A STUDY OF OVERCURRENT PROTECTION FOR MAE SARIANG MICRO-GRID SYSTEM

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A STUDY OF OVERCURRENT PROTECTION FOR MAE SARIANG MICRO-GRID SYSTEM

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ABSTRACT

This thesis presents a study and a design of overcurrent protection for a distribution system in the Mae Saraing district. The Mae Sariaing system has a plan to be connected with Distributed Generations (DGs) and to be operated as a micro-grid (i.e. grid-connected operation or islanding operation). The addition of DGs and the micro-grid operation will make a direction and magnitude of short-circuit currents widely change according to different operating scenarios of the system; hence a mis-coordination of the protection system. The overcurrent protection design applied in this thesis is based on a detection and correction scheme. The method starts with a design of protection for a fundamental scenario (i.e. a scenario without DG). Then, the mis-coordination will be checked. The correction will be done before moving to the next scenario. The study has been performed using DIgSILENT PowerFactory.

KEY WORDS: DISTRIBUTED GENERATION/ MICRO-GRID/
MIS –COORDINATION/OVERCURRENT PROTECTION

83 pages

การศึกษาระบบป้องกันกระแสเกินสำหรับระบบไมโครกริดแม่สะเรียง

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บทคัดย่อ

วิทยานิพนธ์นี้ศึกษาวิธีการออกแบบระบบป้องกันกระแสเกินสำหรับระบบจำหน่ายที่ อ.แม่สะเรียง เนื่องจากระบบนี้มีความต้องการที่จะเพิ่มโรงไฟฟ้าขนาดเล็กเข้าสู่ระบบ และยังต้องการพัฒนาระบบให้สามารถทำงานแบบไมโครกริดได้ กล่าวคือ เป็นระบบไฟฟ้าที่สามารถจ่ายไฟแบบอิสระได้โดยไม่ต้องเชื่อมโยงกับระบบโครงข่ายไฟฟ้าหรือทำงานโดยขนานกับระบบโครงข่ายไฟฟ้าเดิม แต่การเพิ่มโรงไฟฟ้าขนาดเล็กและการทำงานแบบไมโครกริดนั้นจะทำให้ขนาดและทิศทางของกระแสลัดวงจรในระบบเกิดการเปลี่ยนแปลงตามสถานการณ์การทำงานของระบบที่มีได้หลายรูปแบบ และอาจส่งผลให้ระบบป้องกันที่ออกแบบอิงกับสถานการณ์พื้นฐานไม่สามารถทำงานได้อย่างถูกต้องกับสถานการณ์อื่นๆ การออกแบบระบบป้องกันกระแสเกินจะทำโดยการตรวจสอบและแก้ไขปัญหาไปทีละสถานการณ์ โดยเริ่มออกแบบจากสถานการณ์พื้นฐาน หรือสถานการณ์ที่ระบบที่ยังไม่มีการเชื่อมต่อโรงไฟฟ้าขนาดเล็ก หลังจากนั้นจะมีการตรวจสอบหาปัญหาการทำงานผิดพลาดของระบบป้องกันและแก้ไขทันที เมื่อเสร็จสิ้นจะไปทำการทดสอบในสถานการณ์ถัดไปจนครบทุกสถานการณ์ โดยการศึกษานี้ได้ใช้โปรแกรมDIgSILENT PowerFactory ในการจำลองระบบ

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