Rochester Gas & Electric Asset Condition intelligence Solutions™ (ACi) for high voltage power circuit breakers

Customer need

Assuring reliability within New York’s electrical power grid is highly dependent upon the health and reliability of the high voltage cross-state ties among the NYISO’s transmission owners, such as the 362 kV lines connecting Rochester Gas and Electric with The New York Power Authority. To help enhance the reliability of that transmission corridor, RG&E has sought to equip its type PMI capacitor bank breakers, which support that critical east-west tie, with real-time remote condition monitoring and by instituting proactive maintenance practices. Of particular interest for first-trip analysis of its bulk power breakers, was acquiring a means of recording all trip and close operations, as well as the timing statistics, of those breakers. With limited or no Ethernet communications at its remote stations, RG&E secured funding assistance through a recent PUC-granted rate increase (intended for reliability improvements) to acquire the turnkey engineering and installation support necessary to achieve those goals.

ABB solution

The High Voltage Service Group has equipped a fleet of 18 RG&E 121 kV and 362 kV type PMI breakers with ABB’s Asset Condition intelligence Solutions™. The system wirelessly monitors a myriad of breaker status and performance parameters. Data from each breaker is gathered by its onboard Circuit Breaker Sentinel (CBS).

Each CBS has been paired with a cellular communicator, decidedly the most cost effective means of delivering data to a central office, especially from substations lacking an existing network structure. The CBS-based monitoring approach was especially appealing to RG&E, since the units and their wireless communication architecture, function independently from the utility’s bulk power operating and control system. That separation exempts the monitoring system from NERC-CIP requirements.

The accumulated CBS data is processed at RG&E’s central office by ABB’s Asset Condition intelligence Solutions™ (ACi) system, which delivers real time, independently accessible data to detect circuit breaker health and performance conditions before a failure occurs. The ACi system thereby assists circuit breaker problem diagnoses as well as offers corrective recommendations. Its alerts vary in complexity from identifying status changes in an intelligent device to identifying abnormal conditions. The system includes an independent ABB redundant archiving system to ensure reliable storage of long term data.

Facts

<table>
<thead>
<tr>
<th>Country</th>
<th>USA</th>
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<tbody>
<tr>
<td>Customer</td>
<td>Rochester Gas &amp; Electric, a subsidiary of Iberdrola USA</td>
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<tr>
<td>Location of project</td>
<td>City of Rochester, New York</td>
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<td>Scope of supply</td>
<td>18 PMI circuit breakers outfitted with Asset Condition intelligence Solutions™ system</td>
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<td>Year of delivery</td>
<td>2012</td>
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<td>Engineering and construction of installation</td>
<td>Collaboration between ABB HV Service and Circuit Breaker Development Group in Mt. Pleasant, PA, and ABB Consult IT group in Wickliffe, OH.</td>
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Customer benefits

− The highly scalable Asset Condition intelligence Solutions™ system can be readily applied to other electrical apparatus and systems, as well as accommodate future growth.

− Significant overall project savings are available through application of cost effective wireless communicators, especially on monitoring equipment at remote stations.

− Critical circuit breaker parameters, including SF₆ gas content and temperature trends, mechanical integrity, and interrupter wear (e.g., for large capacitor bank switching applications), are continuously monitored and reported by the CBS.

− By providing advance alarm and notification, the CBS helps reduce overtime cost and eliminate unnecessary outages that may otherwise be required by reactive maintenance.

− Transmission system reliability is improved based on the monitoring system’s ability to address circuit breaker maintenance issues in advance of an unplanned outage.

− Deployment of CBS monitors with wireless communications can be separate from the utility’s bulk operating and control system, thereby exempting NERC-CIP compliance. (North American Electric Reliability Corporation’s Critical Infrastructure Protection plan comprises more than 100 Reliability Standards, and sets requirements for protecting critical assets – those which “materially impact” the reliability of the bulk power system.)

A complete program with comprehensive support

The primary objective of a maintenance organization is to ensure asset availability and performance goals are met on a predictable basis. To do so successfully requires visibility and collaboration with the appropriate personnel so that proper maintenance can be performed when needed, which reduces unnecessary downtime. The challenge is having the relevant information available at the right time in the right form, and accessible to the right people.

ABB provides asset management solutions that present condition information seamlessly and in the proper context. As a result, continuous improvement initiatives, such as proactive maintenance practices, will improve maintenance efficiencies and minimize unscheduled shutdowns, as well as minimize the environmental impact of SF₆ gas usage. ABB Service can help utilities achieve those goals through available progressive levels of support:

− Retrofit fleet-wide deployment of condition monitoring devices onto both ABB, as well as alternative brand equipment. Scope can expand to include project management, system engineering and drafting, as well as site services such as training.

− Design and development of network and communications architectures, including device and system integration, IT security (NERC-CIP compliant, as required), and data validation.

− Development of complete asset management programs based on condition monitoring. They can provide predictive maintenance instructions, reliability dashboards that display asset health; and alarm management, which can include historical analyses and reporting services.

− ABB remote monitoring services, which combine secure remote connectivity with technical capabilities, can include complete and total asset management responsibility, tailored to the individual needs of a system. And beyond furnishing periodic reports and maintenance recommendations, ABB can also automatically dispatch expert service personnel to address any site assets whose needs are remotely detected.