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**Abstract**

**Performance Assessment of Advanced Digital Measurement and Protection System**

OVERVIEW: The purpose of this research was to analyze historical and fault data obtained from a Power Quality Meter (ION meter) and a Digital Fault Recorder (Tesla) installed at the American Electric Power's 345 kV Corridor Station, using signals from conventional and optical transformers. The Tesla meter is configured to record 1.0-2.0 seconds of sample voltage and current levels whenever fault is detected. Each record consists of 0.2 seconds of pre-trigger and 0.8 -1.8 seconds of post-trigger data. The ION meter was used to measure true RMS voltage, current, and power. The analysis of the historical and fault data was done by using some programs including RecordBase View, Excel, and Matlab. The historical and fault data were used to compare the influence of the instrument transformers' characteristics on the performance of IEDs (Intelligent Electronic Devices).

STUDENT PROJECT: The result showed that in the case of historical data, there was an average of 0.6%, 3.7%, and 2.8% difference between the conventional and optical samples of the voltage, current, and power data, respectively. While analyzing the fault data, it was found that there were some differences in the ways the optical and conventional transformers replicate power system disturbances. Optical transformers were able to detect voltage notching while the conventional transformers were unable to do so. Another way their translations of disturbances differ is that they both interpret voltage transient disturbances differently.