JNES

RIC 2011
Safety Culture

In Depth Survey of the Effort to Foster Safety Culture in Japan

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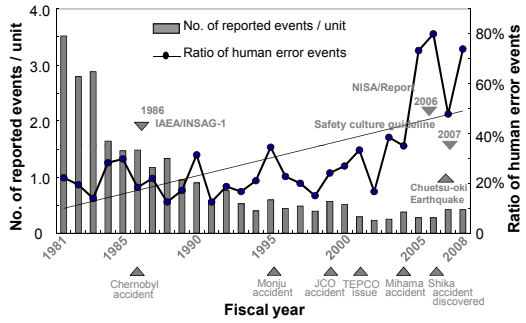
Trend of human error events



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The organizational key issues pointed out in recent events

- Exclusivity of organizations
- Insufficient communication
- Mere shell of experiences and knowledge
- Problems in the succession of technologies and skills
- Problems in the compliance and the maintenance of records
- Insufficient consciousness of information disclosure
- Paralyzed quality assurance function
- Defects in safety culture

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To ensure high level of safety and reliability of nuclear facilities

Indispensable to address
software aspects such as human and organizational factors, system and/or management
to say nothing of hardware aspects

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A regulatory approach toward recent organizational issues

NISA report （Sept., 2006） based on the discussion at the Study Group on the Way of Inspection pointed out

 # Further improve the safety level:
Thoroughly correct the nonconformity caused by human errors, organizational factors and degradation of safety culture (SC).

 # Establish 3 guidelines:
Guidelines to evaluate
1) corrective actions for causal factors of human error
2) contents of root cause analysis
3) licensee's efforts to prevent degradation of SC

（Hereafter abbreviating with **Safety Culture Guideline, SCG**）

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The inspection by Safety Culture Guideline enforced in December, 2007.

- Through vigorous discussions at the NISA Study Group, the SCG was resolved.
- NISA ordered all licensees of reactor operation to add the provision of the system fostering SC to their Operational Safety Program (OSP), including role of top management.
- The inspection for this new OSP was enforced in Dec., 2007.

  More, regulatory oversight of organizational climate during PSR has been implemented already since 2006.
- The SCG also went into effect in Dec., 2007.

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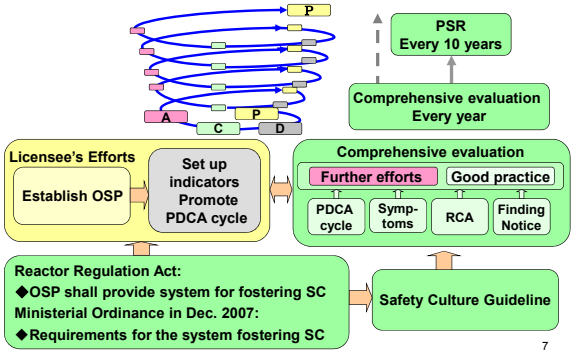
Licensees' Efforts & Regulatory Inspection for Fostering SC



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Methods to evaluate licensee's effort for fostering SC

- **Two viewpoints for comprehensive evaluation**
  - Degree of achievement for the action plan promoted by PDCA cycle.
  - Extent of symptoms of SC degradation.
- **10 steps for evaluation process**
  - Every year with 10 steps
- **14 SC components for evaluation**
  - Evaluate each finding according to evaluation viewpoints of 14 SC components

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14 components of SC for the daily preservation activities

1. Commitment by Top management
2. Clear policies and execution by senior managers
3. Measures to avoid wrong decision-making
4. Habitual questioning attitude
5. Reporting culture
6. Good communication
7. Accountability and transparency
8. Compliance
9. Learning organization
10. Organization coping with prevention of accidents and troubles
11. Self-assessment or Third-party's assessment
12. Work management
13. Change management
14. Attitude and motivation

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Viewpoints for evaluation according to each component of SC

An example of "Habitual questioning attitude"

Viewpoint for evaluation	• All members of the organization should establish a habitual questioning attitude toward their own behavior, the status of equipment, and the way the organization works, as this pertains to safety.
Points to be checked (examples)	➢ When problems occur, there is a highly ritualized response to them. ➢ There is self-satisfaction with current performance; no need to look for problems. ➢ There is no STAR (stop, think, act, review) attitude.

