

Unavailability Analysis of Digital Engineered Safety Feature Actuation System

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Abstract

This paper quantitatively presents the results of the fault tree analysis of Digital Engineered Safety Feature Actuation System which is one of the most important signal generation systems in nuclear power plant. because it generates the signal for mitigating possible accidents. In this paper, as an example, we explore the case of auxiliary feedwater actuation signal. Based on the analysis results, we quantitatively explain the relationship between the important characteristics of digital systems and the system unavailability. Similarly to the PSA result of Digital Plant Protection System, we find out some factors remarkably affect the system unavailability. They are the common cause failures and the coverage of fault tolerant mechanisms. Human operator's backup also plays very important role. In this analysis we ignore the effect of software failure. We also compare the result with the PSA result of conventional analog Engineered Safety Feature Actuation System.