Ring Main System Coordination

Purpose and Description:

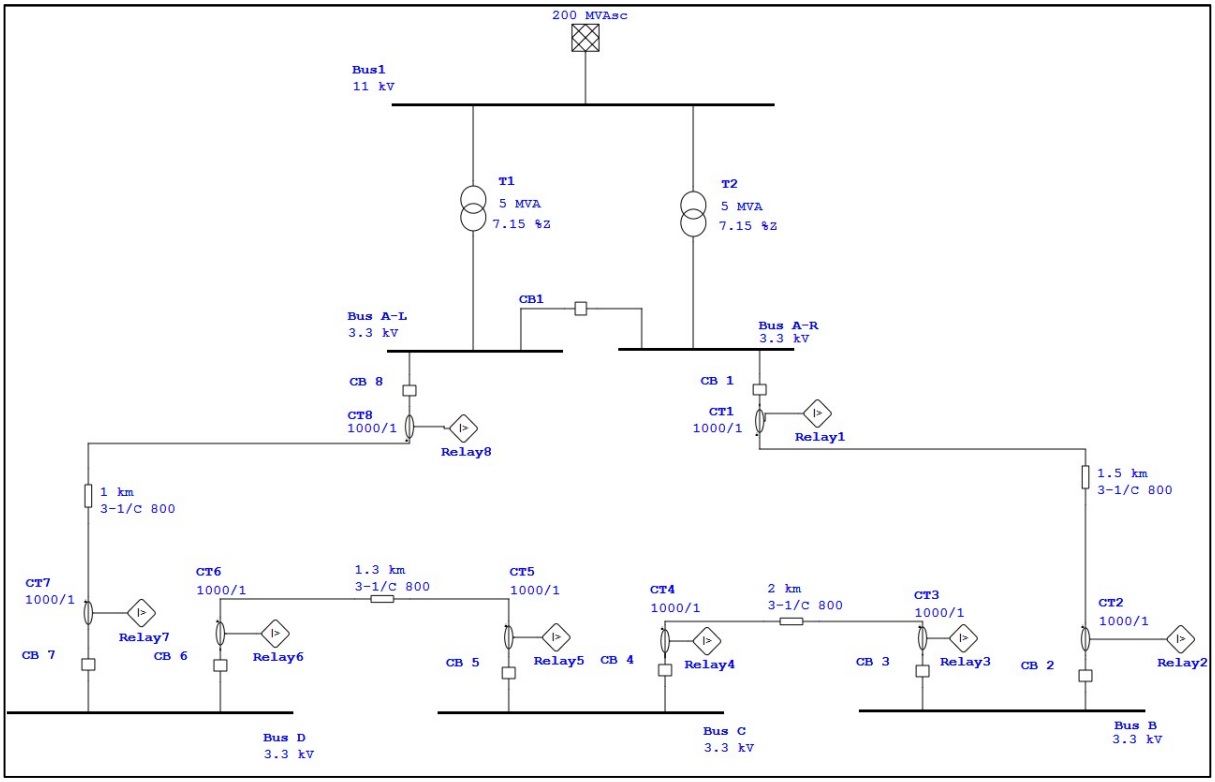
The ring main arrangement is popular within distribution network as it maintain supplies to consumers in case of fault conditions occurring on interconnecting feeders. However, in such an arrangement there is possibility for current to flow in either direction through various relay locations. Therefore, directional overcurrent relays are used for protection in ring main system.

This exercise shows the arrangement of directional overcurrent relays in ring main network looking towards the incoming feeders. The sequence of operation also shows that for different fault locations, the correct relays operate in the proper order.

Procedure:

1) Open the ETAP File – Ring Main Coordination.OTI
Library Location – C: -> ETAP 1610 -> lib -> etaplib1610.lib

2) The system under consideration is as shown below,



3) Relays 1-6 that are used in the system is of the make and model Areva P139 having directional overcurrent feature.

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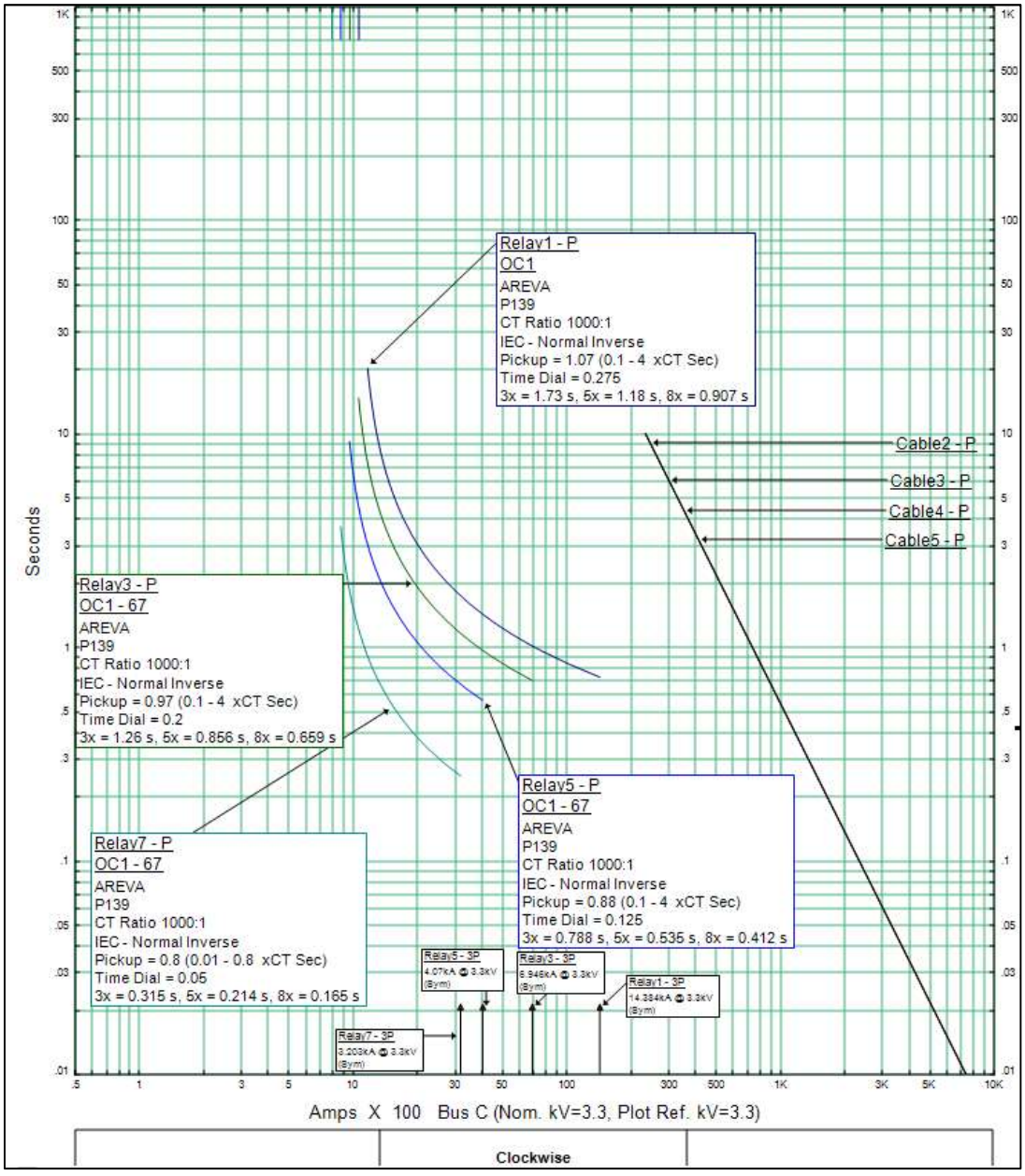
4) The below TCC shows the relays that have been coordinated for faults flowing in the clockwise direction,



