

# **Backgrounder: Open Phase Events**

# **Oconee Units 1 and 3 Open Phase Event**

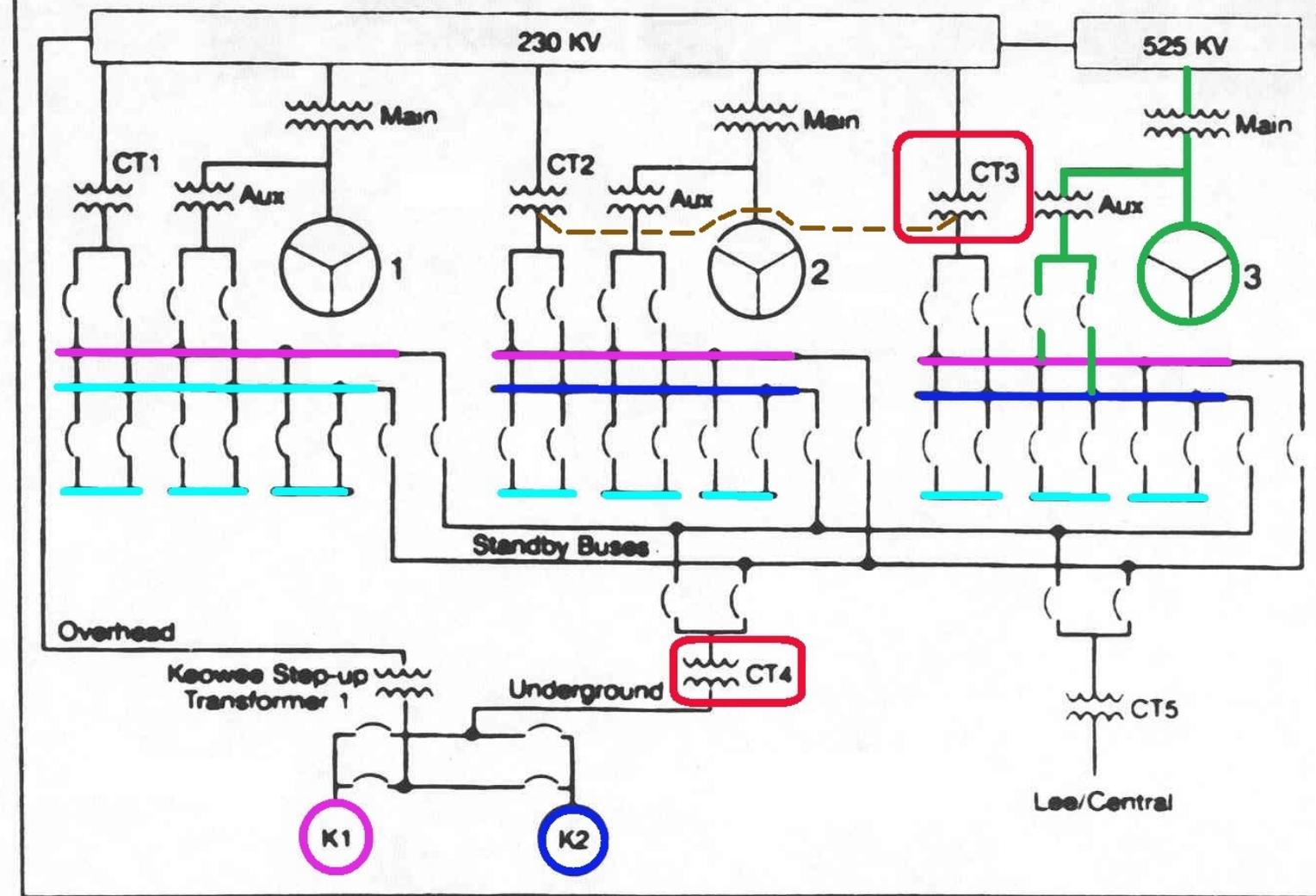
**December 2015**

**A phase connection for one of two sources of electricity for Unit 3 from the emergency backup power source was discovered broken. The next week, a phase connection was found broken on Unit 1.**

**Source:**

**<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML16057A062>**

# OCONEE EMERGENCY ELECTRICAL SYSTEM



Oconee is the only U.S. nuclear plant without emergency diesel generators. Instead, its emergency backup power sources are the two hydroelectric units at the nearby Keowee Dam. A phase connection to transformer CT3 was found broken as workers were about to disable transformer CT4 for maintenance. A week later, a broken connection on transformer CT1 was found.

