Implications of the Fukushima accident from a regulatory perspective

IEM on Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant

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1. Introduction

Two approaches towards Fukushima with very different practical implications

1. „What happened in Fukushima cannot happen here“
   - „Our“ nuclear installations are well designed and were constantly backfitted over the years
   - Tsunamis and strong earthquakes cannot happen here

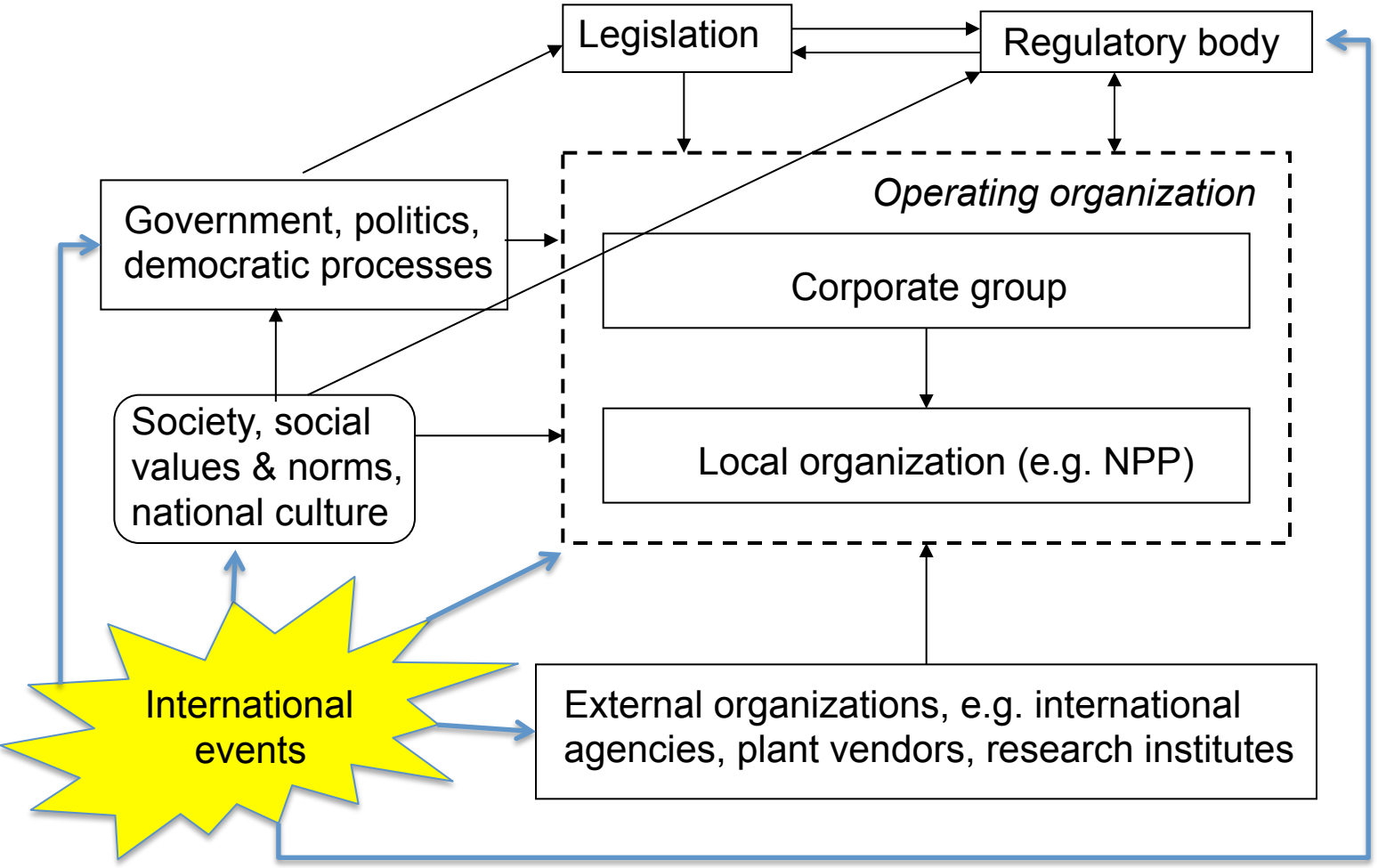
- ➢ Searching for what is different/better that shows we are safe
- ➢ „Distancing through differencing“ (Cook & Woods, 2006)
- ➢ Obstacle to organizational learning: „We are fine, we have no (not many) lessons to learn“

Two approaches towards Fukushima with very different practical implications

2. „What could happen here that we have not expected/ foreseen?"
   - Where could be our „blind spots"?
   - Which are the psychological, organizational, social, cultural mechanisms that foster „blind spots"?
   - How can we prepare „to be unprepared"? How can we manage for the unexpected?

