

Soraphon Kigsirisin 2013: Reliability Improvement and Assessment on Overhead Power Distribution Systems in Large Cities. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Associate Professor Vichai Surapatana, M.Eng. 129 pages.

Large cities are urban areas which are the center of economy and culture. A power interruption the area of large cities can result in a significant economic loss both directly and indirectly. Thus, the Provincial Electricity Authority of Thailand (PEA) has to improve the reliability of power distribution systems which electrify the large cities with all efforts to support the growth of economy continually. This thesis presents necessary steps and procedure of reliability improvement on overhead power distribution systems in the large cities such as replacing all aluminum conductors and partial insulated cables with spaced aerial cables, installing animal guards to cover all live parts, installing additional protective devices and switches, and installing overhead ground wires for lightning protection. Besides, additions of electrical technologies including Distribution Automation System - DAS, Fault Detection Isolation and Restoration – FDIR, which are able to effectively decrease the frequency and duration of permanent outages, are suggested. All reliability improvement is assessed in terms of reliability indices, SAIFI and SAIDI. In this research, an assessment method of both indices after system improvement is described as simple formulae suitable for investment decision making. Finally, the proposed reliability improvement is applied to 4 large cities in the northern, eastern, north eastern and southern parts of Thailand. In addition, the improved reliability of all cities is assessed in terms of SAIFI and SAIDI.