

# WECC

## Misoperations Webinar Series

Session 3 – June 28, 2018

# Objective

Align understanding of how misoperations and operations are defined.

- Look at real-world scenarios to identify common issues
- Explain concepts and provide reference material
- Test concepts on new scenarios

# Follow up

- FAQ document (“Living” document)

<https://www.wecc.biz/Reliability/Misops%20Webinar%20FAQ.pdf>


- Updated with April webinar questions
- Added 1600 data request and PRC-004-5(i) links

# How this will work

## Pre-Webinar Survey

- Scenario
- Results
- Explanation
- Questions
  - Submit through chat
  - Unmute yourself to talk
  - Email

Callers will be muted on entry. To ask questions:


1. Chat:  
Use the chat feature to type in questions. Be aware that the chat is visible to all attendees.
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3. Email:  
send to [relaymisops@wecc.biz](mailto:relaymisops@wecc.biz)  
emails will be addressed after today's session.

# How this will work

## Live Examples

- Scenario
- Live Poll
- Explanation
- Questions

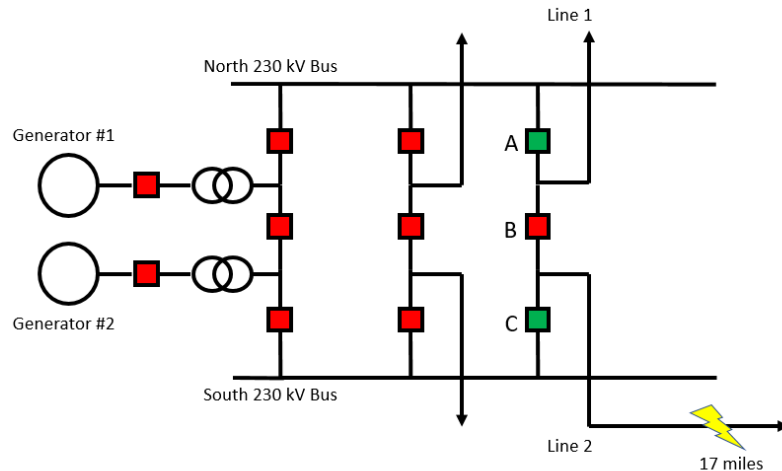
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# Breaker Failure 01 (June 28)

## Question

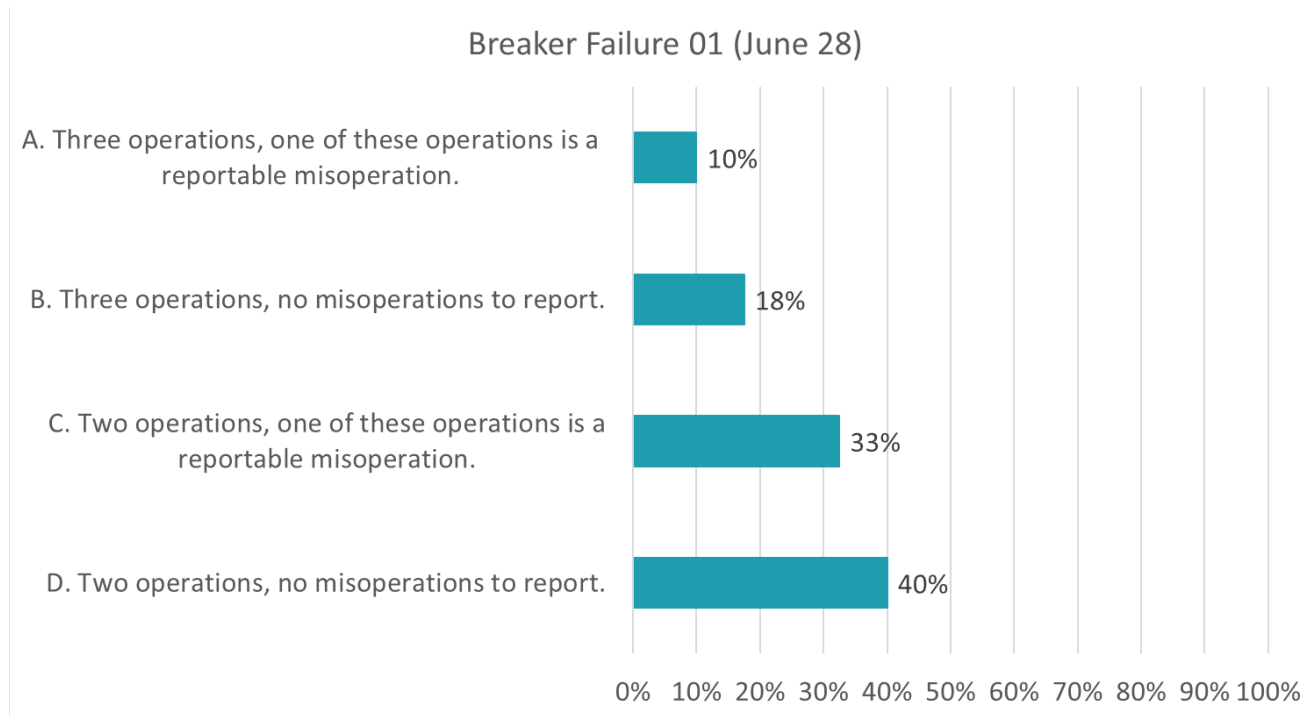
Permanent line fault occurs 17 miles out on Line 2. Line 2 relaying operates as intended; however, Breaker B fails to clear the fault because of a failed breaker mechanism. The breaker failure scheme provides local tripping, but no transfer tripping of the remote end of line 1. Remote relaying on line 1 operates to clear fault from system. How many operations and how many misoperations should be reported?