- ➢ Active search for what is transferrable/applicable to our specific situation
- ➢ Search for lessons to be learned
- ➢ Promotes organizational learning

A systemic perspective on nuclear safety



(On basis of INSAG-13, p. 4)

A systemic perspective on nuclear safety

(IAEA)

Implications of the Fukushima accident from a regulatory point of view

1. What does the accident in Fukushima mean for the operators of nuclear installations all over the world?
   - Lessons to be learned for nuclear installations?
   - New findings with direct regulatory consequences for nuclear installations?

2. What does the accident in Fukushima mean for the regulatory bodies themselves?
   - Lessons to be learned concerning the way to oversee and regulate nuclear industry?
   - New findings with direct consequences for the regulator's organization and oversight work?

What did ENSI do in the HOF area in the light of the Fukushima accident so far?

1. Preliminary and ongoing analysis of the Fukushima accident from the perspective of Human and Organizational Factors (HOF)
   - In-depth Analysis of the Accident at Fukushima on 11 March 2011 – With special Consideration of Human and Organisational Factors (http://static.ensi.ch/1344405634/ensi_analyse_eng_020712_web.pdf)
   - The analysis is still continuing

2. Special safety culture talks with the Swiss operators

3. Self-reflection on regulatory culture at ENSI

2. ENSI‘s oversight activities in the HOF area after Fukushima –

Safety Culture Talks with the operators of Swiss NPPs

Oversight on safety culture

Safety Culture

Observable = Accessible to RB

→ Assessment of visible manifestations of safety culture

Safety Culture Talks

Not (easily) observable, (partially) unconscious

= Not (easily) accessible to RB

→ No systematic assessment

The Safety Culture Talks
The idea behind

- To «dive» underneath the surface and stimulate the operators to reflect on the deeper elements of their safety culture
  - To foster organisational learning and self-reflection of the operators
- To «have a look» under the surface (of the visible manifestations) of the operators' safety culture
- No inspection
  No formal assessment
- Dialogue, open discussion in trustful atmosphere

The Safety Culture Talks
The topic

« The significance and implications of the Fukushima accident with respect to the Safety Culture of Swiss NPP operators »

The Safety Culture Talks
The questions

1. Reactions in the plant to the Fukushima accident
   a) How did the staff and the organisation react to the accident?
   b) How did the staff members (all hierarchical levels) cope with the accident?

2. Effects of the accident on the plant's safety culture
   a) What did the accident provoke in the plant with respect to safety culture?
   b) What effects did ENSI's reaction have with respect to the plant's safety culture?

The Safety Culture Talks
The questions (cont.)

3. What is for you the most important «lesson learned» from the accident?

4. Reactions to the nuclear phaseout and its implications
   a) How did staff members and the organisation react to the political phaseout decision?
   b) How does this decision affect the plant's safety culture?

The Safety Culture Talks
The procedure

1. Announcement letter with questions
2. Part 1: free discussion with operators around the topic (3h)
3. Analysis of discussion output
   - «What we heard»
   - Hypotheses to deepen the discussion
4. Part 2: Feedback to the operators (3h)
   - «Mirror»
   - Verification of statements
   - Discussion of hypotheses
5. Final reports

The Safety Culture Talks – Results
Some answers

- «The tsunami wave shocked me»
- «In the past I often used to say, something like that cannot happen here. I am more prudent with such statements today»
- «Would I be ready…?»
- «We tried to make the staff understand that we stand behind them»
- The accident «has welded us together»
- Discussion between all the staff members; all have thought things through (at all hierarchical levels)
- «We lost the backing support from politics»