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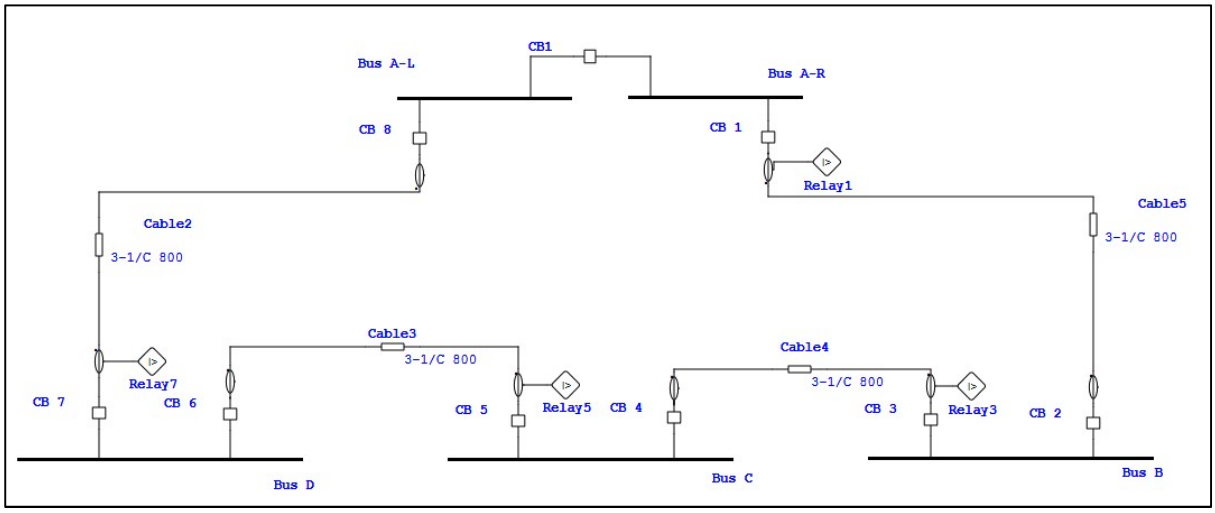
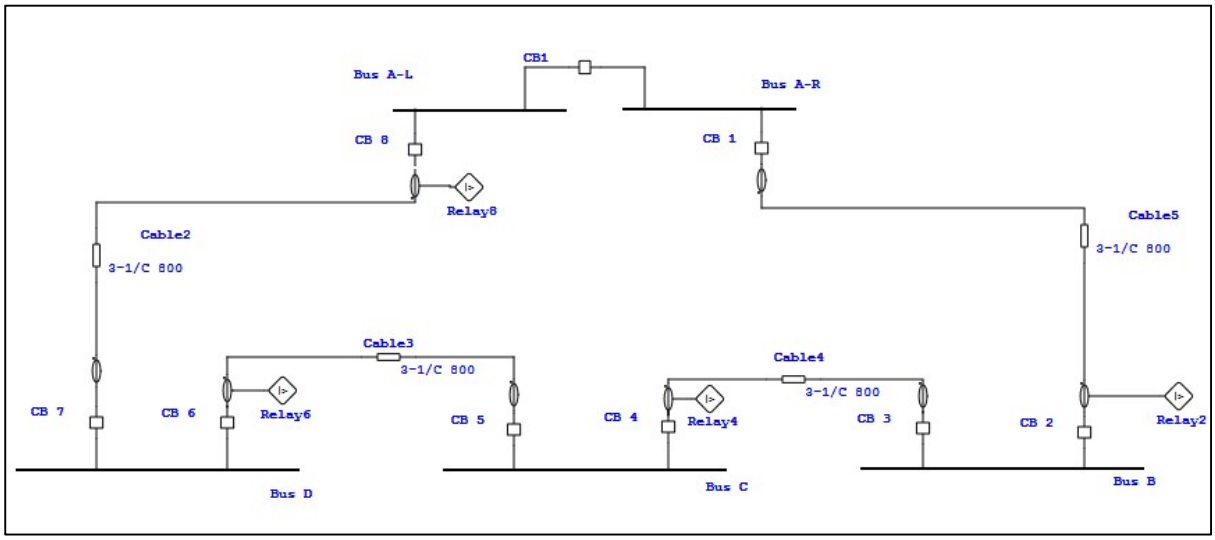


