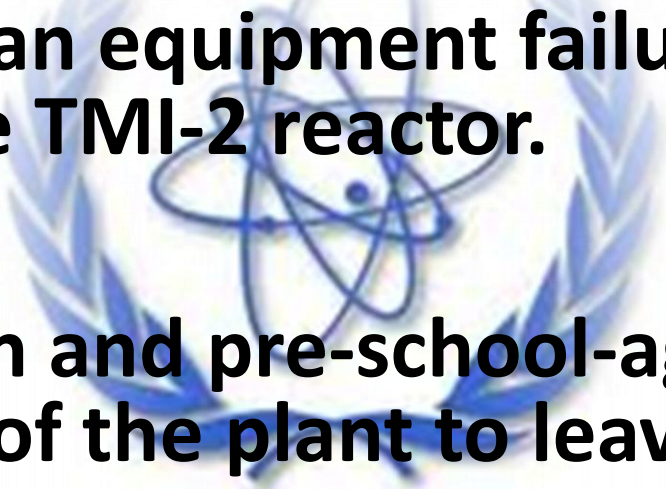


Power Generation



The logo of the International Atomic Energy Agency (IAEA) is centered at the top. It features a stylized atomic symbol with three elliptical orbits and a central nucleus, all enclosed within a laurel wreath. Below the logo, the text "IAEA" is written in large, bold, blue capital letters, and the tagline "Atoms for Peace" is written in a smaller, italicized font below it.

Three Mile Island Accident

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- **March 28, 1979 an equipment failure causes a partial meltdown of the TMI-2 reactor.**
 - **Pregnant women and pre-school-age children within a five-mile radius of the plant to leave the area.**
 - **2 million people around TMI-2 during the accident are estimated to have received an average radiation dose of only about 1 millirem above the usual background dose**