- A. Three operations, one of these operations is a reportable misoperation.
- B. Three operations, no misoperations to report.
- C. Two operations, one of these operations is a reportable misoperation.
- D. Two operations, no misoperations to report.

# Breaker Failure 01 (June 28)

## Results



# Breaker Failure 01 (June 28)

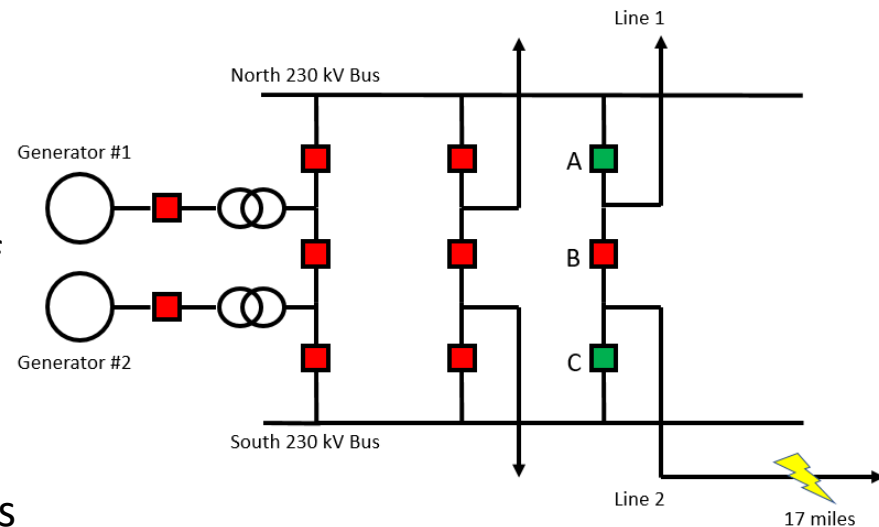
## Answer and Explanation

Answer: B. Three operations, no misoperations to report.

Explanation: One correct operation for Line 2 protection, one correct operation for breaker failure local clearing, and one correct operation for the remote end trip of line 1

Reference: PRC-004-5(i), page 17, example 2

Note: Since the Breaker Failure Protection resulted from the breaker mechanism that is not part of the Composite Protection System, this is not a misoperation.





