Radiation Protection and Emergency Management Aspects
Culture drawn up by RP professionals

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What is meant by Culture?

- The ideas, beliefs and customs that are shared and accepted by people in a society.

- That complex whole, which includes knowledge, belief, art, morals, law, customs, values, symbols, rituals and any other capabilities and habits, acquired by people as members of society that determine appropriate attitudes and behavior.
Culture: a combination of habits and knowledge

(1) **Beliefs, values, and assumptions** of the founders of an organization,

(2) **Learning experiences** of group members as the organization evolves (Groups of people who have shared significant problems, solved them, observed the effects of their solutions, and who have taken in new members)

(3) Beliefs, values, and assumptions **brought in by new members** and leaders.
Why an interest for a Radiation Protection Culture?

- To give visibility to the fundamentals of RP
- To promote radiation risk awareness (conscience)
- To promote shared responsibility among practitioners, operators, manufacturers, management and regulators
- To maintain the RP heritage
- To facilitate its transmission
- To improve continuously the quality and effectiveness of RP
- To contribute to the general safety
Safety culture is a concept that has been defined by different institutions, organizations, and there is a common understanding of its meaning.

- Safety culture includes nuclear safety, RP, occupational safety, security, health, environmental safety, patient safety …
- Hence, RP culture in our organizations should be seen as the implementation of RP principles inside the framework of safety culture.
An organization’s values and behaviours, modelled by its leaders and internalized by its members, which serve to make safe performance of work the overriding priority to protect the public, workers, and the environment. *EFCOG (US DoE)*

Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that as an overriding priority, [nuclear plant] safety issues receive the attention warranted by their significance. *IAEA*

“The way we do things around here when nobody is looking.”
*Common sense approach!*
Safety Culture
(according to Schein)

Beliefs

Espoused Values

Attitudes

Artefacts

Behaviours

What people do - actions

Observable evidence Eg Policies, posters, stories

Mindset which influences actions

Inferred – what is really valued!

The fundamental level!
Basic assumptions and values
RP culture development and improvement

What are the ways to impact radiation protection culture?

- **Strong leadership,**
- **Education and training,**
- **Establishment of a positive behavior at the working place** (Individual and collective behavior)
- **A proper communication** among all practitioners.
- Similarly, **learning from events,** incidents and near misses is an important part of culture development with **a ‘blame-free’ policy to report**

IRPA June 2015 – B. le Guen
Over the past 20 years many organisations have developed models of safety culture, including definitions and structures, eg:

- **IAEA (INSAG)** – 5 Key Attributes of a (nuclear) safety culture
- **US NRC** – 9 Traits (behavioural elements) of a safety culture
- **WANO/INPO** – ‘8 Principles for a Strong Nuclear Safety Culture’, integrated into Performance Objectives and Criteria
- **ONR** – 4 Principles of Leadership and Management for Safety

In the main, these are ‘variations on a common theme’ – with different packaging and emphasis!
The zero risk doesn’t exist,
Process must be fault tolerant that’s why

- Responsibilities must be Understood
- Responsibilities must be Manageable
- Early Warnings must be Available
- Must Learn from others Mistakes
- Corrective Actions must Occur
- Audits must be Conducted
- Peer Review must Happen
- Process should be Accredited
FORO Safety Culture

10 Basic Elements

- Safety Culture in Regulatory Authority
- to provide a conceptual framework and guidance for the Regulatory Authority about its internal Safety Culture
CULTURE IN CASE OF EMERGENCY
Links between Risk mapping and Crises Management:
an comprehensive approach to prevent crises

- Preparation to crisis is the last step of the risk control process
- Preparation to crisis requires to know well the risks environment
- Links between **risks culture** and **crisis culture** ➔ a systematic feed-back approach
Crisis Policy
The basic principles: 5 phases

- Structuring and improving the procedures
- Integrating experience feedback
- Staff training
- Exercises

- On-call procedure
- Monitoring

- Activating the crisis procedures
- Crisis organisation (material and human resources)

Managing the immediate consequences of the crisis

Identifying the actions to be implemented to avoid or limit the consequences of the crisis

These principles are implemented at all levels, from the regulator level to the operator level.