5) The below figures shows the relays that have been coordinated for faults flowing in the anti-clockwise direction,



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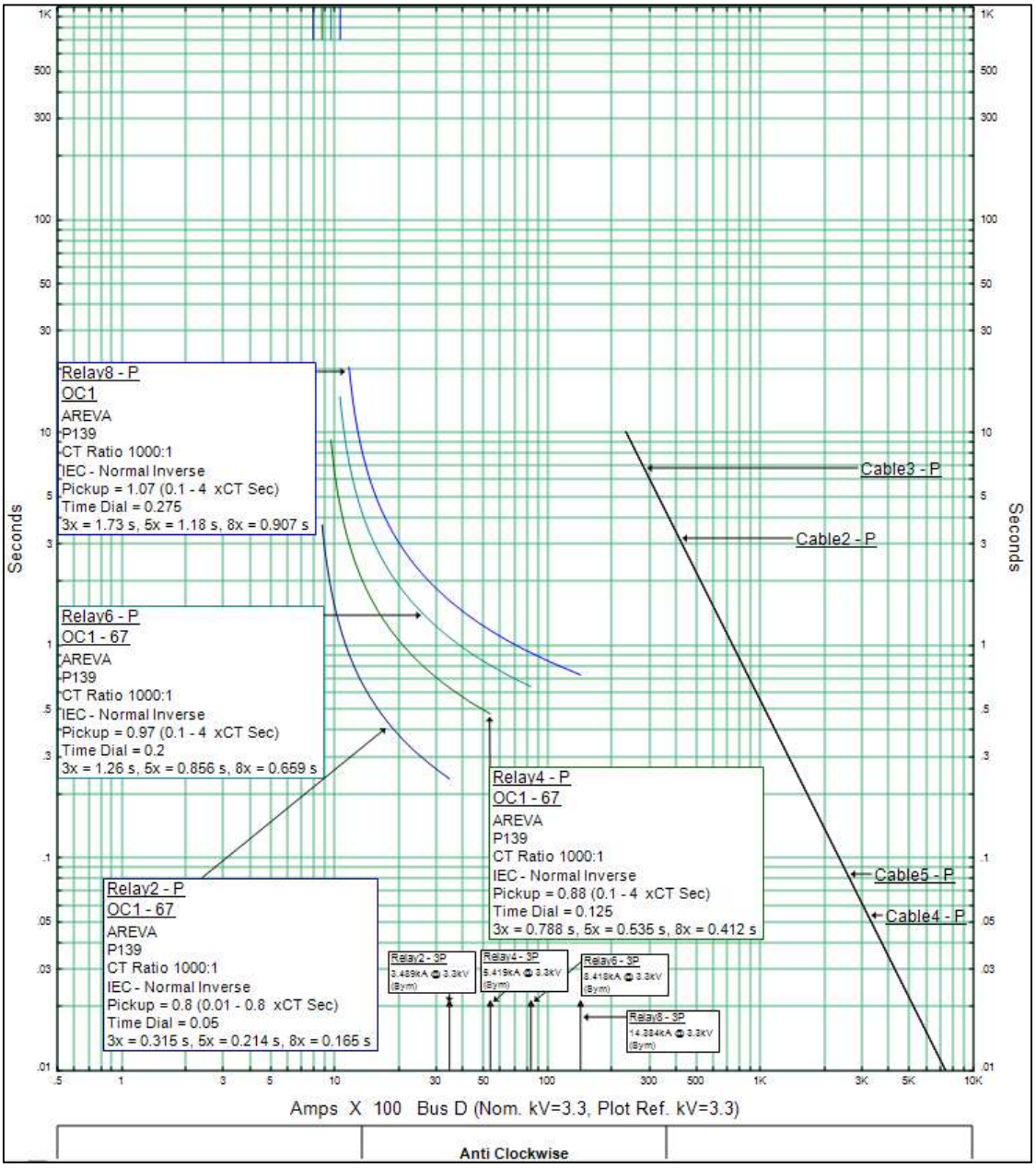

Note: The relays at the source end Relay-1 and Relay-8 can be made bi-directional

6) The normalized TCCs below shows the sequence of operation for each relays for fault in different locations under different outage scenarios,