# Protection/Control 01 (June 28)

## Question

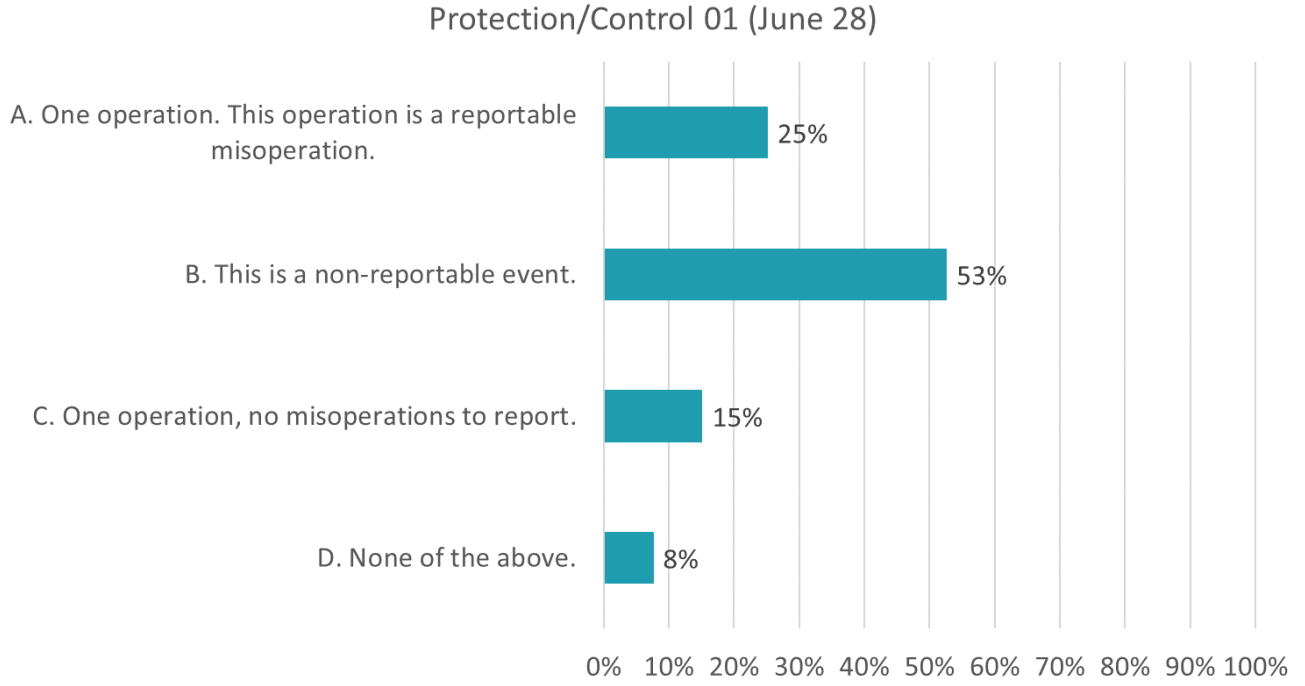
ACME PCB 326 tripped due to a low SF6 gas monitor relay. The gas level was checked and was confirmed to be within normal range. The gas monitor relay was found to be faulty, and was replaced.

How many operations and how many misoperations should be reported?

- A. One operation. This operation is a reportable misoperation.
- B. This is a non-reportable event.
- C. One operation, no misoperations to report.
- D. None of the above.

# Protection/Control 01 (June 28)

## Results



# Protection/Control 01 (June 28)

## Answer and Explanation

Answer: B. This is a non-reportable event.

Explanation: A SF6 gas relay is part of a control system, and therefore does not qualify as a protection system operation/misoperation. This relay is not responding to electrical quantities.

Reference: NERC Glossary of Terms – Protection System

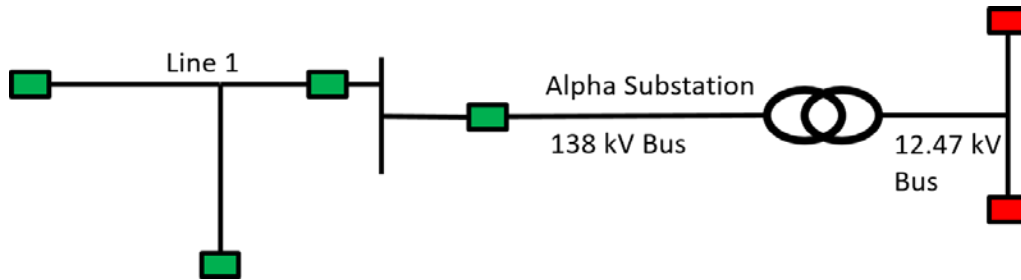
# Protection or Control System?