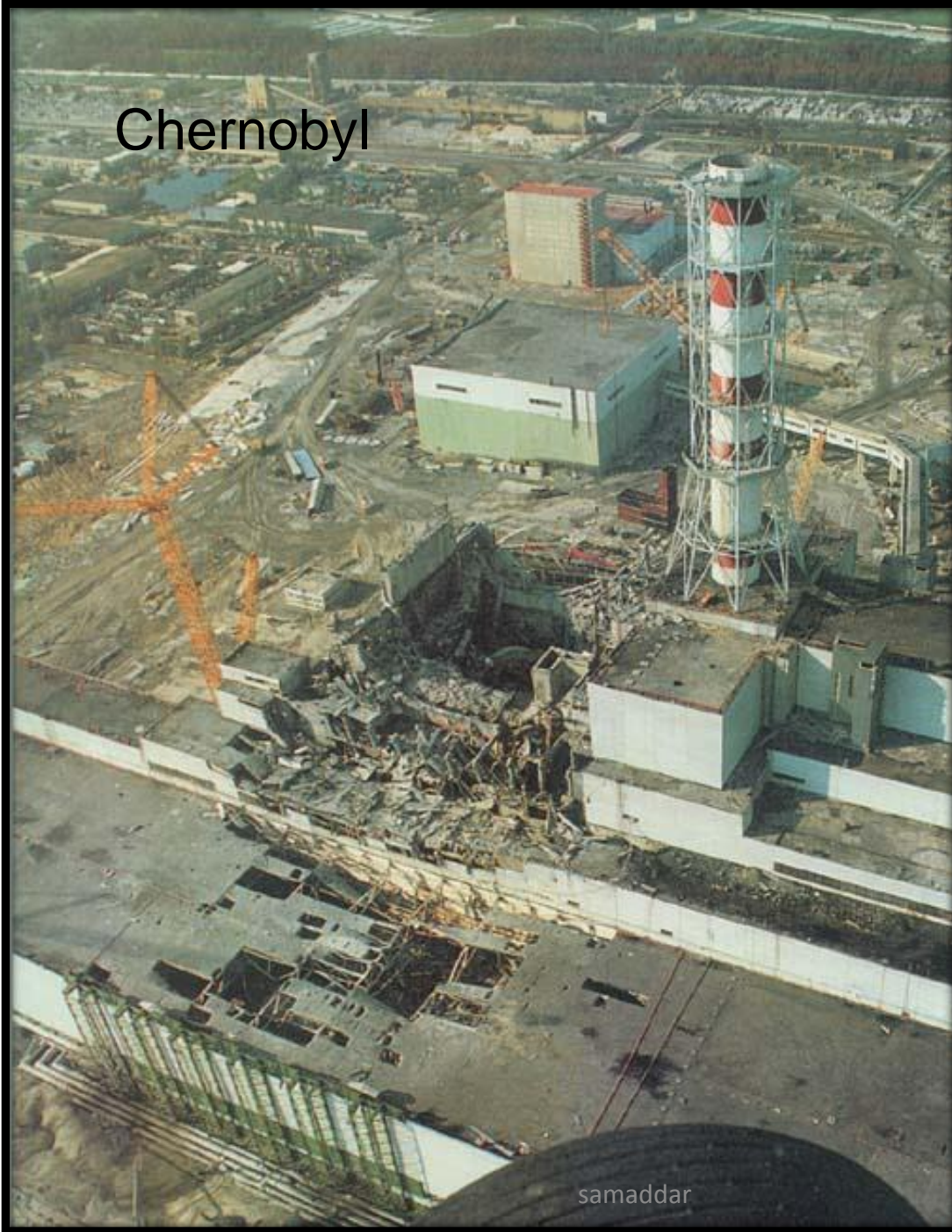


Chernobyl Accident

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On 26 April 1986, the most serious accident in the history of the nuclear industry occurred at Unit 4 of the Chernobyl nuclear power plant in the former Ukrainian Republic of the Soviet Union.

Chernobyl



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Specific violations of procedures were identified in 1986 as major cause of the accident.

The Chernobyl accident resulted in many people being traumatized by the rapid relocation, the breakdown in social contacts, fear and anxiety about what health effects might result

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TEPCO's Fukushima Daichii Accident





The Great East Japan Earthquake and Tsunami on 11 March, 2011 devastates huge tracts of the eastern coast of Japan


The enormous tsunami causes the catastrophic failure of three reactor units for the ensuing inundation

All power and cooling resources lost

Radioactive releases required the evacuation of people from the surrounding areas

Some key lessons:

- **Improve open communications and relationships with key stakeholders**
- **Improve on-site resilience from the effects of major events**
- **Back-up equipment that can readily be connected to the plant**
- **The impact of abnormal natural events on local and national infrastructure; and**

A portrait of Katsutaka Iidogawa, an elderly man with white hair and glasses, wearing a dark suit. He is looking slightly to the left of the camera with a serious expression. The background is a plain, light-colored wall.

We are refugees
living inside of Japan.
We are like forgotten people,
who cannot be seen.
Wasted people.
We are treated without regard.
--Katsutaka Iidogawa