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10 steps process of comprehensive evaluation for a licensee's efforts of fostering SC

Stage	Step
Preparation Stage	1
	2
Inspection Stage	3
	4
Evaluation Stage	5
	6
	7
	8
	9
	10

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Process of comprehensive evaluation for a licensee's efforts of fostering SC

Preparation Stage

Step1: Survey of licensee's action plan and indicators for efforts of fostering SC.

Step2: Survey of licensee's presetting symptom indicators to protect SC degradation.

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Process of comprehensive evaluation for a licensee's efforts of fostering SC

Inspection Stage

Step3: Observing symptoms of SC degradation through day-to-day safety preservation inspection.

Step4: Extracting matters relating components of SC from results of root cause analysis.

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Process of comprehensive evaluation for a licensee's efforts of fostering SC

Evaluation Stage

Step5: Survey of the achievement of licensee's efforts for fostering SC.

Step6: Survey of measured results of licensee's presetting symptom indicators to protect SC degradation.

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Process of comprehensive evaluation for a licensee's efforts of fostering SC

Evaluation Stage

Step7: Selection of necessary items to enhance licensee's efforts.

Step8: Presentation of items requesting licensee's efforts.

Step9: Selection of good practices.

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Process of comprehensive evaluation for a licensee's efforts of fostering SC

Evaluation Stage

Step10: Comprehensive finding for efforts of fostering SC.

Based on the contents surveyed through step 1 to 9, inspectors make their comprehensive finding according to two criteria.

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Two criteria for comprehensive finding

1. Viewpoint of evaluation on "degree of effort to prevent SC degradation".
2. Viewpoint of evaluation on "extent of symptom degrading SC".

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Criterion 1 : Degree of effort

Stage1: No efforts are made.
Stage2: Efforts are made but no improvement.
Stage3: Efforts are made based on the plan, and trends of improvements are observed.
Stage4: Continuous improvements have been made.

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Criterion 2 : Extent of symptom

Level 1: Clear symptom of degradation against two or more SC components.
Level 2: Symptom of degradation against a particular SC component.
Level 3: Continuous monitoring is required in order to observe further trends.
Level 4: Improvement are observed. However, continuous monitoring is desirable without complacency.

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Findings and outcomes

1) NISA inspected 17 NPPs three times in FY2007～2009.
2) In view of Criterion 1, degree of effort was stage 3 or 4.
3) In view of Criterion 2, extent of symptom was almost level 3.
4) Up to now, no serious problem in licensees.

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Findings and outcomes

5) NISA submits the comprehensive evaluation report to each licensee and requests further effort by working with reflecting annual action plan and promoting PDCA spiral-up forward strong SC, to say nothing of praising and encouraging good practice.
6) Evaluation of activity fostering SC just started and the method will be refined in accordance with lessons learned and feedback from stored experience.

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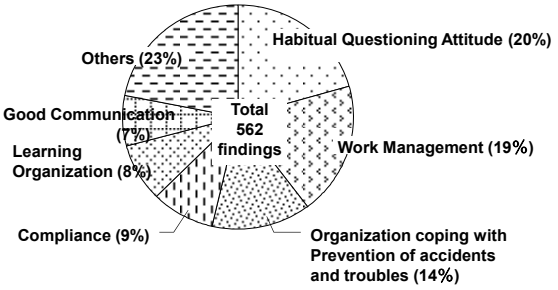
Findings relevant to 14 components in 2009 SC inspection



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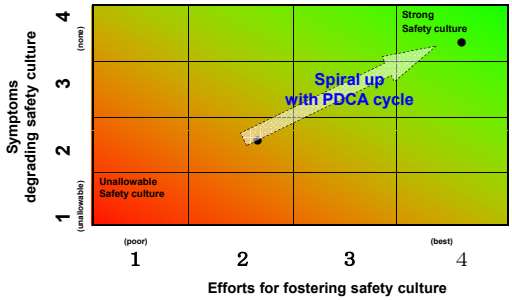
An example of visualization for evaluation result in future



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- Makino, M., Hata, T., Ogasawara, M. (2010). A regulatory perspective on analysis practices and trends in causes. In E. Hollnagel (Edited), Safer complex industrial environments: A human factors approach (pp.133-154). Boca Raton, FL:CRC Press.

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Thank you for your attention

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