- Bus Differential Relay
- Thermal Transducer
- Overcurrent Relay
- Circuit Breaker Trip Coil
- Sudden Pressure Relay
- Protection System
- Control System
- Protection System
- Protection System
- Control System

# Field Testing 01 (June 28)

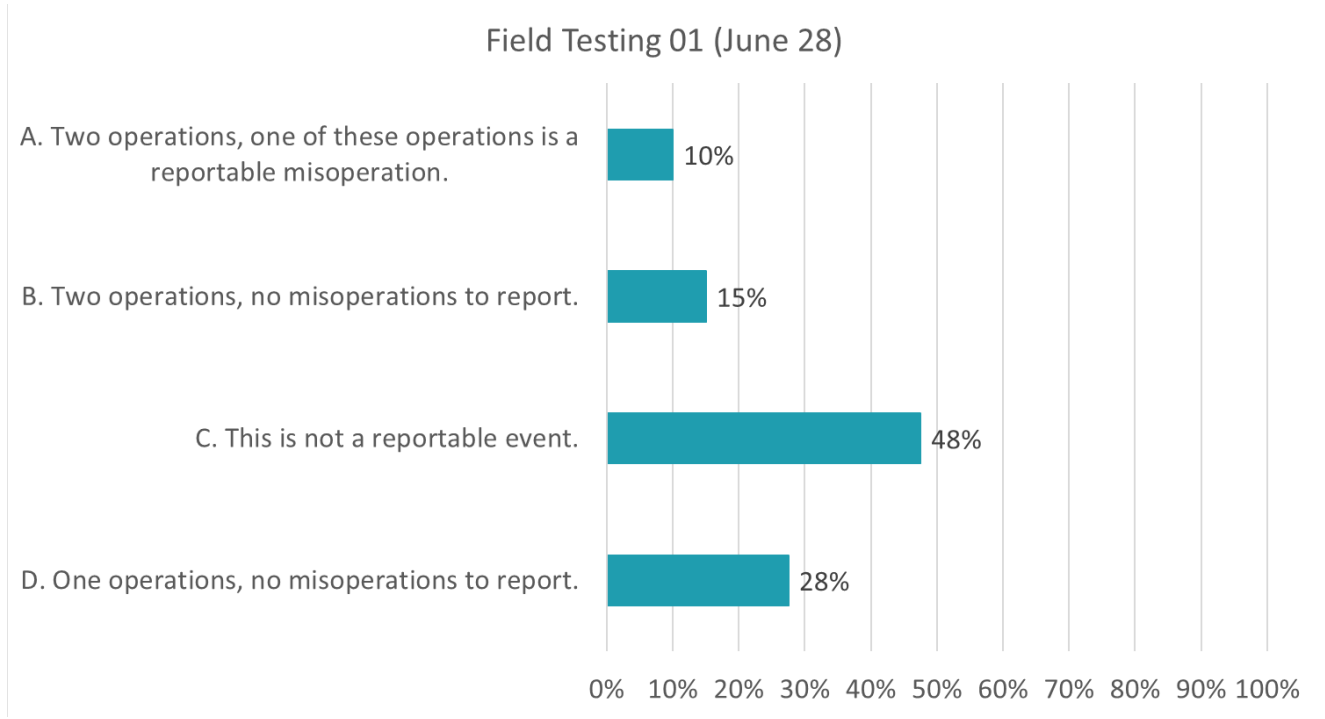
## Question

During substation testing, a transformer CT was not isolated and tripped the bus differential relay at Alpha Sub. As designed, this also sent a DTT on line 1, a 3-terminal line. How many operations and how many misoperations should be reported?



- A. Two operations, one of these operations is a reportable misoperation.
- B. Two operations, no misoperations to report.
- C. This is not a reportable event.
- D. One operation, no misoperations to report.

# Field Testing 01 (June 28) Results



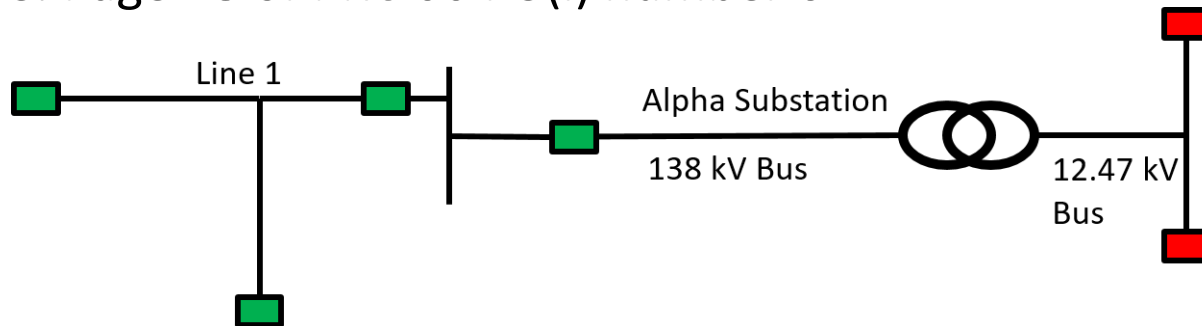
# Field Testing 01 (June 28)

