

ABSTRACT

JAMAICA PUBLIC SERVICE COMPANY (JPSCo) UNDER- FREQUENCY LOAD SHEDDING (UFLS) AND SPINNING RESERVE STUDY

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The maintenance of maximum service reliability has always been a primary concern of the electric utility industry. To attain this end, power systems must be able to handle designed normal and contingency system conditions, along with, probable emergency conditions that were not covered by the design process. UFLS is a globally accepted practice to handle the latter situations.

This report presents the results and conclusion of the above named project. The main focus of the project was to evaluate the effectiveness of the current JPSCo UFLS scheme in protecting the power system during the year 2003. Additionally, the project proposed revising the said UFLS scheme to a more advance scheme which uses both frequency and rate of change of frequency measurements to perform load shedding. The project also entailed determining the most economic spinning reserve for the system with this new UFLS scheme.

Transient Stability simulations performed of the JPSCo power system under various scenarios are presented as a means of evaluating the performance of the UFLS scheme. Simulations results indicates that the existing UFLS scheme is sufficient to preserve the stability of the system under the most probable emergency conditions (which includes the event of the loss of the 120 MW plant), and the resulting power flows throughout the system did not cause any equipment overload. The current UFLS scheme provides coverage against a maximum overload of 78.8% (which corresponds to a 44.1% loss in generation). Simulation results also indicate that the advanced scheme, which was proposed and subsequently modelled, assisted in reducing the levels of over shedding of load by an average of 95.1%. This was in accordance with the aim of the proposal of improving the performance of the UFLS scheme. The economic optimum spinning reserve for the JPSCo system was determined to be 20 MW during demand levels of 608 MW.

Keywords: Duane Rowe; Under Frequency Load Shedding; Spinning Reserve; Power System Reliability; Jamaica Public Service Company.