According to these principles, each institution concerned by the crisis management policy must: have a relevant crisis organisation and the associated material and human resources; carry out at least one crisis exercise per year on its perimeter; organise actions to increase the professionalism of the crisis managers and staff.
EMERGENCY PREPAREDNESS AND RESPONSE ORGANISATION

Practical example of emergency culture: Training on Tactical method
Tactical methods

Analysis and decision making under emergency situations, when pre-established procedures are no more relevant

• Developed by military forces, adapted by fire brigades

• Methods are described but there is no use of procedures on the field → appropriation by drill

Taking action in a destroyed environment

Analysis and decision making under emergency situations

• Ex: Clear and short communication techniques
## Tactical methods

Example: “report message”

<table>
<thead>
<tr>
<th>Je suis</th>
<th>I am</th>
<th>My situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Je vois</td>
<td>I see</td>
<td>Quick description of the scene</td>
</tr>
<tr>
<td>Je prévois</td>
<td>I guess</td>
<td>Predictable evolution of the situation</td>
</tr>
<tr>
<td>Je fais</td>
<td>I do</td>
<td>Actions in progress</td>
</tr>
<tr>
<td>Je demande</td>
<td>I ask</td>
<td>Needs</td>
</tr>
</tbody>
</table>
EMERGENCY PREPAREDNESS AND RESPONSE ORGANISATION

Culture: how to manage the doses for the responders?
Emergency Exposure Situation

On Site – Off site

1. Members of **special radiological emergency teams** (trained, prepared, occupationally exposed)
2. **Members of classic emergency teams** (not occupationally exposed)
3. **Workers with specifics skills** (e.g. bus driver; not trained or prepared, not occupationally exposed)
4. **Workers from vital facilities or activities in the vicinity, which shall stay** (not occupationally exposed)
5. **Elected representatives** (not occupationally exp.,)
6. **Members of the public who freely offer their help** (with specific skills or not; not occupationally exp.)
Requirements in order to develop an Emergency culture

- Responders Preparedness is crucial

- Protection commensurate with the situation and entrusted operations (graded approach)

- Objective based on ALARA = doses below the RL

- Prevailing circumstances may be unforeseen and difficult
  - Requirement both stringent and flexible (adaptable)
  - Intervention framed in space (zoning) and time (evolution)
Requirements in order to develop an Emergency culture

- **Identification of responders**, tasks and operations (in advance whenever possible)
- **The need:**
  - **Informed consent** (± formalized)
  - **Training, preparation** or just-in-time training (specific information)
  - Individual protective **equipment** (if needed)
- **Dose monitoring and recording**

- **Medical care** (if needed)
- **Health surveillance** (as appropriate)
SPECIFIC TRAIT: PSYCHOLOGICAL AND SOCIAL MANAGEMENT OF EMERGENCY TEAM MEMBERS

STRESS MANAGEMENT AND MEDICAL MONITORING
Example of medical monitoring for emergency situations at EDF

At the time of recruitment or change of position

Medical staff

- Special medical fitness for emergency duties
- Information of employee by manager and occupational doctor

During emergency preparation (ex: drills)

- Fitness for duty
- Mandatory awareness of risks
- Support as part of prevention actions required for proper physical condition (EP team members for many years)
- Active participation and contribution of medical staff in emergency drills
- Crossfunctional meetings with medical staff (stress management)
- Medical staff from other sites
- Cross-site exchanges between medical teams during drills

During actual emergency

Support and advice for all response members

Documenting exposure data

- Radiological monitoring
- Initial medical consideration
- Psychological support

Post exposure data and follow up

Upkeep of medical files
Summary

• **All responders** involved are not workers (e.g. firemen, elected representatives, citizens)
• All the workers are not previously occupation exp.
• From a RP point of view, the distinction between responders who have been previously considered as occupationally exposed and the others is relevant
• Idem about the distinction emergency/existing exposure situation

How to develop a common safety culture for all professionnals?
### 2- Protection criteria (ICRP Publ.103)

**Distinction between emergency response and recovery actions**

<table>
<thead>
<tr>
<th></th>
<th>Workers</th>
<th>Members of the public</th>
</tr>
</thead>
</table>
| **In an emergency** | - Emergency exposure situation  
                      Reference level: 100mSv/year or 500mSv/year                | - Emergency exposure situation  
                      Reference level: 20-100mSv/year                          |
| **During recovery work** | ※                                                                                  | - Existing exposure situation  
                      Reference level: 1-20mSv/year                             |
| **During normal operation** | Planned exposure situation  
                      Dose limit: 20mSv/year averaged over 5 years with a maximum of 50mSv in any one year | Planned exposure situation  
                      Dose limit: 1mSv/year                                        |

※ Exposures received from long-term recovery work **shall be treated as a part of planned exposures for radiation workers.** But not easy to easily adapt for workers.
EMERGENCY PREPAREDNESS AND RESPONSE ORGANISATION

how to assess the level of culture?
The assessment tools of radiation protection culture can be done in several ways,

using a combination of quantitative and qualitative tools required to assess the level and quality of radiation protection culture,

- not only to measure the identified criteria of success,
- but also to stimulate judgments and observations about positive or negative trends for such a given criteria.
Conclusion

- Developing a “field culture” in addition to the “science, engineering or medical culture” is a way to anticipate problems and to obtain the commitment of all employees and all organisations / institutions.

- Radiation protection culture is a learned way of life. It must be an ongoing dialogue
  - Among safety professionals, organizational management and the workforce
  - Between organizations, regulator, operators and relevant stakeholders