#FukushimaDontForget

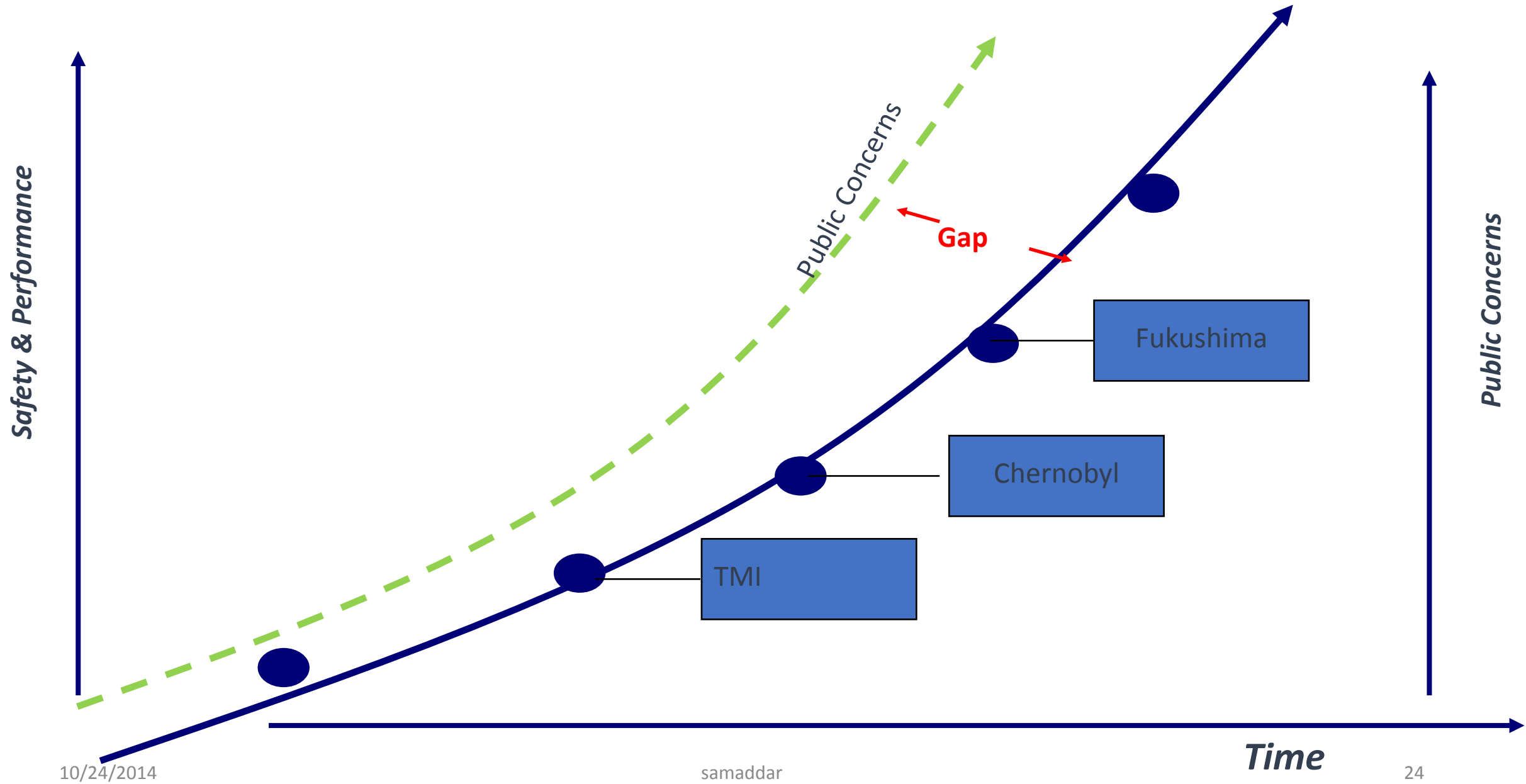


**People's perceptions
even if false can affect the way they feel and act.**



**The past experiences have increased public fears
about nuclear power generation and our efforts have
not provided adequate assurance**

Communication to reduce the Gap



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For **reliable performance** of any organization it is critical that the ideas and actions formulated at senior levels of management are **communicated effectively** within the organization so that a **reliable process** is developed for the implementation of the proposed actions.

Communication

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**Where these
Failures to protect or missed
opportunities to improve ?**



Need to reinforce that a level of safety in any activity is achieved by risk minimization

IAEA
Atoms for Peace



To attain this reliability we manage risk with a disciplined process of informed decision making

IAEA
Atoms for Peace

Risk management goal :

provide risk-informed and performance based defense-in-depth measures by ensuring appropriate resources are in place to prevent, contain and mitigate exposure to radiation in relation to the hazard, scenario and their associated uncertainties

the risk resulting from the failure of some or all of the barriers and controls, including human error is maintained acceptably low