The Safety Culture Talks – Results

Topics (examples)

- How the operators coped with the accident
  - Cognitive/rational level
  - Emotional level
  - Behavioural level
- «Thinking the unthinkable»
- Challenges of organisational learning
- Effects on safety
  - Improvements
  - Challenges
- Nuclear phaseout in Switzerland
  - Effects on individual perspectives
  - Effects on safety etc.
- Oversight
  - Effects of ENSI's reaction after the accident

The Safety Culture Talks – Results
Hypotheses for discussion (example)

- The accident in Fukushima represents a «fundamental surprise» (Lanir)
- It questions basic assumptions

➢ The accident opens for a given time a «window» for organisational learning

***Hypothesis*: The «window» for organisational learning will be closing again soon**

→ How does the NPP use the time before closure of the window?

→ How does the NPP delay the closure of the window?

→ How does the NPP integrate the lessons learned in the organisation in a sustainable manner?

3. Regulatory (Safety) Culture

Regulatory (Safety) Culture
Assumptions

- The regulatory body, by nature, influences the operator‘s safety and safety culture.

- The nature of this influence substantially depends on the regulator‘s regulatory strategy and culture
  - Also negative impact is possible.

➢ The regulatory body should strive for positively (not negatively) influencing licensees‘ safety culture by carefully choosing appropriate regulatory strategies
  - Foster licensees‘ ability and motivation to take on their responsibility for nuclear safety

Regulatory (Safety) Culture
Self-reflection by the regulatory body

- The regulator must be aware of its own regulatory culture and of its impact on the licensees

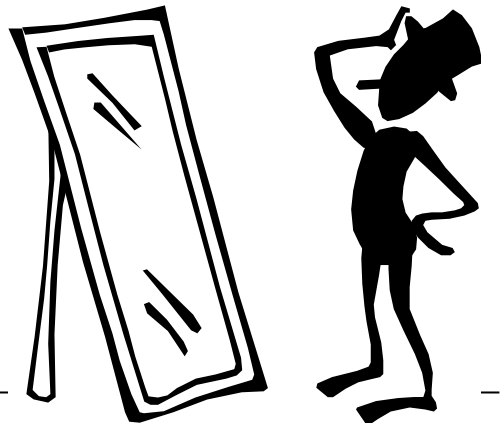
  - ... in order to be able to positively foster licensees‘ safety culture

