Advanced Testing Simulator From GE Helps Customers Save Time And Money

Real-Time Digital Simulator Provides Insight for Protection System Integration

**Markham, Ontario – March 27, 2002** – GE Power Management’s (GEPM) testing services provide customers with a cost effective and rapid means of testing their protection systems. GEPM is proud to offer customers power system simulation and relay system transient testing services on a Real-Time Digital Simulator (RTDS) in our Markham, Ontario facility. This modern facility includes a wide array of equipment offering EMTP/ATP case studies of protection, control and communications equipment, playback testing of protective relays, and a made-to-scale physical generator simulator. Our facility allows customers to conduct multiple testing scenarios in a short time frame, with a variety of diagnosis equipment available.

Two utilities from Ohio recently had the opportunity to test compatibility of their protection systems at this facility. American Electric Power (AEP) of Columbus and FirstEnergy of Akron are in the process of connecting their transmission line protection systems, as part of a capacity expansion initiative. New transmission lines and substations are being built to support requirements for extra power handling capacity, and existing substations are undergoing replacement of aging technology.

AEP is retrofitting its existing substations and outfitting new ones with D60 Line Protection Relays from GEPM, and wanted to test the compatibility of the relay with older GE protection relays as well as those produced by other manufacturers. GEPM Regional Sales Manager David Campbell invited AEP and FirstEnergy to visit the Markham, Ontario headquarters to test the relays using the RTDS. Skip Williams from AEP explains the goal of the testing: “As a result of the substantial investment we are making with our upgrade...
and expansion initiative, we wanted to be absolutely certain that our D60 protection system would work harmoniously with FirstEnergy’s, as well as our older components. “

Tests performed included fault detection and directional comparison blocking outputs, with each relay being monitored by a separate D60 acting as a digital fault recorder. During the test, ten distinct fault types were placed on the buses external to the protected line, with each fault type applied at incidence angles in the range of 0 and 90 degrees referenced to phase A voltage zero crossing. All relays were tested with strong and weak sources closest to them, as well as load flow in both directions at 0 and 60 degrees sources angular difference.

John Burger, Principal Engineer from AEP’s protection, measurement and engineering standards group, remarked on the user-friendlyness of the testing facility: “We have used GE Power Management’s testing services many times in the past to verify our schemes to assure proper operation in the field. The simulator is the most versatile and user-friendly we have used. We ran 350 fault tests in under 9 hours. This level of testing would normally take weeks to complete.” As part of the service, Ilia Voloh, GEPM Protection and Control Engineer, was on hand to help with equipment setup and testing, and with analyzing the performance data.

As the testing concluded successfully, James Detweiler from FirstEnergy commented on the capability of the RTDS and the testing facility: “The GE Power Management testing facility was state-of-the-art. We were able to conduct multiple testing scenarios in a small timeframe, with the convenience of having all the results available immediately on the simulator. The tests definitely helped resolve uncertainty on the issue of relay compatibility in a directional comparison blocking scheme. This will greatly facilitate the integration process between our systems.”

The testing facility provides an illustration of how committed GEPM is to helping customers save time and financial resources. The facility offers modern equipment, highly skilled personnel, and the latest analysis software. GEPM engineers were able to customize the D60 settings to meet the special requirements of AEP, as part of the testing. The RTDS can be used for a variety of transient studies – in particular for closed-loop testing of protection systems. The simulator is capable of testing three-terminal line protection applications including actual communications equipment. Multiplexers in the facility allow testing of current differential relays and teleprotection.
applications. It also has the means to simulate abnormal conditions in modern digital communications channels. An actual Power Line Carrier is available for reproducing field conditions for testing. Independent digital monitoring equipment is available to verify test conditions and response of tested equipment. This level of professional service is unique in the industry.

**About GE Power Management:**
GE Power Management, a division of GE Industrial Systems, is a global leader in the design, manufacture, sales and service of protection, metering, control and automation systems, as well as telecommunication networks for utility, industrial and general industry applications. For more information, visit the website at [http://www.GEindustrial.com/pm](http://www.GEindustrial.com/pm).

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