Mitigation method/Results/Conclusion

As the equipment is being damaged by lightning surges of 10s of amperes, a fast acting overcurrent protector is required. A possible solution is to install a recently developed semiconductor overcurrent protector (SOP) (see Appendix II of ITU-T K.30 for details of this type of device) between the electronics and the GDT. This will limit the current entering the power supply to approximately 200 mA and prevent the –70 V and –35 V rails from being driven more negative. There may be other solutions, but they would involve a change to the circuit design or development of a custom external protector. This is unnecessary as a suitable device is available to fix the problem.

Tests were performed on a working circuit in the test laboratory to check if the SOP device will protect the electronics. Figure 2.10-5 is a surge below the operating voltage of the GDT (–226 V at the GDT). The maximum voltage across the overcurrent protector is 158 V (226 V – 68 V). A negative surge pulls the b leg negatively until the diode connected to –70 V begins to conduct. As soon as the current through the SOP exceeds 200 mA, it operates and goes into a high resistance state. If the surge voltage is high enough, the GDT operates and protects the SOP.

Mitigation method/Results/Conclusion

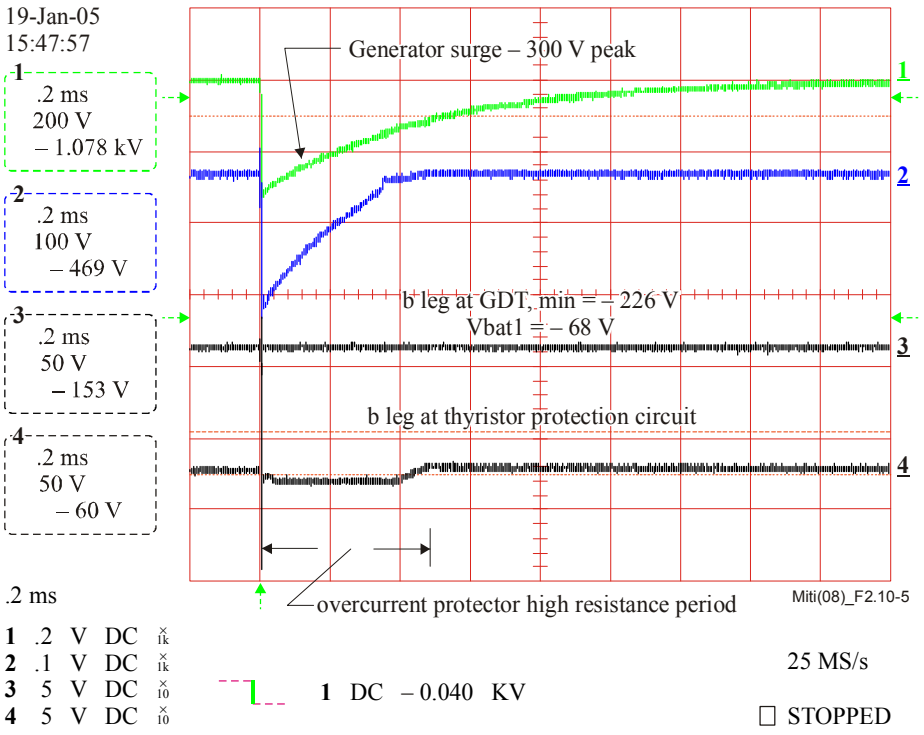

Figure 2.10-5 – Waveforms showing the semiconductor overcurrent protector blocking the surge