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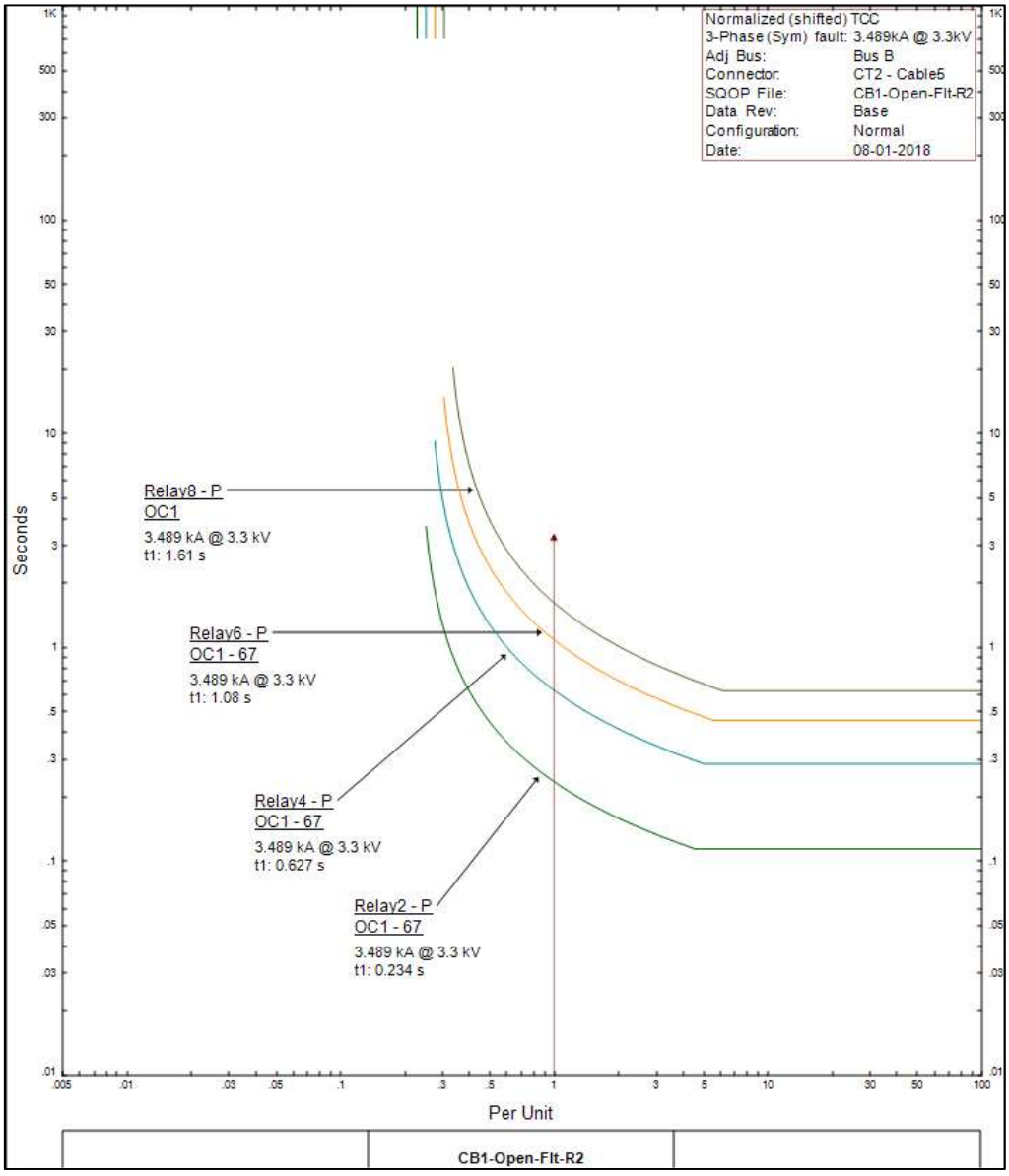

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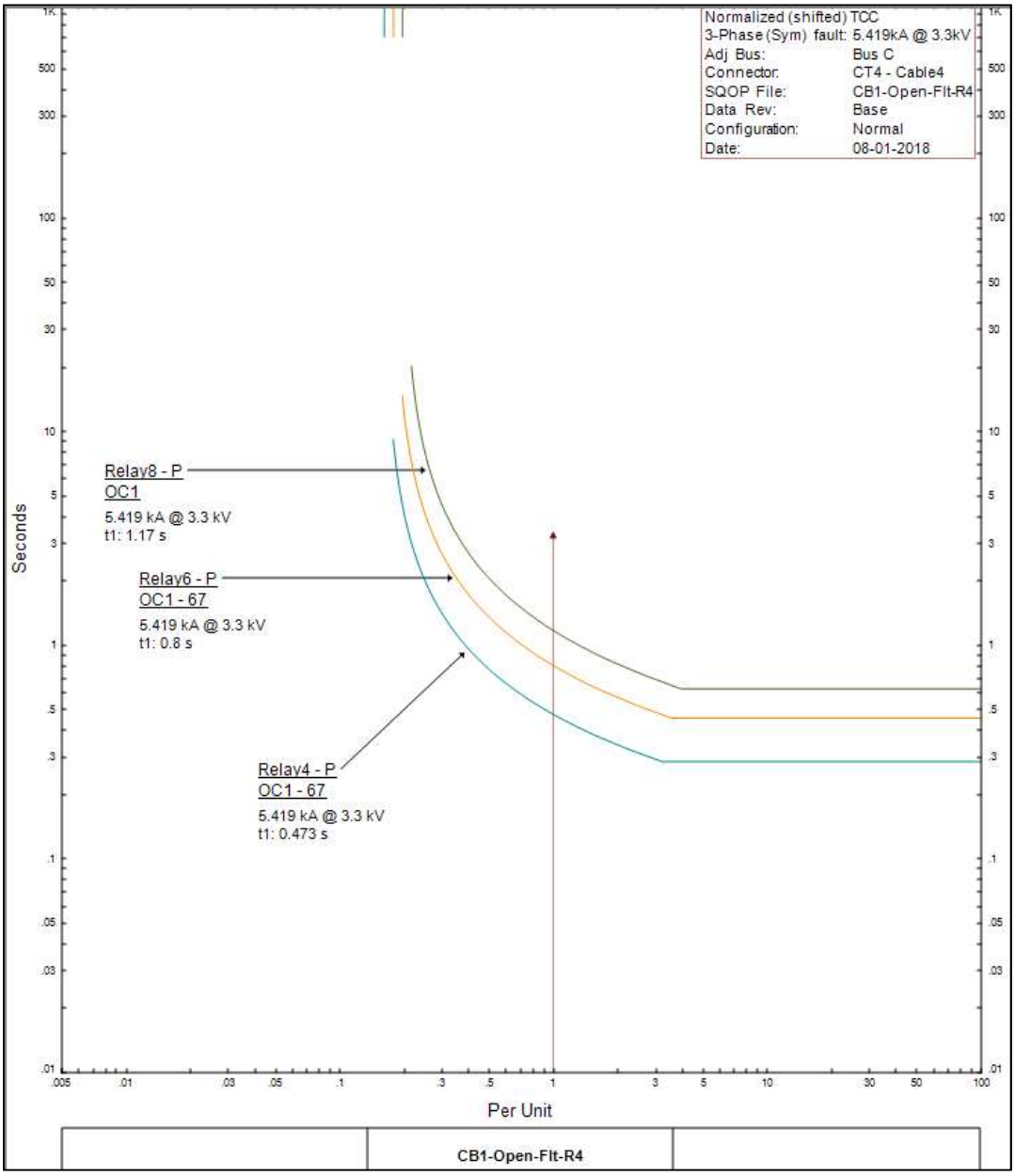

