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A study on improving a writing system based on writing purpose and event severity level for enhancing the quality of NPPs operating experience reports

Seonghun Lee
KHNP Central Research Institute., OE analysis Dept., Yuseong-gu, Daejeon, 34101 Korea
*Corresponding author : tjdgns3007@khnp.co.kr

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1. Introduction

Operating experience reports are essential tools in nuclear power plants for systematically recording operational events, analyzing their causes, and preventing recurrence.

The utilization of operating experience is widely recognized as a critical component of safety management by both regulatory bodies and plant operators.

However, current reporting systems exhibit structural limitations that fail to adequately reflect document purpose and required analytical depth.

The existing system employs a single-screen interface in which both Operating experience reports and technical review reports are prepared using identical input structures, regardless of event severity. This results in several issues :

1) Misalignment between reporting objectives and analytical content,
2) Over-or Under-analysis relative to event importance,
3) User confusion and inefficiency, and
4) Inconsistency in report quality

Previous efforts have primarily focused on data standardization and management, with limited attention given to designing reporting structures that simultaneously incorporate both report purpose and event severity.

Accordingly, this study addresses the following research questions :

1) What structural limitations exist in the current single-screen reporting system?
2) How can a reporting framework be designed to reflect both report purpose and event severity?
3) What are the impacts of such a redesign on reporting quality and efficiency?

The objective of this study is to analyze the structural problems of the current system and propose a differentiated reporting framework based on purpose and event severity, thereby improving both consistency and effectiveness of reporting.

2. Methods and Results

This study analyzed the structure, input items, and document types of the existing system and redesigns the reporting framework based on writing purpose and event severity.

2.1 Separation of screens based on writing purpose

< Fig1. Existing screen for writing a operating experience report>

Operating experience reports focus on event analysis and recurrence prevention, whreas technical review reports support technical decision-making such as design or procedural improvements.

In the existing system, both report types share identical input items, leading to ambiguity in writing standards and mixing of document characteristics.

To address this issue, this study proposes a purpose-based separation of writing screens characterized by :

1) Independent configuration of input items for each document type
2) Elimination of redundant or unnecessary fields
3) Clear structuring of information according to document objectives

This approach reduces confusion, improves writing efficiency, and enhances structural consistency in reporting.

< Fig2. Improvement of Operating Experience Report Screen>

< Fig3. Improvement of Technical Review Report Screen>

2.2 Differentiation of writing screens by event severity level

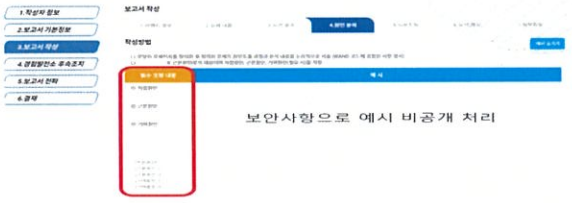
The required analytical depth varies depending on event severity; however, the current system applies a uniform structure to all cases.

This study introduces a event severity based differentiated reporting structure :

1) Level A : In-depth analysis including root cause analysis
2) Level B : Causal analysis-focused structure
3) Level C and D : Simplified structure for basic evaluation and event recording

Additionally, example-based guidance is provided to clarify analytical expectations for each level.

This differentiation enables appropriate analysis aligned with event importance, reduces unnecessary workload, and improves consistency and adequacy of reporting content.



< Fig4. Level A Report Writing Screen (including Root Cause Analysis)>

< Fig5. Level B Report Writing Screen (including Casual Cause Analysis)>

< Fig6. Level C and D Report Writing Screen(Including Simple Evaluation)>

3. Conclusions

This study identifies the structural limitations of a single-screen reporting system and proposes a dual criteria framework incorporating both report purpose and event severity.

The proposed approach-based on purpose-driven separation and event severity-based differentiation-improves alignment between reporting objectives and analytical depth, reduces user confusion, and enhances consistency in report quality.

Academically, this study contributes by redefining reporting systems as a purpose and event severity based design framework, extending beyond conventional standardization approaches.

Practically, it offers a directly applicable system design solution that improves usability, efficiency and appropriateness of analysis according to event significance.

However, the study is limited to structural improvements and does not fully address qualitative enhancement of report content.

Future work should intergrate training programs based on international standards and AI-assisted reporting tools to futher advance report quality and usability.

REFERENCES

[1] KHNP's internal procedure of utilization and management of operating experience