Lesson Learned

Back Office EMS Support Tools Impact Real-Time Situational Awareness

Primary Interest Groups
Transmission Operators (TOPs)
Reliability Coordinators (RCs)
Transmission Owners (TOs) who operate an EMS with study/simulation capabilities

Problem Statement
Upon receiving a call from its RC about a particular contingency, a registered entity identified that half of the contingency lists in the energy management system (EMS) list were disabled. This was due to a back-office study where the contingency list control display was opened and modified, inadvertently impacting the contingencies being displayed in the real-time environment.

Details
Upon receiving a call from the RC, the transmission System Operator discovered that contingency analysis results were not correct. They were receiving a valid time-stamp regarding a state estimator solution, but results for some of the contingencies were not being displayed. Upon investigation, the entity identified that half of the contingency lists were disabled. Re-initialization was performed to enable all of the contingency lists. The entity opened a ticket with the vendor to investigate why this happened.

Past EMS snapshots were reviewed to determine when the problem began. It was found that while running a back-office study, the tabular contingency analysis list was opened in a new window in the real-time environment rather than as part of the study environment. Because no one else had exclusive control of the real-time environment, this resulted in changes to the contingency list being made in the real-time case without any notification to the person running the study. If someone had control of or "locked" the real-time case prior to this study being run, the person running the study would have gotten a message that they were not in control of the real-time case and would have realized that they were working in the real-time case rather than in the study case. The operations support engineer making the changes to the contingency list did not realize that these changes were being made in the real-time case.

The EMS design did not have alarms to indicate when changes are made to real-time case without the user having proactively taken control of the real-time case or when contingency lists are disabled.

Corrective Actions
Because the lack of application seperation for study case vs real-time made the need to maintain the real-time case locked absolute, and this condition was not well understood, the registered entity trained its operations support staff regarding this issue. The EMS support staff have been instructed not to release control of the real-time case when they complete their work as changes can inadvertently be made to real-time case when no one has control of real-time case.

Lesson Learned

The Regions have seen other similar events where a study tool or simulation tool has impacted the real-time EMS environment. The test, study, and simulation tools often share functionality and data with the real-time EMS tool to closely mimic real-time conditions. The test, study, and simulation tools are used to test out new features and technology; apply patches and fixes; run near-term studies looking for thermal, voltage, or stability concerns; and train the operators on interesting scenarios, including some stress-cases. Because these tools look and feel the same and often share some common data links, there is a risk that the real-time EMS environment can be compromised by changes to the test, study, or simulation systems, or the persons making the changes thinks they are in a non-real-time environment when really he or she is making changes to the production environment. The following controls may be implemented to help prevent, detect, and correct this risk:

- Build a separate Quailty Assurance (QA) or testing environment for back-office study.

- Discuss any vulnerabilities with the EMS vendor. What changes made to the test, study, or simulation tools could have consequences in the real-time environment?

- When possible, use different visual effects, such as different colored borders or backgrounds, to help operations support personnel differentiate between the real-time EMS environment and test, study, or simulation environment and know which applications they are using.

- Train operations support personnel and transmission System Operators on the risks of any setting changes or contingency list updates made to any of these environments.

- Provide clear guidelines on who is authorized to work in which environment and which study clones are assigned to which operators or support personnel. Ensure there is no overlap where two or more persons could be working on the same study in real-time applications.

- Work with internal EMS IT expertise or the vendor to design/assign application/environment permissions (read, write, modify) to support personnel and transmission System Operators. (Ideally, back office studies should only have read access to the data with no easy toggle between real-time and simulation tools.)

- Continue to work with Reliability Coordinators and Transmission Operators who have overlapping coverage of the entity's system. If the observations of the RC or the TOP differ from the registered entity's observations, investigate whether the differences in observations are the result of inadvertent disabling of tools or features.

- When performing start-up testing of any new EMS technology applications, carefully monitor other EMS tools and applications to ensure that the new application is not impacting the other systems.

- Ensure that opening and closing breakers in the simulation tool is not capable of opening and closing breakers in the production server (this avoids surprises when running drills and simulations).

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Source of Lesson Learned: ReliabilityFirst

Lesson Learned #:   20180603

Date Published: June 5, 2018

Category: Communications