

## Accepted Manuscript

Systematic Development of Scenarios Caused by  
Cyber-attack-induced Human Errors in Nuclear Power Plants

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PII: S0951-8320(16)30443-4  
DOI: [10.1016/j.res.s.2017.05.046](https://doi.org/10.1016/j.res.s.2017.05.046)  
Reference: RESS 5866



To appear in: *Reliability Engineering and System Safety*

Received date: 31 August 2016  
Revised date: 12 May 2017  
Accepted date: 27 May 2017

Please cite this article as: Hee Eun Kim , Han Seong Son , Jonghyun Kim , Hyun Gook Kang , Systematic Development of Scenarios Caused by Cyber-attack-induced Human Errors in Nuclear Power Plants, *Reliability Engineering and System Safety* (2017), doi: [10.1016/j.res.s.2017.05.046](https://doi.org/10.1016/j.res.s.2017.05.046)

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**Highlights**

- To find out the consequences resulting from wrong operator actions due to a cyber-attack, a method to develop a fault tree (FT) for cyber-attacks was suggested.
- These wrong actions were obtained by analyzing an emergency operating procedure. The wrong actions of the operator were added as basic events in the existing probabilistic safety assessment model..
- The minimal cut sets (MCSs) consisting of the basic events related to cyber-attacks can be obtained by post processing. These MCSs represent the cyber-attack scenarios which lead to core damage without other random events.
- As a case study, the feed-and-bleed operation was analyzed using the developed FT and some scenarios which lead to core damage were derived. The results of this study can be used in a penetration test plan generation.

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