

CASE STUDY : Protection Co-ordination Study

CLIENT NAME : A Multinational company who is the project supplier

END CUSTOMER : Water Treatment Plant

PROJECT TITLE : Protection Co-ordination Study for a Water Treatment Plant

INTRODUCTION

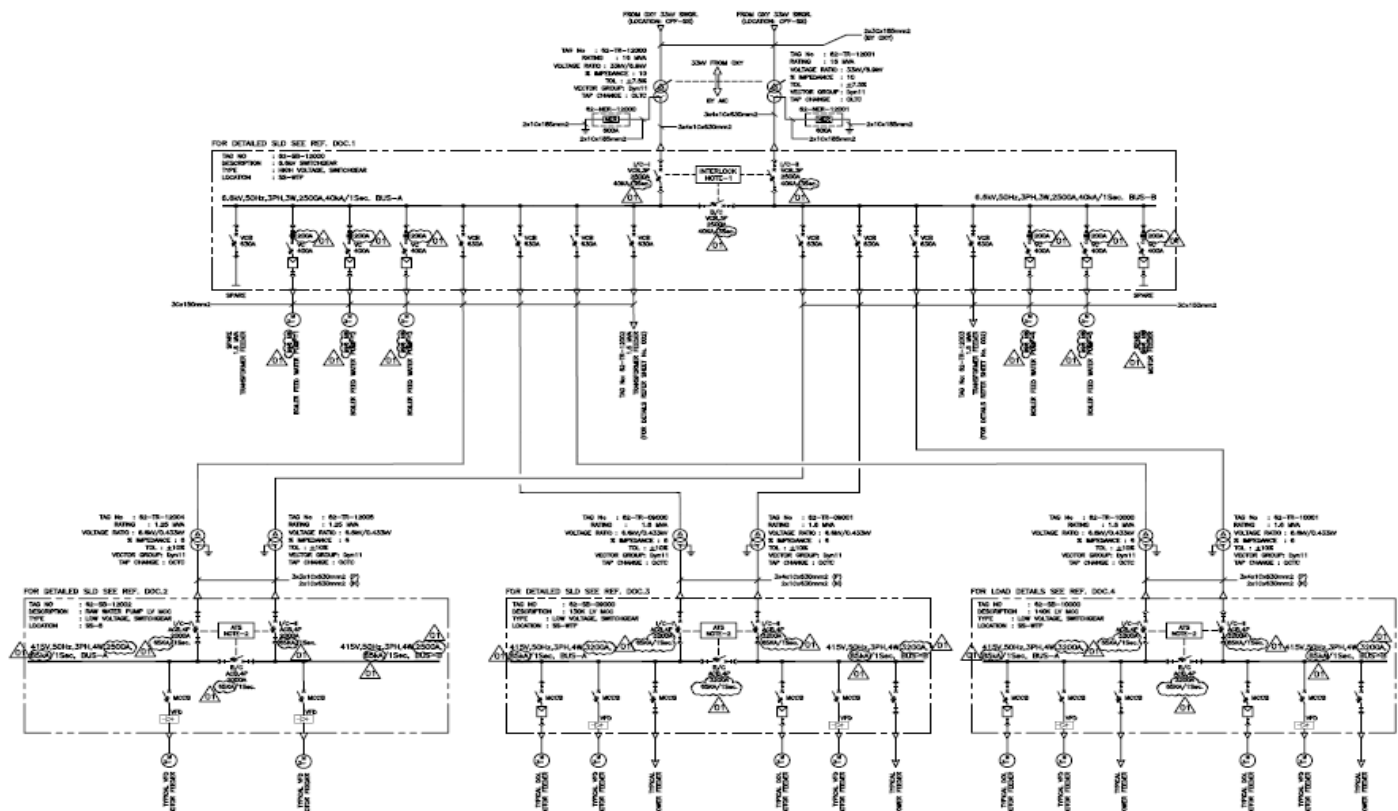
The primary function of protective devices in a power system is to detect short circuits and isolate the fault by activating the appropriate circuit interrupting devices, which increases the reliability and safety of the electrical system. The relay co-ordination study is required to properly select the protective devices and necessary settings so that circuit interrupter closest to the fault opens before other devices.

SCOPE OF WORK

Perform protective device co-ordination analysis for HV panels including 2 Nos HV incomer panel, 2 Nos 16 MVA, 33 kV/6.9 kV power transformer, 1 No bus coupler, 8 Nos +1 spare distribution transformers (including LV side breaker of the transformers), 5 +1 spare motor feeders etc and provide results and recommendations as required by the specification and client.

NETWORK DETAILS

Network was represented from 33 kV to last relay location at LV side. The Single Line Diagram is shown in the following figure.