# **Dungeness B (United Kingdom) Open Phase Event**

**April 27, 2014**

**An open phase in the 400,000 volt power supply to the plant caused some large electrical equipment to stop running.**

**Source:**

**<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML15057A085>**

# **Forsmark Unit 3 (Sweden) Open Phase Event**

**May 13, 2013**

**A mistake during a test caused an open phase condition. Some safety-related and non-safety-related equipment supplied by the degraded power source overheated and failed.**

**Source:**

**<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML15057A085>**

# **Bruce Unit 1 (Canada) Open Phase Event**

**December 22, 2012**

**After a cooling pump unexpectedly stopped running, workers were unable to start either of two backup pumps due to an undetected open phase condition in a 230,000 volt transmission line connection.**

**Source:**

**<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML080280592>**

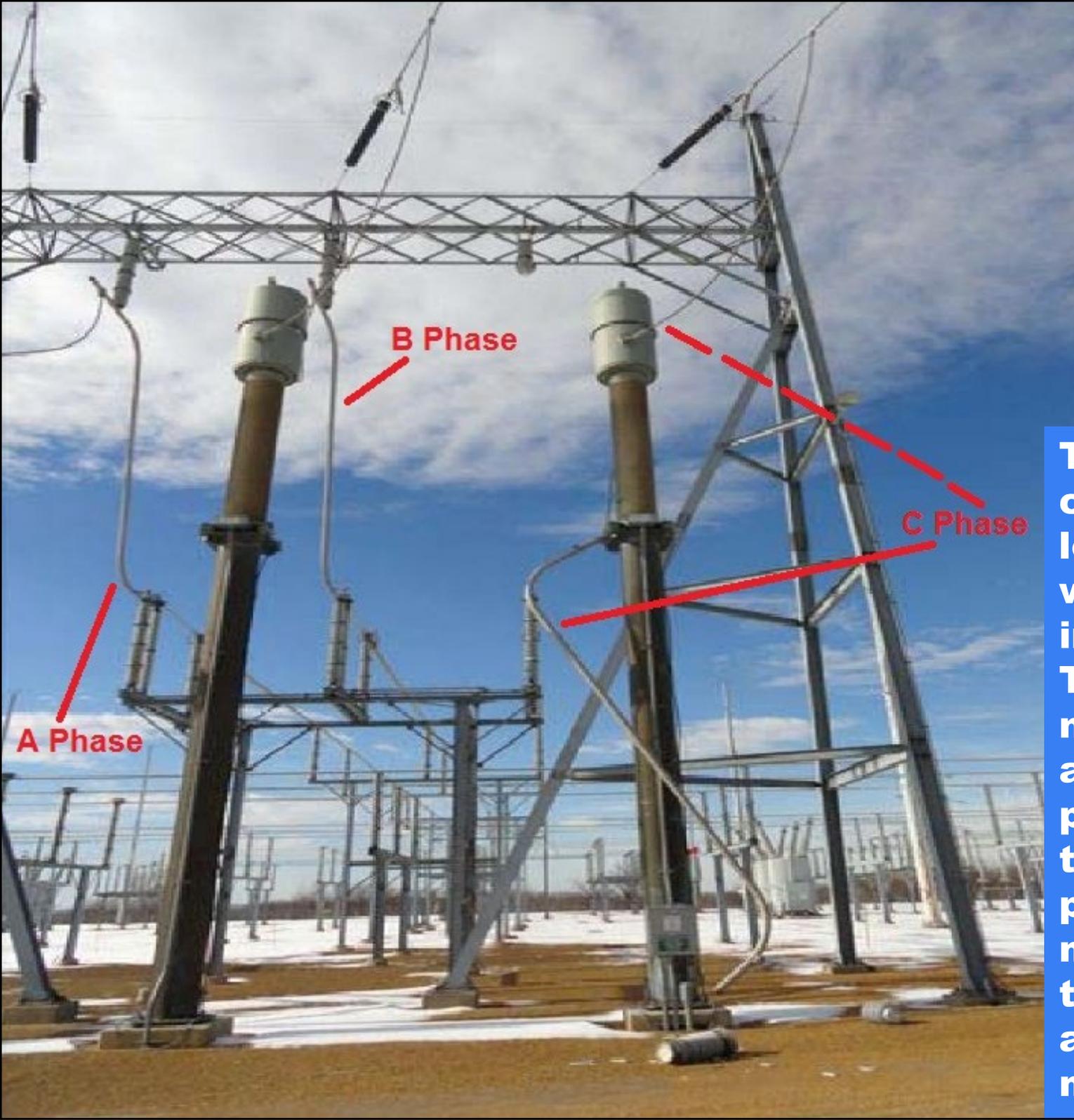
# **Byron Unit 1 Open Phase Event**

**January 30, 2012**

**The “A” phase connection for one of two sources of electricity from the offsite power grid broke on November 1, 2007, but was not discovered until November 27, 2007.**

