NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Lesson Learned

SCADA System Software Design Flaw Prevented Processing of Alarms and Events

Primary Interest Groups

Reliability Coordinators (RCs)
Balancing Authorities (BAs)
Generator Operators (GOPs)
Transmission Operators (TOPs)

Problem Statement

A SCADA system encountered an operational problem when a software design flaw prevented the application from processing alarms and events due to a character limit within the SCADA database.

Details

An alarm was received in the SCADA system from the field and the system operator entered a comment to provide additional information regarding the alarm. The comment was 179 characters in length, which is the maximum number of allowable characters for this field. The 179 character limit was by design and is based on the length of the field within the database.

Unknown to the operator at that time, a defect in the SCADA system caused it to only be able to process the first 90 characters of the comment, but allowed 179 characters to be typed anyway. The state changed back to “normal” for that particular alarm and the system operator could not clear or delete the alarm. The database was originally designed for a 179 character message but it could only handle the first 90 characters due to a coding error; therefore, it hung while trying to evaluate the remaining part of the alarm note.

Subsequently, rebooting the alarm process did not resolve the issue as it crashed every time it was restarted due to attempting to process the alarm note. This filled the alarm processor queue, preventing additional alarms from being displayed, thus impacting the system operator’s ability to monitor and control transmission facilities. Eventually, the support staff, with assistance from the software vendor, were able to identify and truncate the system operator’s note to less than 90 characters and successfully clear the database table. After initial investigation, it was discovered that the vendor had a patch available to resolve this issue.

Corrective Actions

A software patch provided by the vendor was applied to the SCADA system, preventing future notes from inhibiting the system’s ability to process state changes.

Lesson Learned

- Software users should consider stress testing all user-enterable fields.
- Entering a comment or note to a system alarm is considered a secondary function; however, it proved to be a single point of failure. Therefore, do not overlook what appears to be the less

impactful parts of the system during testing, monitoring, and troubleshooting. Be proactive about reviewing vendor patches, regardless of how insignificant they may appear. This includes subscribing to vendor notification lists and vendor user groups.

- Engaging vendor support early will help identify and resolve problems faster.
- A centralized monitoring of the system's components and processes will help diagnose these issues sooner.
- System operators should be trained on the importance of situational awareness as it relates to EMS health. Early detection of EMS health issues and notification to EMS support personnel leads to quicker resolution.

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NERC – Lessons Learned (via email)	NPCC – Event Analysis
Source of Lesson Learned:	Northeast Power Coordinating Council
Lesson Learned #:	20161202
Date Published:	December 6, 2016
Category:	Communications

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