

Study Committee A3
 Transmission and Distribution Equipment
 Paper 11137_2022

Monitor Data Management for Asset Failure Prevention

Abigail Zafiris and Reynold Cornell
 American Electric Power

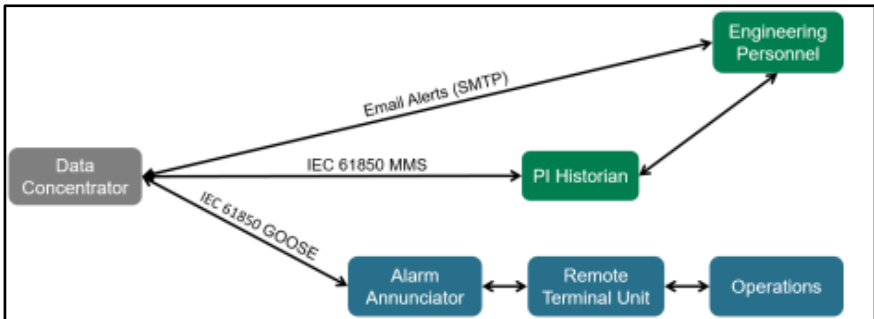
Motivation

- Asset failure prevention is a goal for many utilities, including AEP.
- Asset monitoring is used for failure prevention.
 - Over 400 Transmission-Level Transformers and Reactors Monitored
 - Dozens of Transmission-Level Circuit Breakers Monitored
- Data challenges can arise:
 - Volume of Data
 - Diversity of Data

Method

- A monitor data management plan is needed to overcome data challenges and prevent asset failure.
- An effective monitor data management plan includes three key components:
 - Data Infrastructure
 - Alarm Ownership
 - Stakeholder Training
- The components must be designed for compatibility.

Method: Data Infrastructure



Method: Alarm Ownership

Alarm Category	Required Response
Category 1	Immediate Action
Category 2	Next Business Day
Category 3	No Operator Action; Will Be Addressed by Field Personnel
Category 4	No Operator Action; Will Be Addressed by Asset Monitoring Personnel

Method: Stakeholder Training



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Investigation

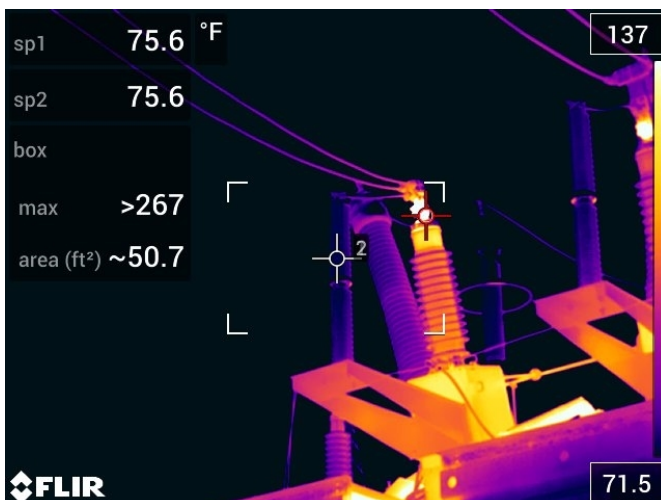
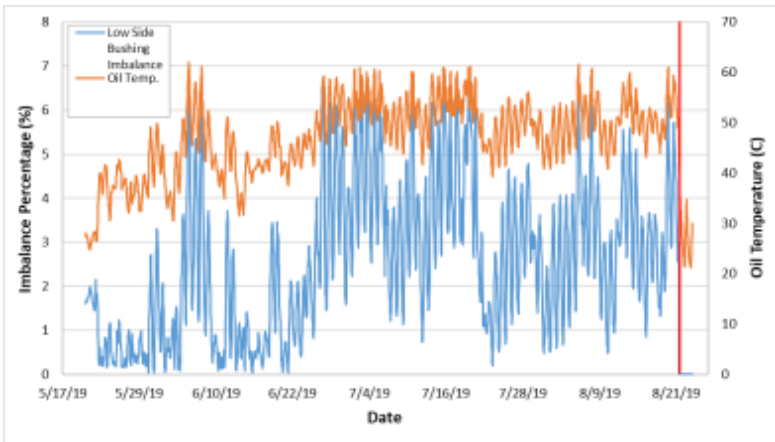
- AEP tested the effectiveness of the monitor data management plan through failure prevention experiences on monitored transformers, reactors, and circuit breakers.

Results

- The monitor data management plan was nuanced enough to successfully prevent asset failures with a wide variety of timescales.

Results: Long Term Failure

345 kV to 138 kV Autotransformer
 Bushing Health Monitoring and Temperature Monitoring



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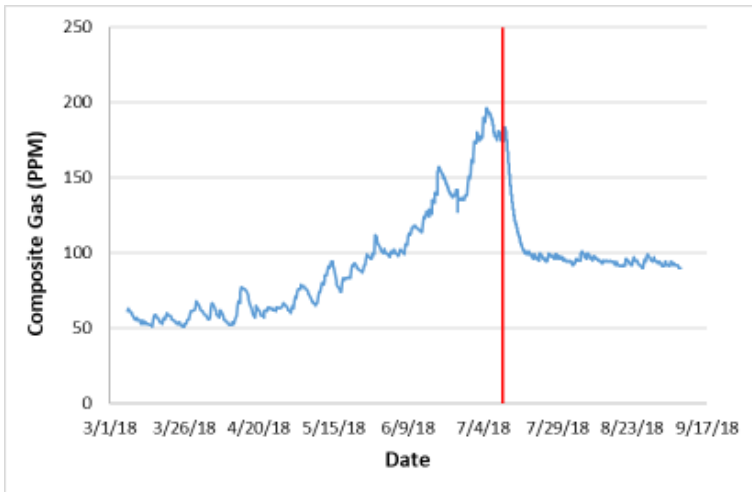
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Results: Short Term Failure

345 kV to 138 kV Autotransformer
Dissolved Gas Monitoring



Results: Short Term Failure

345 kV Circuit Breaker
SF6 Monitoring



Discussion & Conclusion

- With an effective monitor data management plan, the value of asset monitoring can be realized.
 - Asset failure preventions can be achieved on various assets and various timescales.
 - Asset failure preventions can lead to financial benefits, improved reliability, increased safety.
- AEP will continue to refine its monitor data management plan.
 - Additional Assets with Similar Structure
 - Automated Data Analysis in PI Historian