**Source:**

**<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML080280592>**



**The “C” phase connection broke loose, dropping the wire to the ground in the switchyard. The open phase did not trigger automatic protection actions to isolate the problem. Operators manually took those measures about eight minutes later.**

# **Beaver Valley Unit 1 Open Phase Event**

**November 1-27, 2007**

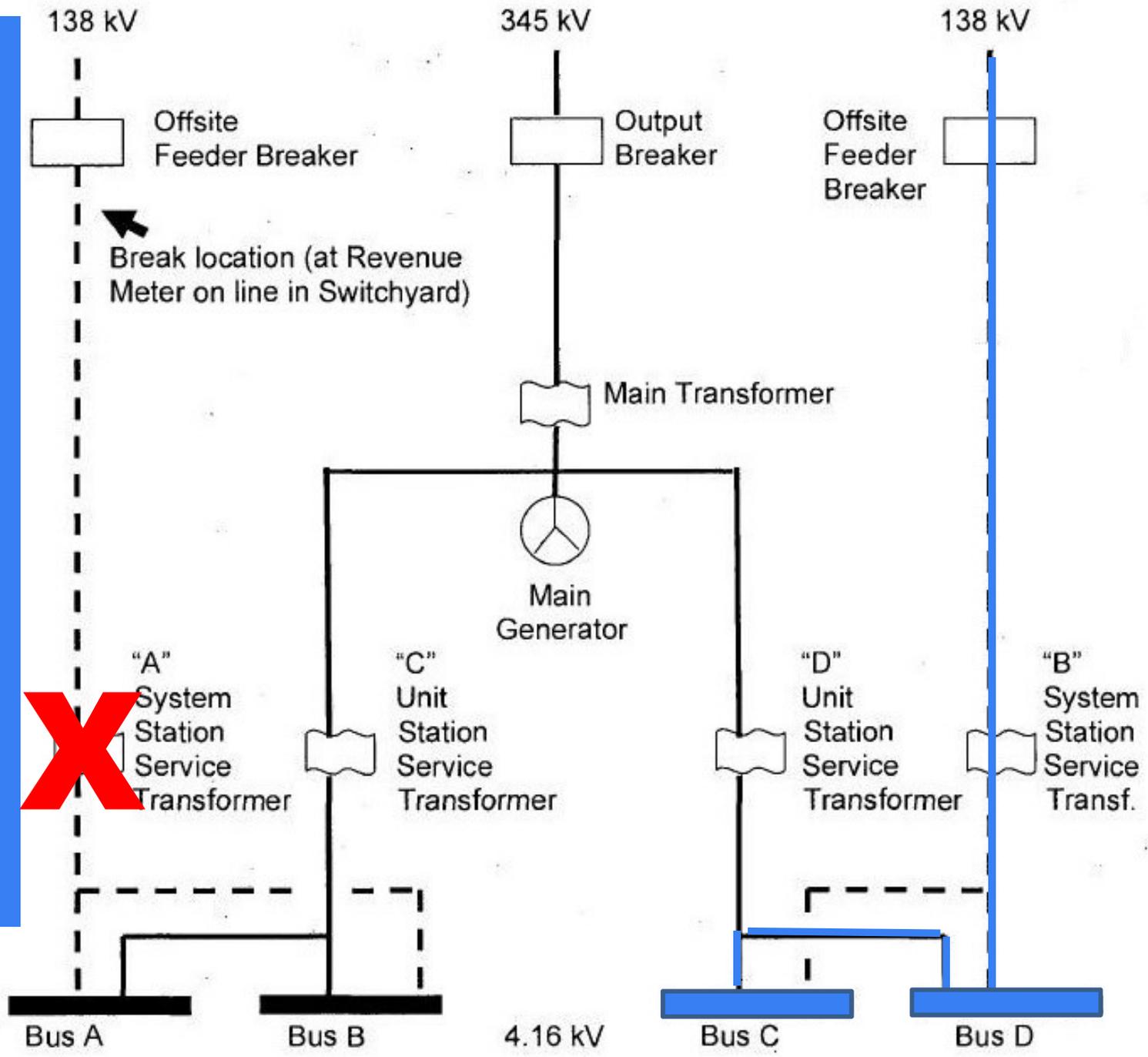
**The “A” phase connection for one of two sources of electricity from the offsite power grid broke on November 1, 2007, but was not discovered until November 27, 2007.**

**Source:**

**<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML080280592>**

**Had the generator tripped, the open phase would have prevented Buses A and B from being supplied electricity from either their normal or primary backup sources.**

**An emergency diesel generator (not shown) may have supplied electricity to vital equipment supplied by Bus A.**



# **Nine Mile Point and James A. FitzPatrick Open Phase Event**

## **November and December 2005**

**One of two transmission lines from the 115 kilovolt switchyard had an undetected open phase condition between November 29, 2005, and December 19, 2005.**