**Risk minimization messages should become a part of
the nuclear industries communication with stakeholders**

IAEA
Atoms for Peace



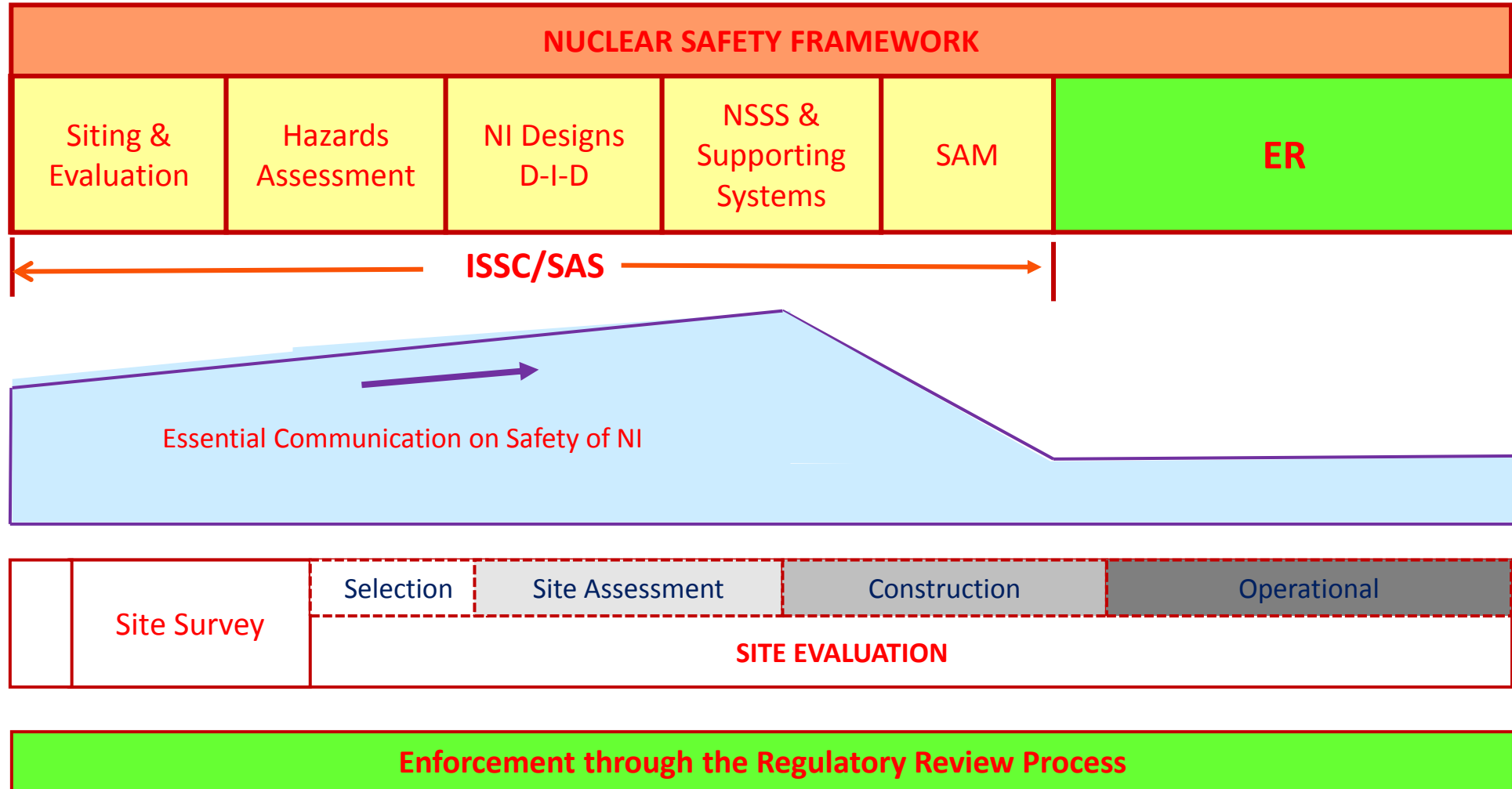
**The lessons learnt and preventive measures taken
should communicate risk minimization**

IAEA
Atoms for Peace

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Assurance of such safety or the ability to further reduce the risk of adverse impact on human health and the environment can only be achieved by communicating about safety from the early stages

Essential Communication on Safety in Nuclear Project



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In NPP's risk minimization is achieved by using:

Site with lower risks

Engineered protective measures

Using conservative design codes and material properties

Providing diversity in operating systems

Providing redundancy in components and systems

Providing multiple layers of protection



Some items to dwell on.....

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Since safety in any activity is achieved by risk
minimization

A residual risk will always be associated with an
activity

and

the nuclear industry though its continual improvement
process strives to minimize this residual risk



This residual risk is the result of uncertainty



The probabilistic approach provides for a systematic scheme to account for uncertainty

IAEA
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Site selection provides for this first level of protection against external hazards

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Proper site evaluation minimizes risk by
selecting the appropriate levels of external
hazards for installation design

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Design codes and material minimize risk by
conservative design approaches and use of well
establish material properties

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System design minimizes risk by systematically evaluating the plant system functions for different potential and postulated scenarios

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Probabilistic risk assessment of the installation ensures that the installation can mitigate the risk poised by all the different conditions to which it can be exposed.



The margin assessment provides a certain level of confidence that the installation will be able to mitigate challenges beyond its design limits bounded by the uncertainty limits.



The tools to communicate are well established.

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In concluding: Accidents will happen but we need to learn from them and communicate our corrective actions to minimize future risk to the stakeholders continually



These messages need to be communicated to the public to dispel their fear about things nuclear

Thank You

