FRCC Regional Procedure for Analysis and Mitigation of Transmission and Generation Protection System Misoperations
FRCC-RE-OP-002 r0

December 10, 2012
1.0 Purpose/Scope

The purpose of this FRCC Regional Entity procedure is to identify the process that is to be used by Transmission Owners, Distribution Providers that own a transmission Protection System or Generator Owners within the FRCC Region to ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.

2.0 Background

The PRC-004 NERC Reliability Standard establishes requirements that Transmission Owners, Distribution Providers that own a transmission Protection System and Generator Owners shall analyze BES Protection System Misoperations and implement a Corrective Action Plan to avoid future Misoperations of a similar nature. Documentation will be created and provided to the FRCC Regional Entity (RE) contact of all Misoperations’ analysis and the developed Corrective Action Plans.

3.0 Applicability

Transmission Owner

Distribution Provider that owns a transmission Protection System

Generator Owner

FRCC Member Services Staff

4.0 Procedural/Process Steps

4.1 Procedure for analysis of Protection System Misoperations

Each Transmission Owners, Distribution Provider that owns a transmission Protection System and/or Generator Owners is responsible for reviewing all protection trip operations within their specific area, including operation of Special Protection Systems (SPS). This analysis should include the determination that the relay action was either correct or incorrect.

Documentation of correct relay operations are to be maintained in accordance with established internal procedures by each Facility owner. Misoperations are to be analyzed and a Corrective Action Plan developed to avoid future Misoperations of a similar nature.

Each Transmission Owners, Distribution Provider that owns a transmission Protection System and/or Generator Owners is responsible for identifying the root
cause of the Misoperations. The results of this investigation and implementation of Corrective Action Plan shall be documented by the Facility owner.

4.2 Corrective Action Plans and reporting

Once the root cause has been identified, the Transmission Owners, Distribution Provider that owns a transmission Protection System and/or Generator Owners shall provide documentation of its Misoperations analysis including a Corrective Action Plan to the FRCC Member Services (MS) Staff as outlined in Attachment A. The Corrective Action Plan will include any steps to reduce Protection System Misoperations of a similar nature. The Corrective Action Plan can include, but not limited to items such as:

- Improved documentation
- Active communication
- Improving the relay setting preparation process including sharing data through the FRCC working groups
- Use of field measured line impedances where practical
- Improving procedures to reduce human errors affecting the operations
- Recommendations for replacing legacy relays with microprocessor relays
- Refining maintenance practices and maintenance cycles as necessary

If a Corrective Action Plan is not provided, explain in a declaration why corrective actions are beyond the entity’s control or would reduce BES reliability.

The FRCC RE contact will receive the documented Misoperations from the FRCC MS Staff and provides these documented Misoperations to NERC on quarterly bases. The Misoperations report will have the Corrective Action Plans removed prior to submitting to NERC.

FRCC MS Staff will provide the report to the FRCC RE contact quarterly according to the following schedule.

<table>
<thead>
<tr>
<th>Action</th>
<th>FRCC MS submission to FRCC RE</th>
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<tbody>
<tr>
<td>1st Quarter data</td>
<td>May 31</td>
</tr>
<tr>
<td>2nd Quarter data</td>
<td>August 31</td>
</tr>
<tr>
<td>3rd Quarter data</td>
<td>November 30</td>
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<td>4th Quarter data</td>
<td>February 28</td>
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</tbody>
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5.0 References
PRC-004 Analysis and Mitigation of Transmission and Generation Protection System Misoperations

6.0 Attachments
Attachment A

7.0 Revision History

<table>
<thead>
<tr>
<th>Effective Date</th>
<th>Document Number</th>
<th>Document Changes</th>
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<tbody>
<tr>
<td>12/10/2012</td>
<td>FRCC-RE-OP-002 r0</td>
<td>Document creation into new template.</td>
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8.0 FRCC Disclaimer
This supporting document may explain or facilitate implementation of one or more NERC Reliability Standard requirements but does not contain any explicit mandatory requirements subject to compliance enforcement. The requirements and procedures described herein are not intended to be fully inclusive of all activities that may support compliance to a specific NERC Reliability Standard referenced or implied within the procedure.

