

## A Study on the Reduction of the Reactor Power Measurement Uncertainty for Use in the RCS Flow Measurement of KSNP

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### Abstract

For the RCS flow measurement by the heat balance method, the reactor power uncertainty of 2% has been used, which includes much conservatism to cover all the operating conditions expected during the plant operation and is used for safety analyses. The reactor power uncertainty for the flow measurement purpose is believed to be reduced to below 2% with the stabilized plant conditions during the RCS flow measurement period. In this paper, a study on the reduction of the reactor power measurement uncertainty has been conducted to be used in the RCS flow measurement of KSNP. All the process parameters relevant to the reactor power have been examined for the plant conditions during the RCS flow measurements. The results of this analysis indicate that the maximum uncertainty is less than 1.4% for all steam generator blowdown conditions, and that the uncertainty can be lowered to below 1% if the high capacity blowdown is not allowed during the RCS flow measurement. From a sensitivity study, it is found that the reactor power measurement uncertainty is most significantly influenced by the blowdown flow uncertainty for the high capacity blowdown, and by the feedwater venturi differential pressure uncertainty for both normal and abnormal blowdown. It is also found that all the parameters which could be directly affected by the venturi fouling have influence on the reactor power measurement uncertainty.