- The incomer transformer panel is equipped with a SEPAM 80 Series relay for integrated transformer protections as follows,
 - ◆ 46- Unbalanced load protection relay
 - ◆ 50-Instantaneous Over Current Relay
 - ◆ 50N-Instantaneous Earth Fault Relay
 - ◆ 51- Time Delayed Over Current Relay
 - ◆ 51N-Time Delayed Earth Fault Relay
 - ◆ 64REF-Restricted Earth Fault Relay
 - ◆ 87T Transformer Differential Protection Relay

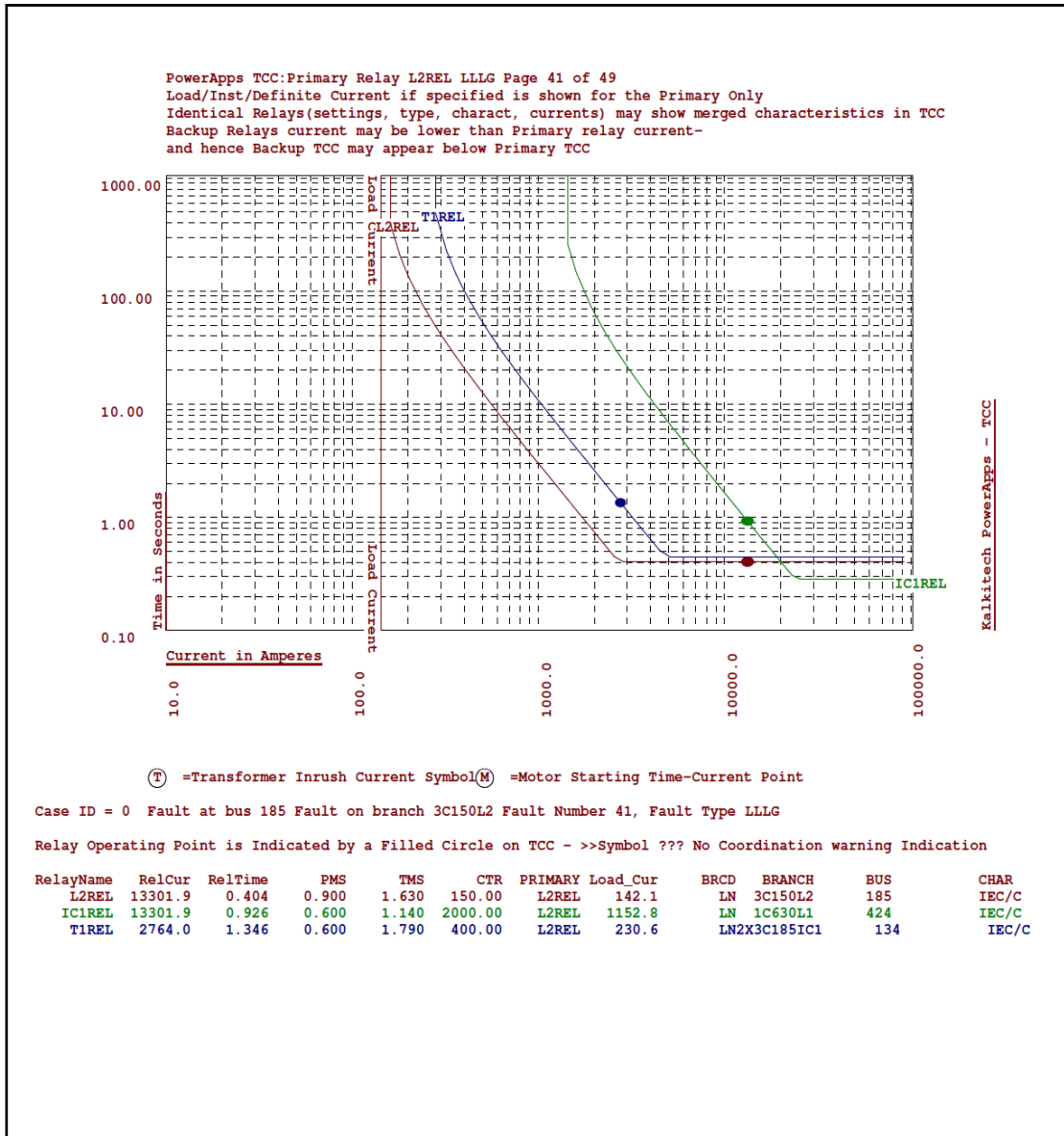
- The 6.6kV Motor feeders are equipped with a SEPAM 80 Series relay for integrated motor protections as follows
 - ◆ 12- Over Speed Relay
 - ◆ 14- Under Speed Relay
 - ◆ 27- Under Voltage Relay
 - ◆ 27D Positive Sequence Under Voltage Relay
 - ◆ 38-Temperature Monitoring
 - ◆ 46-Negative Sequence Unbalanced Load Protection Relay
 - ◆ 48-Excessive start Relay
 - ◆ 49RMS-Thermal Over Load Relay
 - ◆ 50-Instantaneous Over Current Relay
 - ◆ 50N-Instantaneous Earth Fault Relay
 - ◆ 51- Time Delayed Over Current Relay
 - ◆ 51N-Time Delayed Earth Fault Relay
 - ◆ 51LR-Locked Rotor Relay
 - ◆ 66-Number of Starts per hour

- The outgoing Feeders are equipped with a SEPAM 80 Series relay for over current phase and earth fault protections.
- The LV incomer panels are equipped with a SEPAM 80 Series relay for over current phase and earth fault protections.

SOFTWARE DETAILS

KALKITECH PowerApps was used for the Over current and Earth Fault relay Co-ordination studies.

A Sample Time Current Characteristics Curve of Relay Co-ordination Study



REFERENCES

1. www.kalkitech.com/offerings/solutions-powerapps
2. http://www.powerapps.org/PAES_PSSystemStudies.aspx