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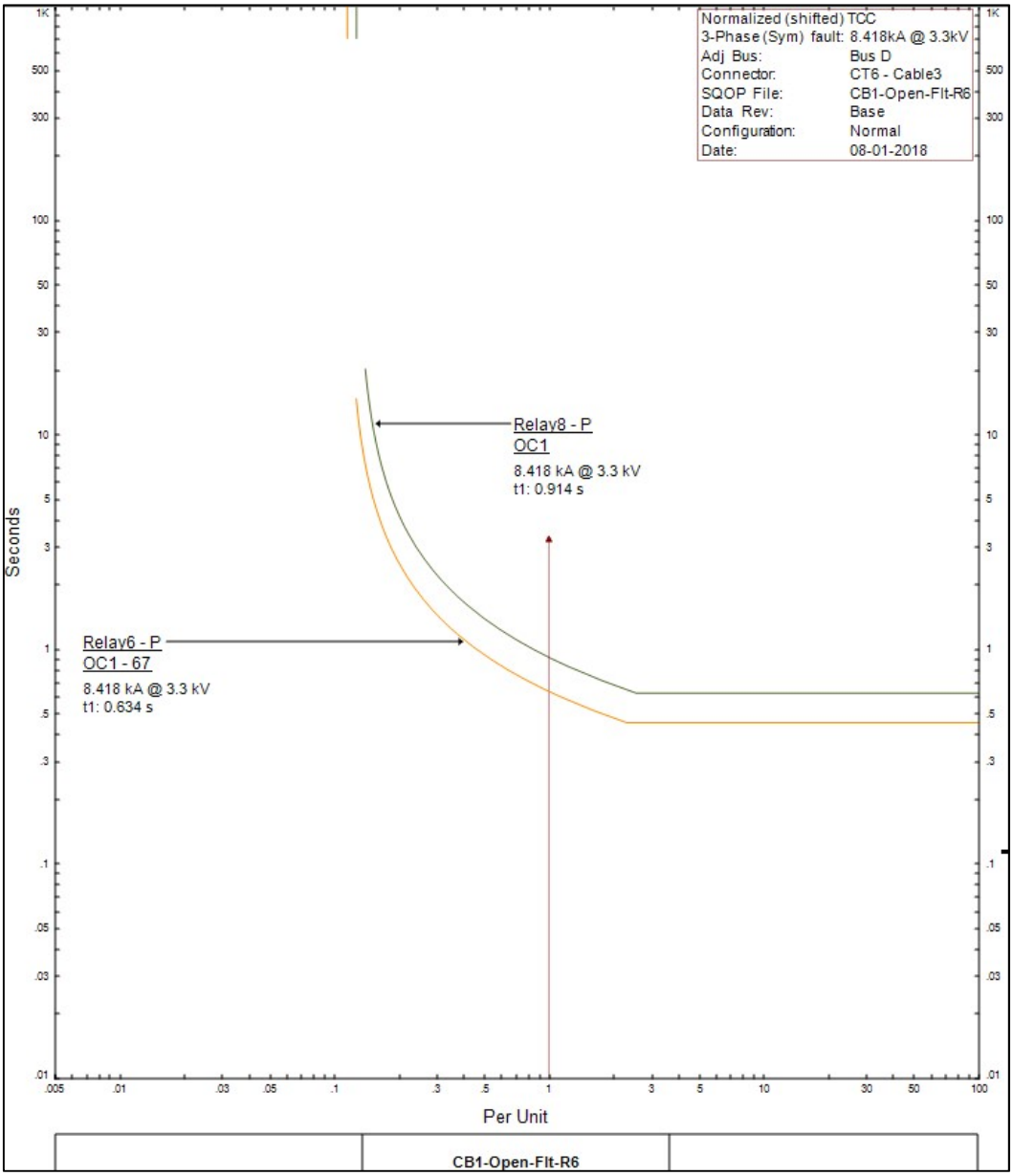
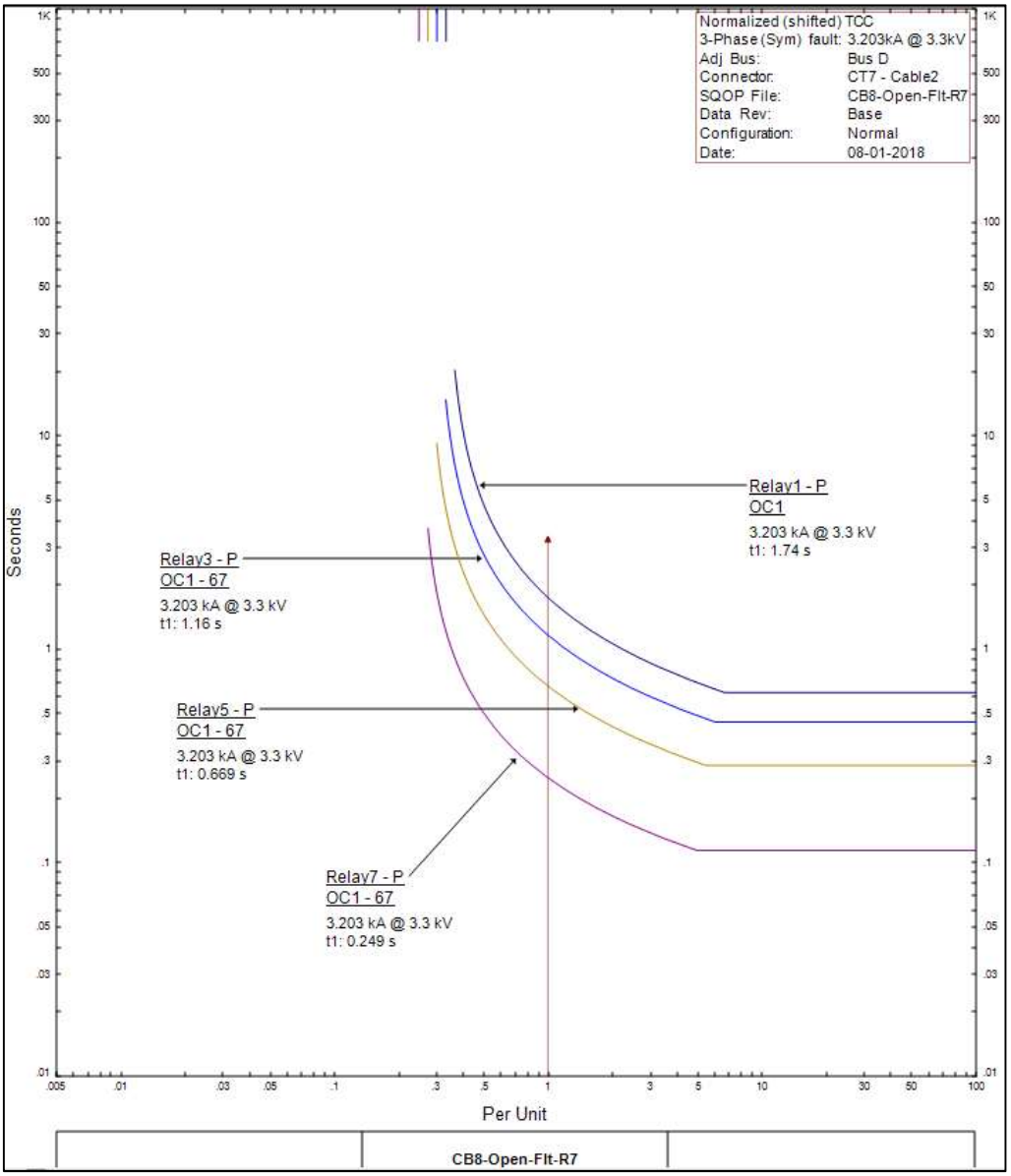


