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Safety Performance Indicators

Lead in Discussion

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Questions

- **Can a threshold be established to compare safety data to risk relevance**
- **Can an international system or „menu” of safety performance indicators be used in the frame of the national reports prepared for the Convention on Nuclear Safety**
- **Should the set of internationally agreed safety performance indicators be used for public information**

Threshold - Risk relevance

Characteristics of PI

- **direct relationship between the indicator and safety,**
- the necessary data are available or capable of being generated,
- indicators can be expressed in quantitative terms,
- indicators are unambiguous,
- their significance is understood
- not susceptible to manipulation,
- manageable set,
- meaningful,
- they can be validated,
- they can be linked to the cause of a malfunction,
- the accuracy of the data at each level can be subjected to quality control and verification, and
- local action can be taken on the basis of the indicator

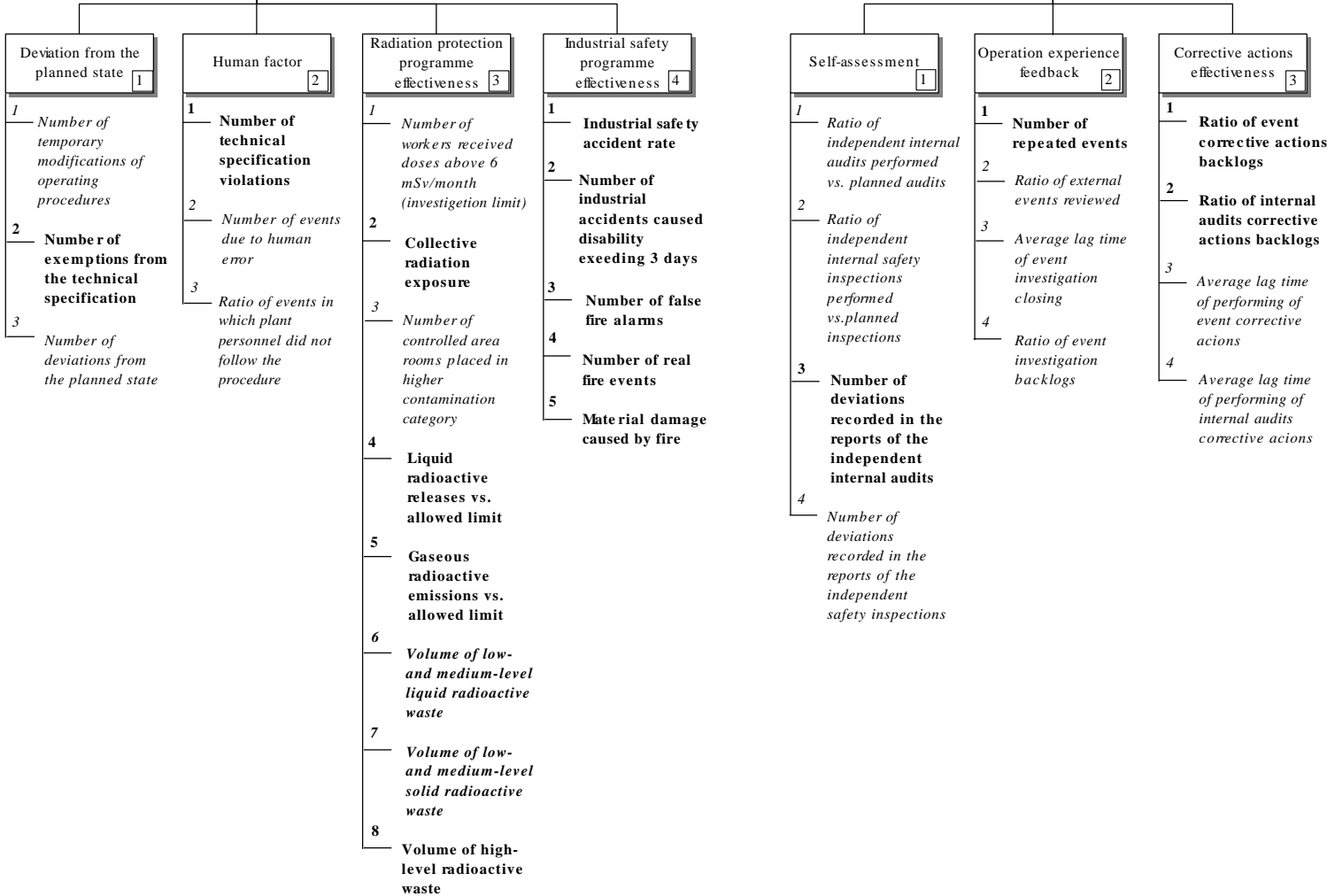
Threshold - Risk relevance

- **Basic terms**
 - Relationship to safety
 - Importance (Weight) of the indicator
 - Threshold
- **Assessment approaches**
 - Deterministic
 - Probabilistic
 - Engineering judgement

ATTITUDE TOWARDS SAFETY C

HUMAN PERFORMANCE I

STRIVING FOR IMPROVEMENT II



OPERATIONAL SAFETY B

SAFETY SYSTEMS AND EQUIPMENT I

Actuations 1

- 1 **Number of reactor scrams**
- 2 **Number of ECCS actuations**
- 3 *Number of Emergency Electric Power Supply Systems actuations*
- 4 *Number of reactor protection level 3 actuations*
- 5 *Number of Auxiliary Emergency Feedwater System pumps actuations*

Safety systems performance 2

- Number of times a safety system is unavailable*
- Safety systems performance**
- Ratio of failures discovered by testing of safety systems*
- Reliability of diesel starts**
- Reliability of safety systems pump starts**

PREPAREDNESS II

Operational staff 1

- 1 *Ratio of failed licensing exams*
- 2 *Ratio of failed internal exams*
- 3 *Number of trainings*

Emergency 2

- 1 *Findings during emergency drills*