## Answer and Explanation

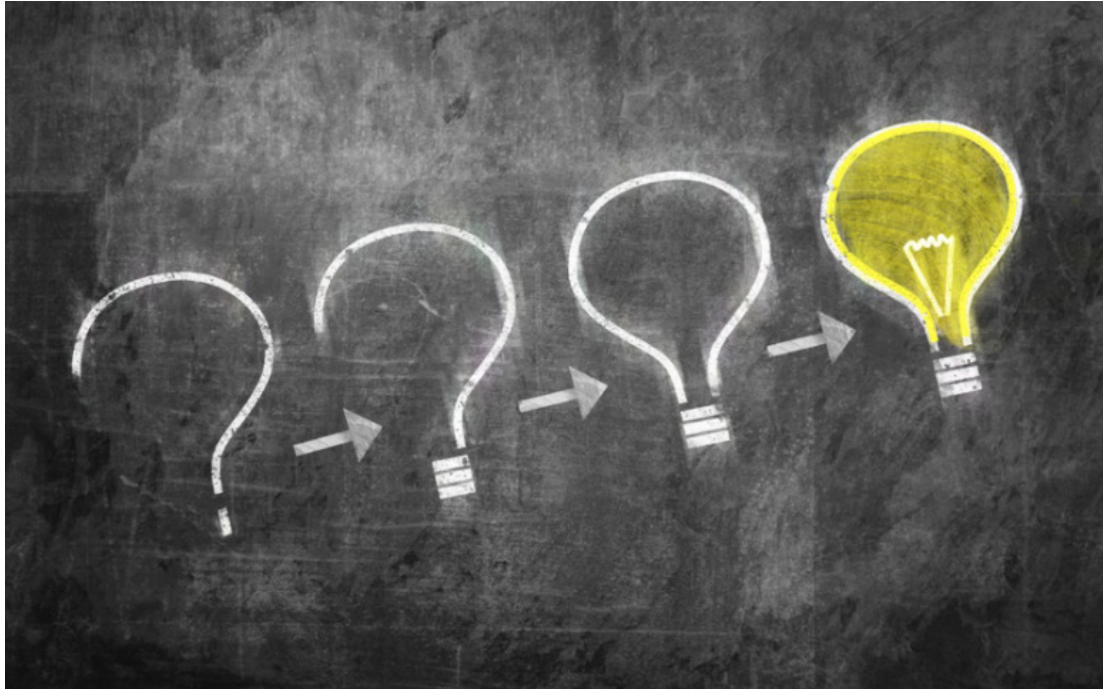
Answer: C. This is not a reportable event.

Explanation: As outlined in PRC-004 an Unnecessary Trip – Other Than Fault of a Composite Protection System operation that is caused by personnel during on-site maintenance, testing, inspection, construction, or commissioning activities is not a Misoperation.


Reference: Page 18 of PRC 004-5(i) number 6



# Questions



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“...knowledge without practice  
is of no value.”