  - ... in order to avoid negative impact

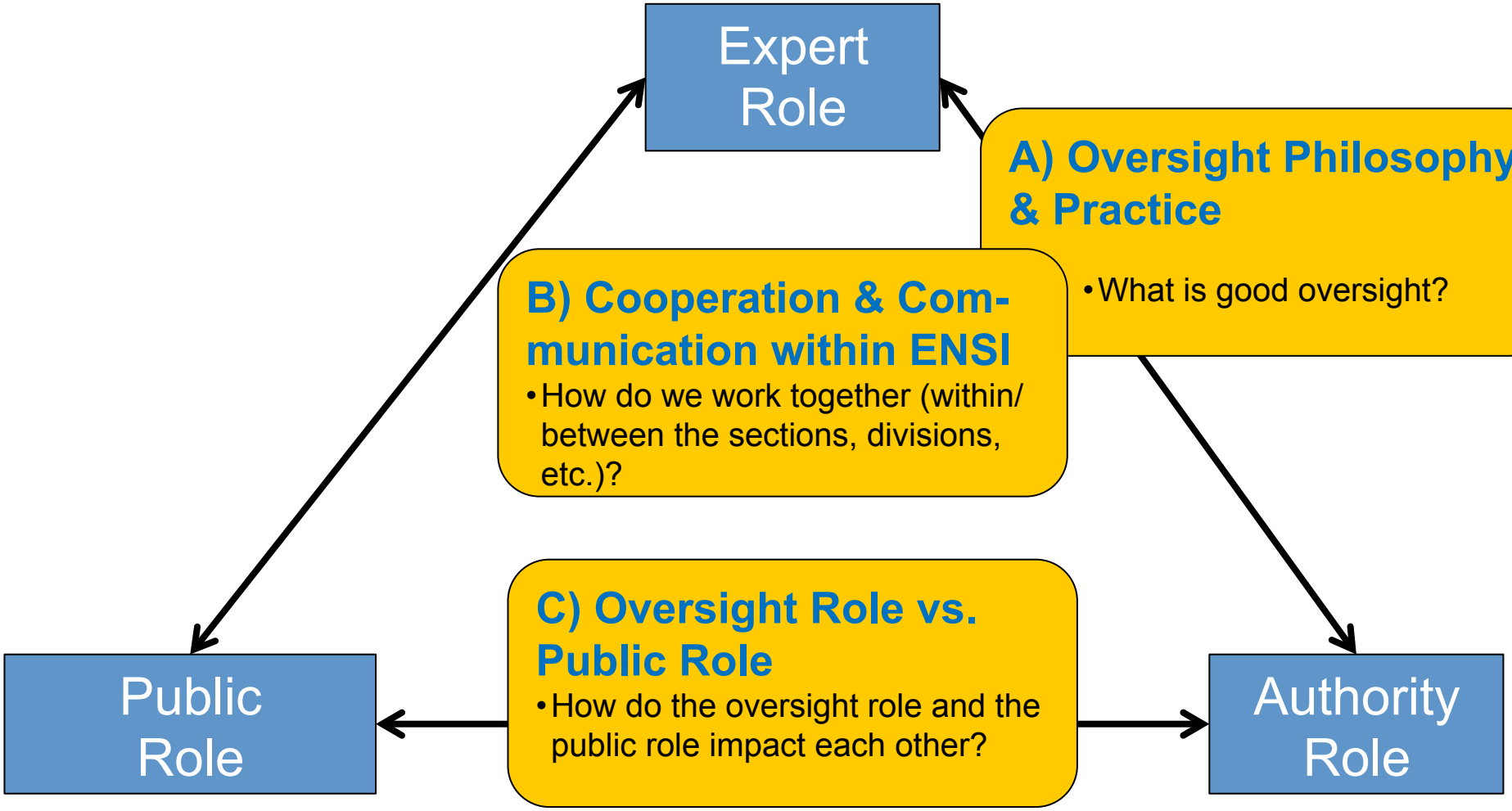
Regulatory (Safety) Culture
ENSI‘s project on regulatory culture

Phase I: Analysis of the current state

- Analysis of three concrete examples of regulatory activities
    - Interviews with involved actors
- Formulation of hypotheses about ENSI‘s regulatory culture by project team
- Workshops with ENSI staff (all divisions)
    - Sections‘ metaphors of regulatory cultures
    - Questionnaire on hypotheses about ENSI‘s regulatory culture
- Workshop with licensees on ENSI‘s regulatory culture



Regulatory (Safety) Culture
Main subjects



(On basis of Reiman & Norros, 2002)

Regulatory (Safety) Culture
ENSI‘s project on regulatory culture

Phase II: „Target“ regulatory culture

- What kind of regulatory culture do we strive for?
- Draft formulation of „target“ culture by the project team
- Discussion with entire ENSI staff (workshops)
  - Corroboration of „target“ culture
  - Actions to be taken to reach the target
- “Mission statement” on ENSI‘s regulatory culture

4. Conclusions

Conclusions from a regulatory perspective

- Safety Culture needs to be treated by the regulatory body with particular care:
  1. As an object of oversight
     - … which cannot be regulated
     - but needs to be fostered and competently addressed
     - Need for specific competencies within the regulatory body
  2. As an object of self-reflection by the regulatory body (regulatory culture)
     - The regulator's impact on licensees' safety culture
- Need for integrated oversight
  - Systemic perspective
  - Integration of Human, Organizational and Technical Factors
  - Interdisciplinary oversight work

Needs from a regulatory perspective
From Theory to Application

- More attention to role and impact of regulatory strategies and practices on nuclear safety and safety culture
- More international exchange on practical implications of new developments in organizational safety science for regulatory work
- Need for specialists in the HOF area within regulatory bodies

➢ Let's collectively benefit as much as possible from the "learning window" opened by the accident in Fukushima!

➢ Important role of IAEA in facilitating and promoting international developments and discussion on these topics

Thank you for your attention!