- 2 *Ratio of people receiving training on the Emergency Plan to the employee total*

RISK MANAGEMENT III

Plant configuration risk 1

- 1 **Number of events leading to limited operational conditions defined by technical specification**
- 2 **Number of technical specification violations**

Initiating events 2

- 1 *Number of initiating events*
- 2 *Conditional core damage probability caused by initiating events*

Core damage risk 3

- 1 **Core damage frequency (operational)**
- 2 *Core damage probability during shut-down*
- 3 *Core damage frequency caused by fire*
- 4 *Core damage frequency caused by flooding*

Performance Indicators - Nuclear Safety Convention

The objectives of the Convention on Nuclear Safety are:

“to achieve and maintain a high level of nuclear safety world-wide, to establish and maintain effective defences in nuclear installations against potential radiological hazards and to prevent accidents with radiological consequences and to mitigate such consequences should they occur.”

Performance Indicators - Nuclear Safety Convention

- **Safety assessment [®] periodic country report**
- **One of the tools of the assessment may be Safety Performance Indicators**

Only for a limited number of review areas (Safety of installations [®] operation)

Hungarian country report PIs:

⇒ radiation exposure

⇒ collective dose

⇒ radioactive releases

⇒ INES rated events (eliminated from the second report)

- **The use of international system of PI**

Safety Performance Indicators for Public Information

The performance indicators are a very convenient tool to demonstrate safety to the public.

International set of possible indicators to be used can be determined, however the question of suitable indicators for a specific country highly depends on different cultural factors in the given country. Thus the international system can serve as a “menu” for the users.

Safety Performance Indicators for Public Information Safety PI board at Paks

- **Number of RP actuation**
- **The date of last RP actuation**
- **Number of INES rated events**
- **Last date of INES**
- **Gaseous releases**
- **Liquid releases**
- **Collective radiation exposure**
- **Industrial safety accident rate**
- **Availability factor, outage duration**