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Attachment A:

The following is a listing of the detailed entry to be provided in spreadsheet form found on the FRCC website: Misoperations Reporting

**Misoperation ID**: Please enter a company unique identifier ( alphanumeric including underscore) for each unique Misoperation. If you are resubmitting a Misoperation from a prior quarter, please use the same Misoperation id as the Misoperation from the prior quarter.

**Regional Entity**: Select Regional Entity from drop-down list

**NERC ID**: Enter NERC ID (Format: NCR#####). If your company does not have a NERC ID, please enter the company name.

**Misoperation Date**: Enter the date of the Misoperation in this MM/DD/YYYY/ format. When copying, use "Paste_Values" to retain format. If no Misoperations occurred during the previous quarter, enter NONE.

**Misoperation Time**: Enter the time of the Misoperation in (24 hr.) HH:MM:SS format

**Time zone**: Select time zone from drop-down list. Detailed Definitions are available under the next sheet "Definitions".

**Facility Name (Location of Misoperation)**: Identify the name of the facility (i.e., substation or generating station) where the Misoperation occurred.

**Equipment Name (protected by Protection System that misoperated)**: Identify by name the generator, transmission line, transformer, bus or equipment protected by the Protection System that misoperated.

**Equipment Type**: Select type of equipment being protected (e.g., Line, Transformer, etc.) from drop-down list

**Facility Voltage**: Select system voltage (in kV) of the protected element (if transformer, high side kV) from drop-down list.

**Equipment Removed from Service (Permanently or Temporarily) as the result of the Misoperation**: Enter names of the equipment becoming unavailable due to the Misoperation (Equipment only refers to circuits, transformers, busses, but not breakers UNLESS the breaker is the only element).

**Event Description**: Provide a brief description of the event and detailed description of Misoperation root causes (see cause code in Column P).

**Misoperation Category**: Select Misoperation Category from drop-down list. Detailed definitions of the categories are available under the next sheet "Definitions".

**Cause(s) of Misoperation**: Select root cause(s) of the Misoperation from drop-down list. Detailed definitions of the root causes are available under the next sheet "Definitions".

**Protection Systems/Components that Misoperated**: Only provide information on the components/Protection Systems that misoperated. If the "Cause of Misoperation" is "Relay failures/ malfunctions" or "Incorrect settings/logic/design errors" and the cause is associated with a relay, list relay models (types) and protection schemes.

**Relay Technology**: Select Electromechanical, Solid State, or Micro Processor from drop-down list if the "Cause of Misoperation" is "Relay failures/malfunctions" or "Incorrect settings/logic/design errors" and the cause is associated with a relay.

**Is this a TADS reportable outage?**: Select Yes or No from drop-down list.

**Corresponding TADS Cause Code**: For reference, this field is automatically populated to show corresponding TADS cause code(s). No entry is needed.
Enter one or more TADS "Event IDs" if this is a TADS reportable outage?: Create a TADS Event ID using TADS Form 5 (Typically, a TADS Event does not last for more than 5-10 minutes. If a Misoperation lasts for 30 minutes or more, there will likely be more than one TADS Event ID to be entered in this column. The TADS Form 5 "Event IDs" can be entered by the TO (or his delegated reporting entity; i.e. TOP or relay technician) at any time of the day or night. TADS is always running...for those Users who wish to do partial data entry on the same day as the Event)

If the Misoperation caused a generator forced outage, select the generator?: If the Misoperation involved a generator forced outage, please select the generator from the list. If the generator is not listed, please enter the GADS ID of the generator.

If there are multiple generators involved, please select the first generator that had a forced outage.

Analysis and Corrective Action Status: Select the status from drop-down list. In general, Misoperation analysis is conducted first, then a Corrective Action Plan will be developed and implemented to mitigate the Misoperation.

Corrective Action Plan: Identify the corrective actions

Target Completion Date: If corrective actions are not complete, estimate when they will be complete. Enter date in this MM/DD/YYYY format. When copying, use "Paste Values" to retain format.

Actual Completion Date: If corrective actions are complete, enter actual completion date in this MM/DD/YYYY format. When copying, use "Paste Values" to retain format.

Reported By: Enter the name of the person filling out the report.

Phone: Enter the reporting person's phone number.

E-Mail: Enter the reporting E-MAIL address.

Date Reported: Enter the report date in this MM/DD/YYYY format. When copying, use "Paste Values" to retain format.