- Heber J Grant

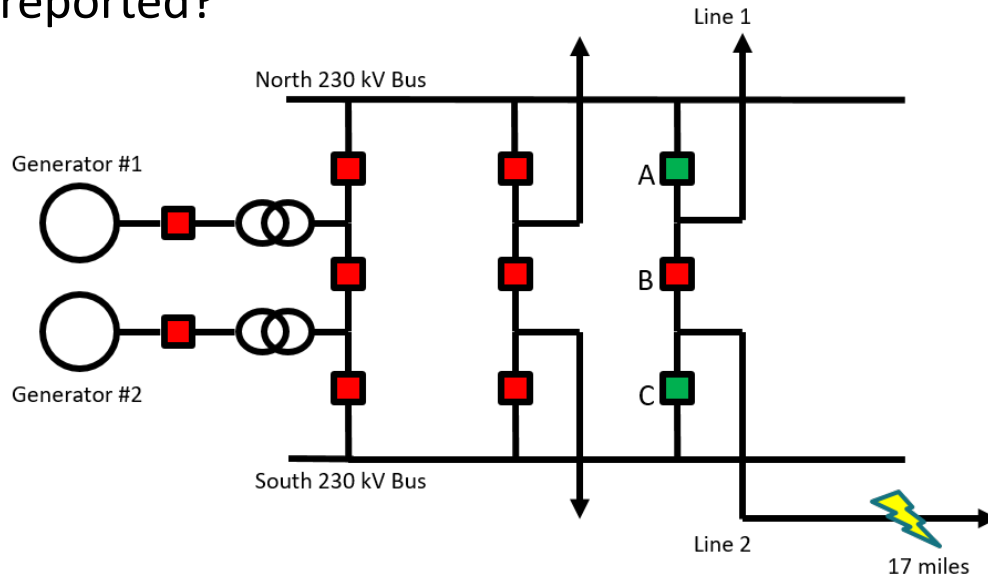
## Practice Session

Grant, H. J. (2011). Teachings of President of the Church: Heber J. Grant. pp. 33-41. Church of Jesus Christ of Latter-Day Saints. Retrieved June 22, 2018, from <https://www.lds.org/manual/teachings-heber-j-grant/chapter-4?lang=eng>

# Breaker Failure 02 (June 28)

## Question

Permanent line fault occurs 17 miles out on Line 2. Line 2 relaying operated as intended, however, Breaker B fails to clear the fault because of a failed trip coil. There is breaker failure relaying in place with transfer tripping of remote ends. How many operations and how many misoperations should be reported?



- Three operations, one of these operations is a reportable misoperation.
- Three operations, no misoperations to report.
- Two operations, one of these operations is a reportable misoperation.
- Two operations, no misoperations to report.

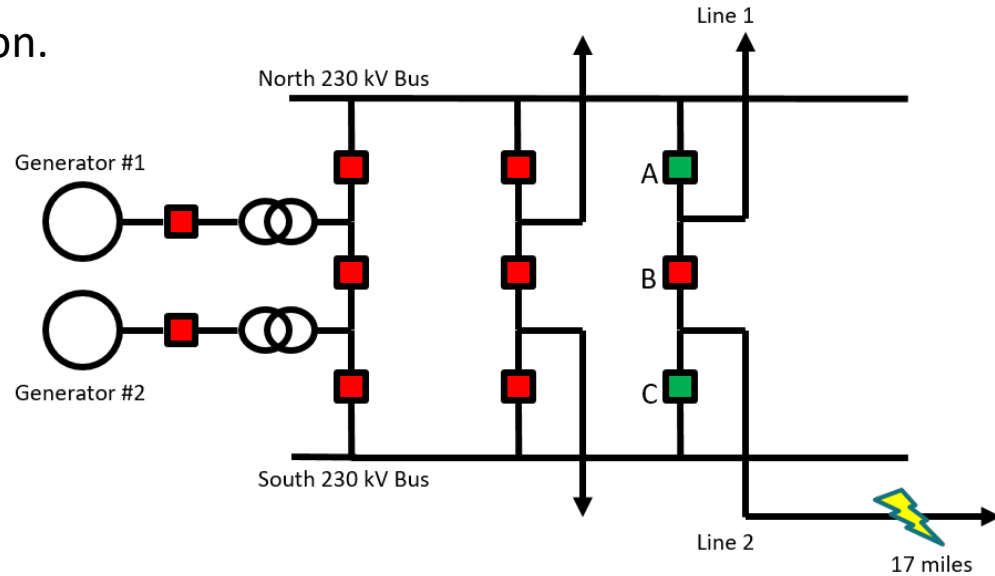
# Breaker Failure 02 (June 28)

## Answer and Explanation

Answer: C. Two operations, one of these operations is a reportable misoperation.

Explanation: Misoperation for Line 2 protection since breaker B did not operate due to a failed trip coil, one correct operation for breaker failure protection with transfer tripping of remote ends

Reference: PRC-004-5(i), page 17, ex. 1.



Note: Since the Breaker Failure Protection resulted from a failed trip coil that is included as part of the Composite Protection System, this is a misoperation.

# Protection/Control 02 (June 28)

## Question

A 230/115kV bank was removed from service due to a incorrect operation of a sudden-pressure relay.

How many operations and misoperations should be reported?

- A. One operation. This operation is a reportable misoperation.
- B. One operation, no misoperations to report.
- C. This is a non-reportable event.

