**Pinotage Interlocking Rules**

1. **Introduction**

This document showcases the interlocking rules that applied are on the Eskom Pinotage substation. These rules can be applied to all other substations with the similar single-line diagram configuration as the Pinotage substation.

External conditions - refers to all the devices that do not belong to same bay as the device interlocked.

Internal conditions – refers to all the devices that belong to the same bay as the device interlocked.

**2. Interlocking Rules**

2.1. **400kV Diameters: Bay with connection to 400kV Bus-bar** (GA1, GA2, GB1, GB2, GCT)

* + 1. Breaker: Close

1. For external conditions, the terminals of the bay on the nodes should not be connected to earth. For the devices on the bay, the side ES breakers must be open and the isolators must be closed.
2. The isolators on both side of the breaker in question must be open.
   * 1. Isolator: Open and Close
3. For external conditions, the node ES breaker on the Bus-bar should be disconnected from earth. For the devices on the bay, the side ES breakers must be disconnected from earth. The breaker should be open and the remaining isolator should be open.
4. For external conditions, the terminals of the bay on the nodes should not be connected to earth. On the internal conditions, the side ES breakers must be open and the breaker must open.
   1. **400kV Diameters: Bay linking other two bays with connection to 400kV Bus-bar** (GAT, GBT)
      1. Breaker: Closing
5. No external conditions. The isolators on the bay should be closed. Both terminals of the bay line must not have earth connection.
6. The isolators on both side of the breaker in question must be open.
   * 1. Isolator: Open and Close
7. No external conditions. The breaker must be open, the other isolator on the bay must be open, the side ES breakers must be open and the bay terminal before the isolator interlocked should be disconnected from the earth.
8. No external conditions. The breaker must be open, the side ES breakers must be open and both terminals of the bay line must not have earth connection.
   1. **400kV Feeders:** 
      1. Isolator: Open and Close
9. For external conditions, the node of the bay the feeder is feeding from must not be connected to earth. The breakers of the two bays (on 400kV diameter) that share the same node with the feeder must be opened. For the internal condition, the feeder ES breaker must be open.
10. For external conditions, the node of the bay the feeder is feeding from must not be connected to earth. The breaker of the bay between the feeder and the 400kV bus-bar must be open and the isolator of the bay linking other two bays (GAT, GBT) with connection to the node the feeder is connected should be open. For internal conditions, the feeder ES breaker must be open.
11. For external conditions, the node of the bay the feeder is feeding from must not be connected to earth. The isolator with connection to the node the feeder is connected belonging to the bay between the feeder line and 400kV bus-bar must be open. The breaker of the bay linking other two bays (GAT, GBT) should be open. For internal conditions, the feeder ES breaker must be open. For the external conditions, the feeder ES breaker must be open.
12. For external conditions, the node of the bay the feeder is feeding from must not be connected to earth. The isolator with connection to the node the feeder is connected belonging to the bay between the feeder line and 400kV bus-bar must be open. The isolator of the bay linking other two bays (GAT, GBT) with connection to the node the feeder is connected should be open. For internal conditions, the feeder ES breaker must be open
    1. **Transformer**
       1. HV Isolator: Open and Close
13. For external conditions, the terminal of the bay linking the two other bays (400kV diameter) the transformer is connected to must not be connected to the earth and the breaker of that bay must be open. The breaker of the bay (on 400kV diameter – GA1) between the transformer line and the 400kV bus-bar should be open. The ES breaker on the 132kV bus-bar (BB1) should not be connected to earth. For internal conditions the 132kV transformer and bus-bar (BB2) isolator should be open, and the transformer must be connected to earth.
    * 1. MV breaker: Close