Ring Main System Coordination



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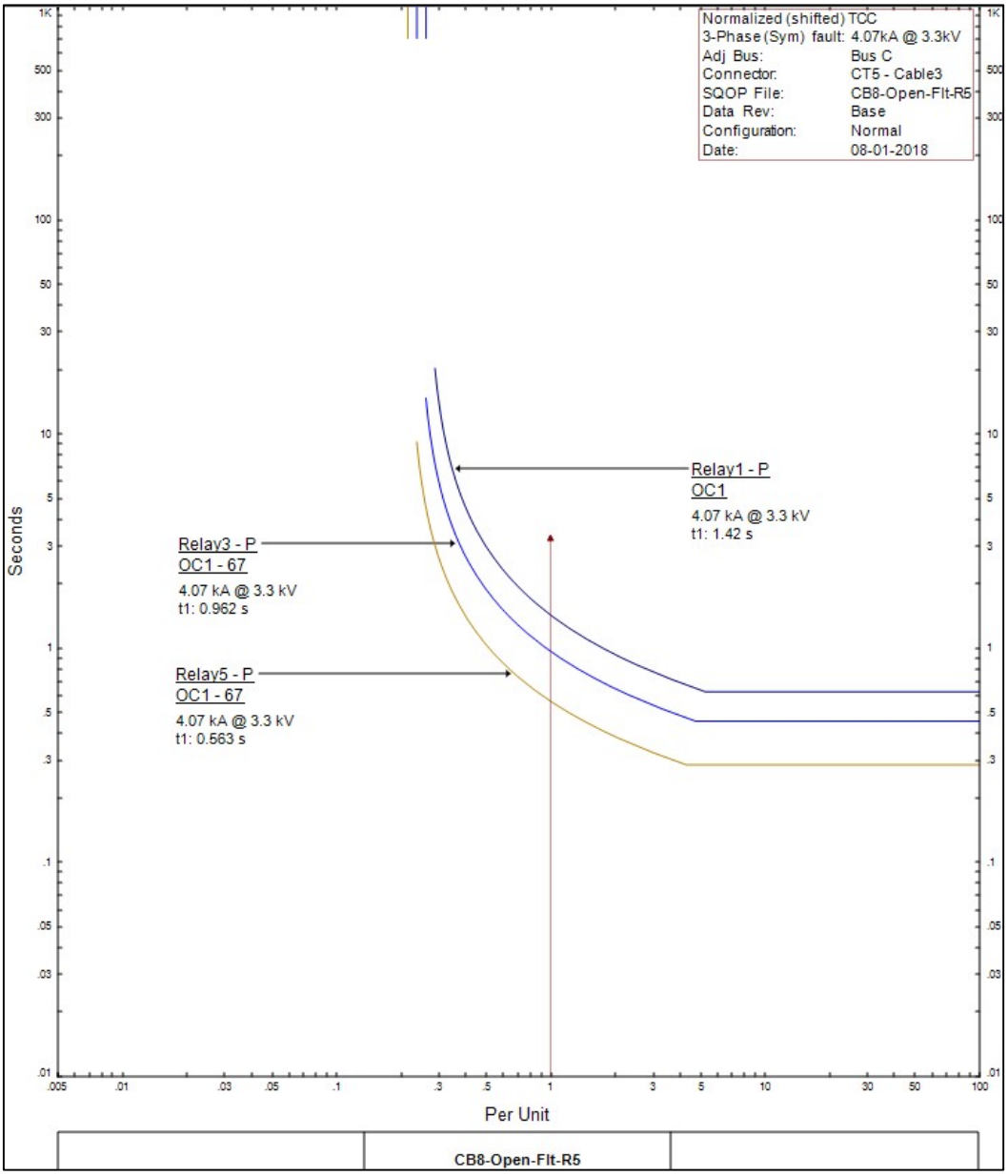