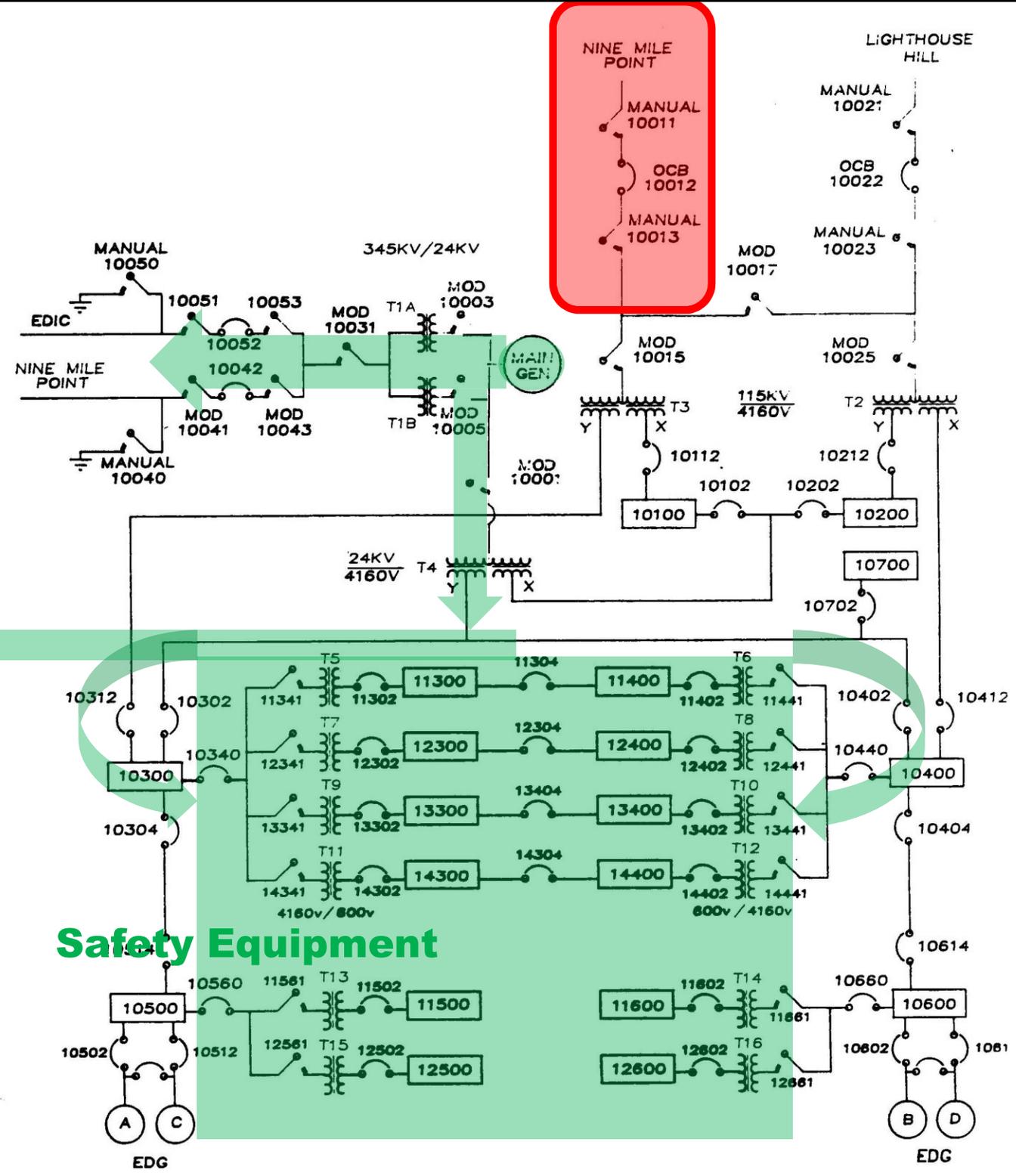
### **Sources:**

**NMP <http://pbadupws.nrc.gov/docs/ML0606/ML060620519.pdf>**

**JAF <http://pbadupws.nrc.gov/docs/ML0606/ML060610079.pdf>**

Nine Mile Point and FitzPatrick reactors operated for about 3 weeks with open phase on one of two offsite power lines

Reactors were allowed to operate for up to 7 days with one offsite line unavailable; otherwise, shut down in 12 hours



# **South Texas Project Open Phase Event**

**January 19, 2003**

**A malfunctioning breaker in the switchyard created an open phase condition that interrupted the electricity supplied to Unit 1 (operating) and Unit 2 (refueling) equipment.**

**Source:**

**<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML030840662>**

