

Study on Investigation and Analysis of Human and Organizational Factors

Objectives of the Project

The objectives of the project are to investigate and analyze issues associated with human and organizational factors involved in incidents of nuclear facilities, and to study and develop evaluation methods of these countermeasures. It is aimed to collect and offer the information relating to these activities.

Topics in the Fiscal Year of 2003

- Buildup of Knowledge and Lessons Learned from Investigation and Analysis of Human and Organizational Factors Involved in Accidents and Trouble Information, etc.**
 By analyzing and evaluating sixteen cases relating to human and organizational factors involved in the domestic and overseas accidents and troubles information, the recurrence preventive measures, subjects to be reflected to regulation and lessons learned were extracted and added to data base. Six important cases and two assumed situation figures were incorporated into the Lessons Learned Text. Through the statistical analysis of the cases, it was found out that the decreasing tendency of the number of cases of domestic incidents due to human errors has a strong correlation with that of "inappropriateness of management procedures and drawings", which is one of causes of human errors.
- Development of Fostering and Establishment of Nuclear Safety Culture**
 A draft guidebook to evaluate nuclear safety culture has been developing. On the other hand, "Discussion on How to Implement Safety Culture Sufficiently and Possible Recommendations (2003)"(*) reported "Safety culture evaluation should be positioned within Application of the Quality Management Framework". In response to this issue, the draft guidebook was compared and evaluated with such a code as "JEAC 4111-2003 Quality Assurance Code for Safety of the Nuclear Power Station", and the evaluation items, classifications etc. of the safety culture described in the draft guidebook were revised. Moreover, evaluation of the recent organizational issues (TEPCO's falsifications issue, the Colombia space shuttle issue, and the Millstone NPS issue, etc.) using this revised draft guidebook revealed the degradation of safety culture. It was confirmed that the revised draft guidebook is practically applicable and an evaluation matrix can visualize the situation of safety culture degradation.

(*) "Discussion on How to Implement Safety Culture Sufficiently and Possible Recommendations (2003)" is one of regulatory actions against TEPCO issue.

Furthermore, through research of IAEA related literatures and information exchange with Office Inspector General of US NRC, evaluation items of the nuclear safety culture were investigated to audit activities of regulatory bodies, which were proposed by the "Discussion on How to Implement Safety Culture Sufficiently and Possible Recommendations (2003)", and the relating information was collected.
- Study on Standards Concerning Evaluation of Main Control Room etc from the Standpoint of Human Engineering**
 The comparative study on details of various guidelines for upgrade, opinion exchange with NRC and the Brookhaven National Laboratory on the related US regulatory trend, and investigation concerning renewal for the Unit-1 and 2 of Genkai PS were conducted. Based on these, important elements of human engineering design were obtained and philosophy on evaluation from the standpoint of human engineering regarding the main control room design for modification of existing control panels etc. in Japan was developed.

Furthermore, the explanatory text describing the guide for evaluation items, examples and detail explanation, and PC tools were prepared for this philosophy.

Use of Outcomes

The information provided to the related domestic and overseas organizations in the fiscal year of 2003 were as shown in the followings:

- The paper, titled "Toward a Safety Culture Evaluation Tool", was contributed to the Emerging Demand For Safety (Taylor & Francis Publication in England).
- The paper, titled "Methodology and Applications for Organizational Safety Culture" and "A Case Analysis of an Organizational Safety Culture Using a Questionnaire and Interview Method", was registered to the NUTHOS-6 International Conference.
- The paper, titled "An Integrative Evaluation For Organizational Safety Culture" was registered to the OECD/NEA CNRA/CSNI Workshop.
- Lectures were given at the IAEA Technical Conference with a title of "About Approach to the Issues to be Considered by the Regulatory Authority", and at the East Asia Training Course with titles of "Lessons from Japanese Experiences" and "Assessment of Safety Culture/Methodology and Application".
- Lectures were given at the field training course for Senior Specialists for Nuclear Emergency (three places), with a title of "Lessons Learned and Issues of Human Factors in an emergency", on human factors and human errors, organizational accidents and safety culture, and lessons learned and issues of human factors in an emergency. At the opportunities, the side reader, "The Lessons Learned and Issues of Human Factors in Nuclear Emergency Preparedness" which was prepared in past fiscal year and the report of the Study Group, "Discussion on How to Implement Safety Culture Sufficiently and Possible Recommendations (2003)" edited for the lecture, were distributed and referred.
- A lecture was given to about eighty responsible managers in charge of quality control at the Ohi Power Plant with a title of "Human Factors and Organizational Accident" with an explanation from the view of regulatory bodies.

Examples of the Outcome

Evaluation Matrix

Number of trouble cases/number of human errors per reactor year

Year	Number of cases per reactor year	Number of power plant units
1981	2.3	24
1982	2.5	25
1983	2.6	26
1984	3.2	33
1985	3.5	36
1986	3.7	39
1987	4.1	42
1988	4.6	48
1989	4.9	50
1990	5.2	52
1991	5.2	52
1992	5.2	52
1993	5.2	52
1994	5.2	52
1995	5.2	52
1996	5.2	52
1997	5.2	52
1998	5.2	52
1999	5.2	52
2000	5.2	52
2001	5.2	52
2002	5.2	52

Flow of analysis

Guidance etc.

Assumed situation figure

Lessons learned text

PC tool

Evaluation from the standpoint of human engineering

Over All Schedule

Main activities	2001 fiscal year	2002 fiscal year	2003 fiscal year	2004 fiscal year	2005 fiscal year	2006 fiscal year
Analysis and Evaluation of Domestic and Overseas Human Factor Cases						
Development of a draft guidance to evaluate activities of licensee including preparation of manuals of inspection activities for fitness-for-safety activities						
Development of a draft guidance, such as policies desirable to be implemented by regulatory bodies responsible for monitoring safety culture.						
Development of a draft guidance concerning matters required for confirmation of technical capabilities related to safety culture						
Development of draft provisions concerning audit of a main control room etc. including preparation of a trial plan.						
Development of draft provisions concerning inspection of a main control room etc.						
Development of draft provisions concerning system management and control of a main control room						