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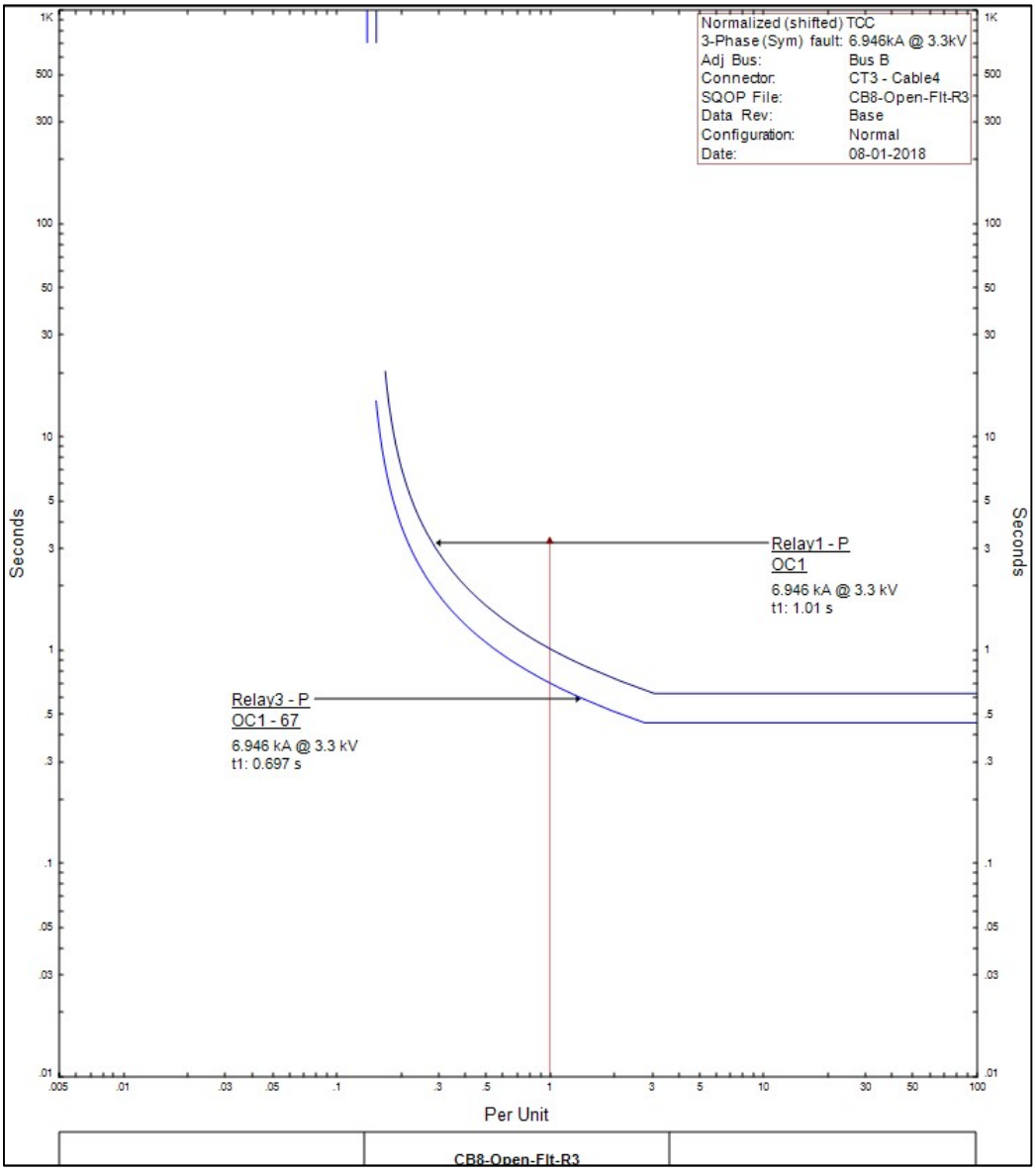