# Protection/Control 02 (June 28)

## Answer and Explanation

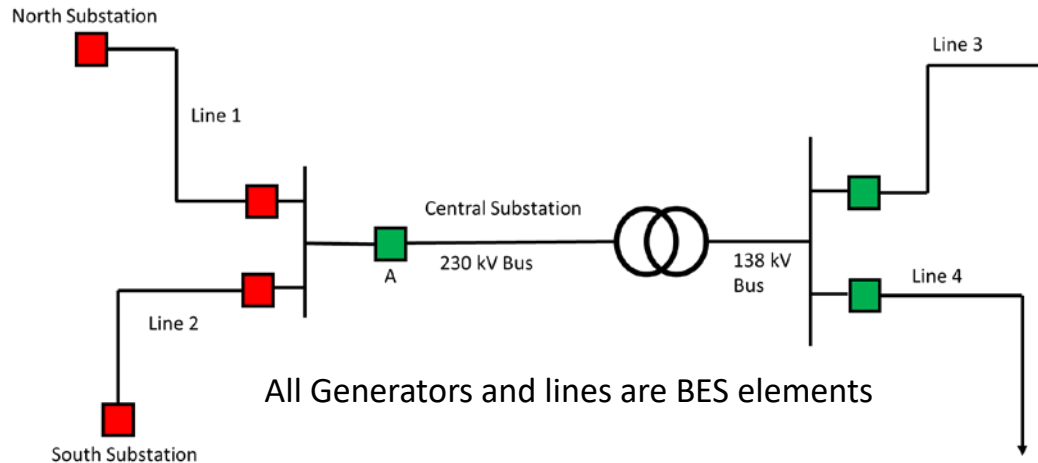
Answer: C. This is a non-reportable event.

Explanation: A sudden pressure relay is not responding to electrical quantities and therefore does not qualify as a protection system operation or misoperation.

# Field Testing 02 (June 28)

## Question

Breaker A was recently replaced. Testing of the transformer differential was not performed due to insufficient load. As loading increased hours later (all personnel had left the site), the bus differential tripped because the CT connections were rolled. How many operations and misoperations should be reported?



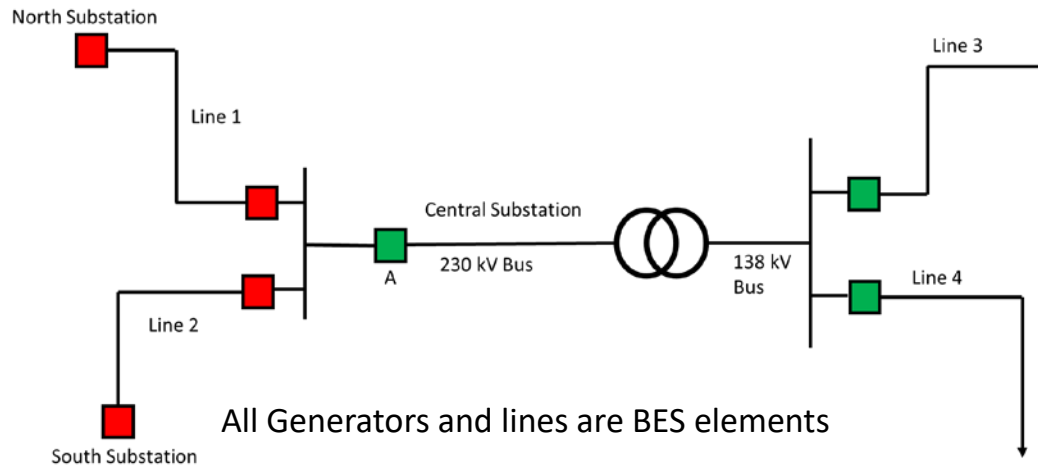
- A. One operation, this operation is a reportable misoperation.
- B. This is not a reportable event.
- C. One operation, no misoperations to report.
- D. None of the above.

# Field Testing 02 (June 28)

## Answer and Explanation

Answer: A. One operation, this operation is a reportable misoperation.


Explanation: Even though the work to replace the breaker was recently performed, the new breaker was being placed into service. The rolled CTs were an As-Left condition resulting in a misoperation.



# Questions



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# Coming Soon....

- Slides and information from today's call
  - Email to misops info mailing list
    - To be added, email [support@wecc.biz](mailto:support@wecc.biz)
  - Posted on WECC website (Performance Analysis [page](#))
- Misoperations Webinar Series call #4
  - Thursday, August 23, 2018 10:00-11:30 a.m.
  - Topic suggestions, issues, ideas for scenarios: email to [relaymisops@wecc.biz](mailto:relaymisops@wecc.biz)