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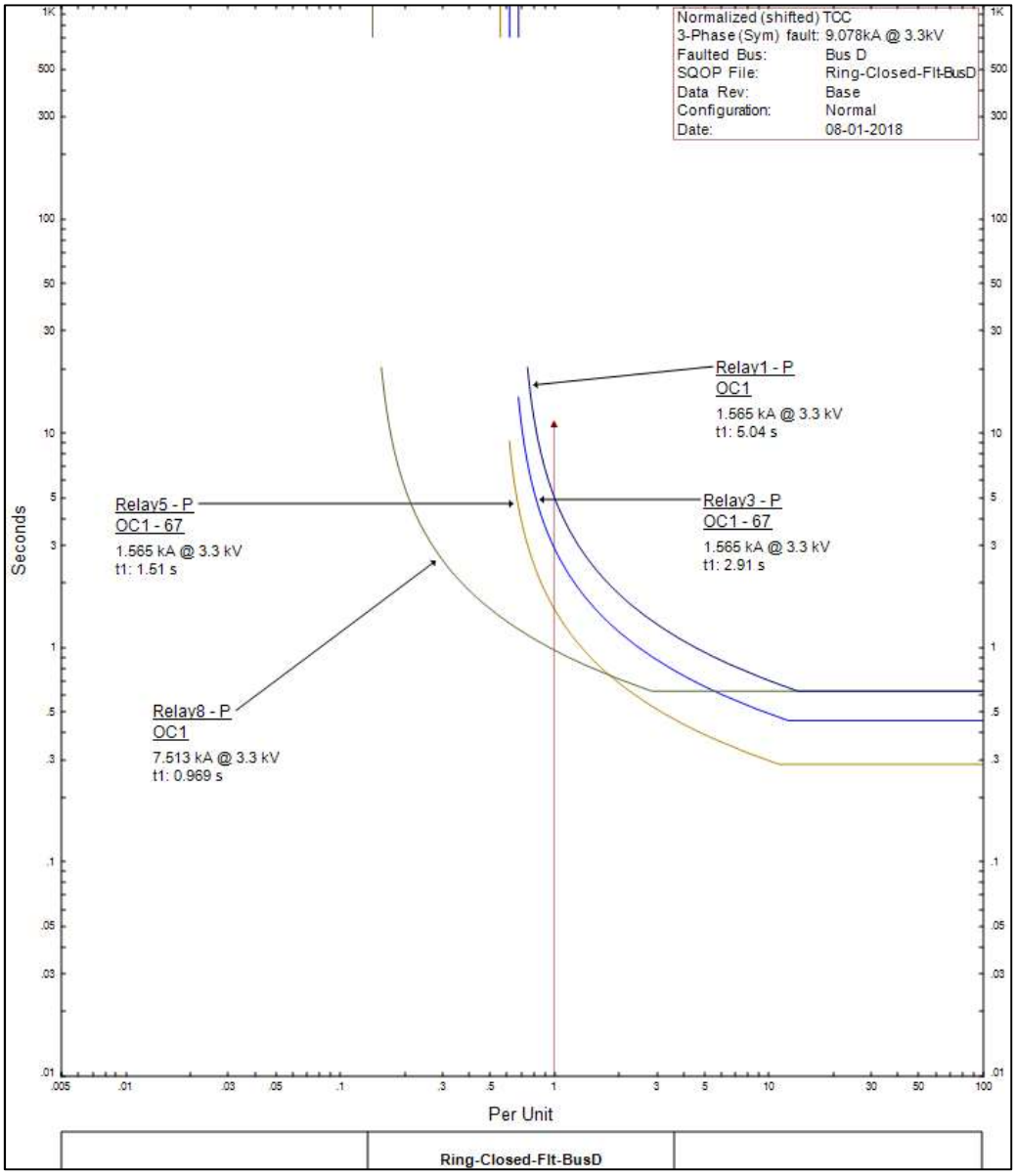

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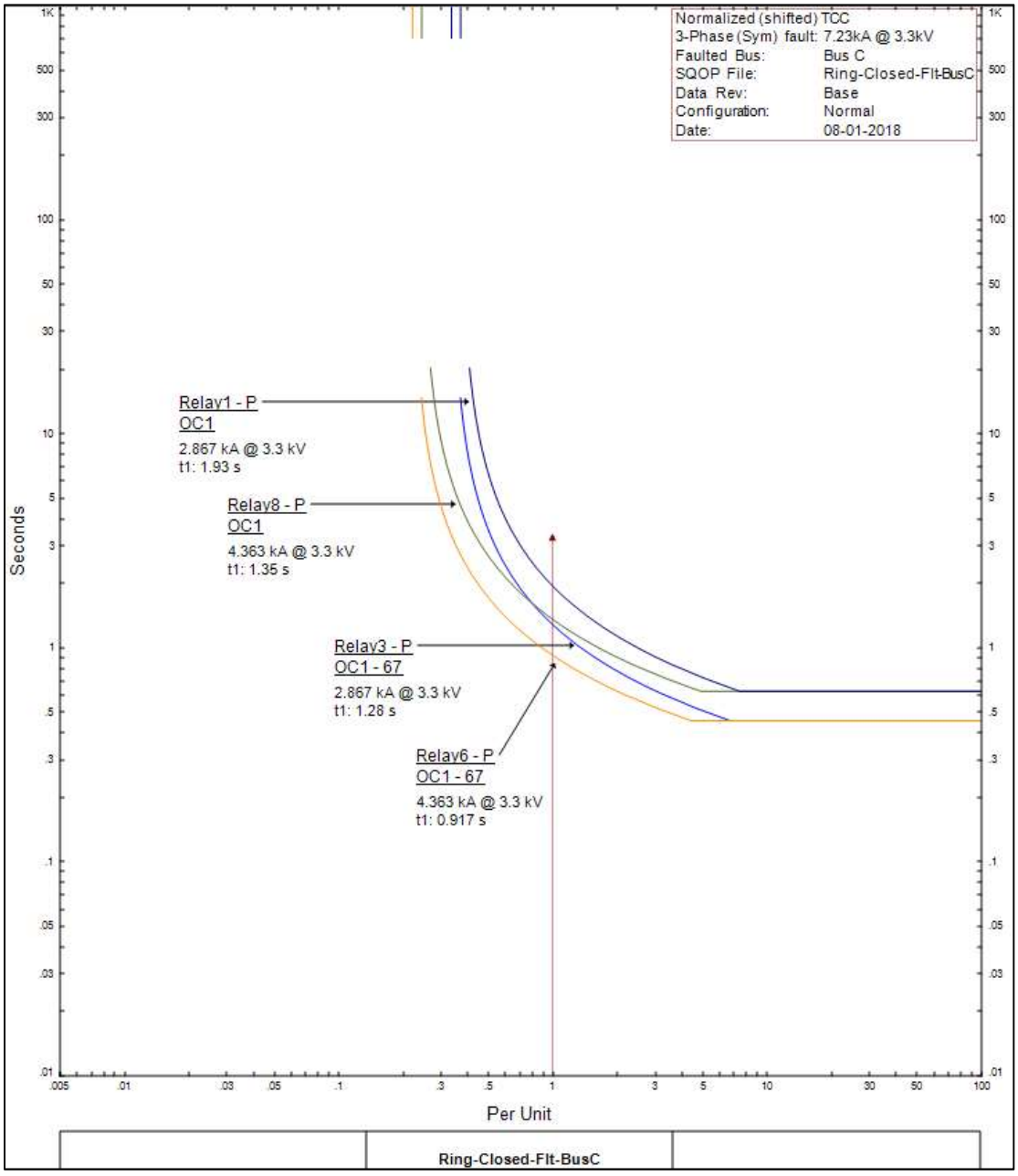

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