

Matafonua Beach Resort Findings

Nov 2015 .

All of Falaloa All house pole fuses blown when system switched on first time when turned on with 11 kV .

22 05 17.

I arrived on site and opened up the main 3 phase switch board. We noted obvious signs of a flashover between phases on the circuit breakers and main switch, which occurred back in November 2015. I was told that this happened on the day of the changeover from 6.6kV to 11 kV was done.

In the late evening, measured voltages and observed waveform .THD is around 3 % on all 3 phases.

Voltages were 241 243 246 to neutral. Neutral to true ground was 2.3 volts. This varied with load and was a reasonable variation.

Investigated sub board and manual generator transfer switch in kitchen. This was all good and functional. Neutral connections were good and tight.

23 05 17.

Connected three different instruments, Fluke scope meter, Fluke power Analyser and Fluke multimeter set to fast peak record at the 3 ph sub board in the kitchen.

Had power station operator open feeder two switch and captured voltage on all 3 phases on power analyser. No overshoot or ringing observed.

On switching back on, again no ringing or overshoot. Gen sets tripped after 10 seconds due to under excitation then restarted, feeder switched on again, no overshoots or ringing observed during these events.

From discussion with customer, the recent failures of household appliances happened during commissioning of the solar inverter, which at the time could not support the load. I was present during that part of commissioning and the inverter did not shut down and stay shutdown. It pulsed on and off and also this was observed with the inverter room lighting. The gen sets had already tripped off during this incident.

I the afternoon I visited the hospital as requested. There I was shown three washing machines and clothes dryer with blown control modules. Also the photo copier was damaged. This appeared to happen at the same time as the solar inverter commissioning.

Conclusions from Findings

No wiring issues found on both main and sub boards that could cause major voltage swings.

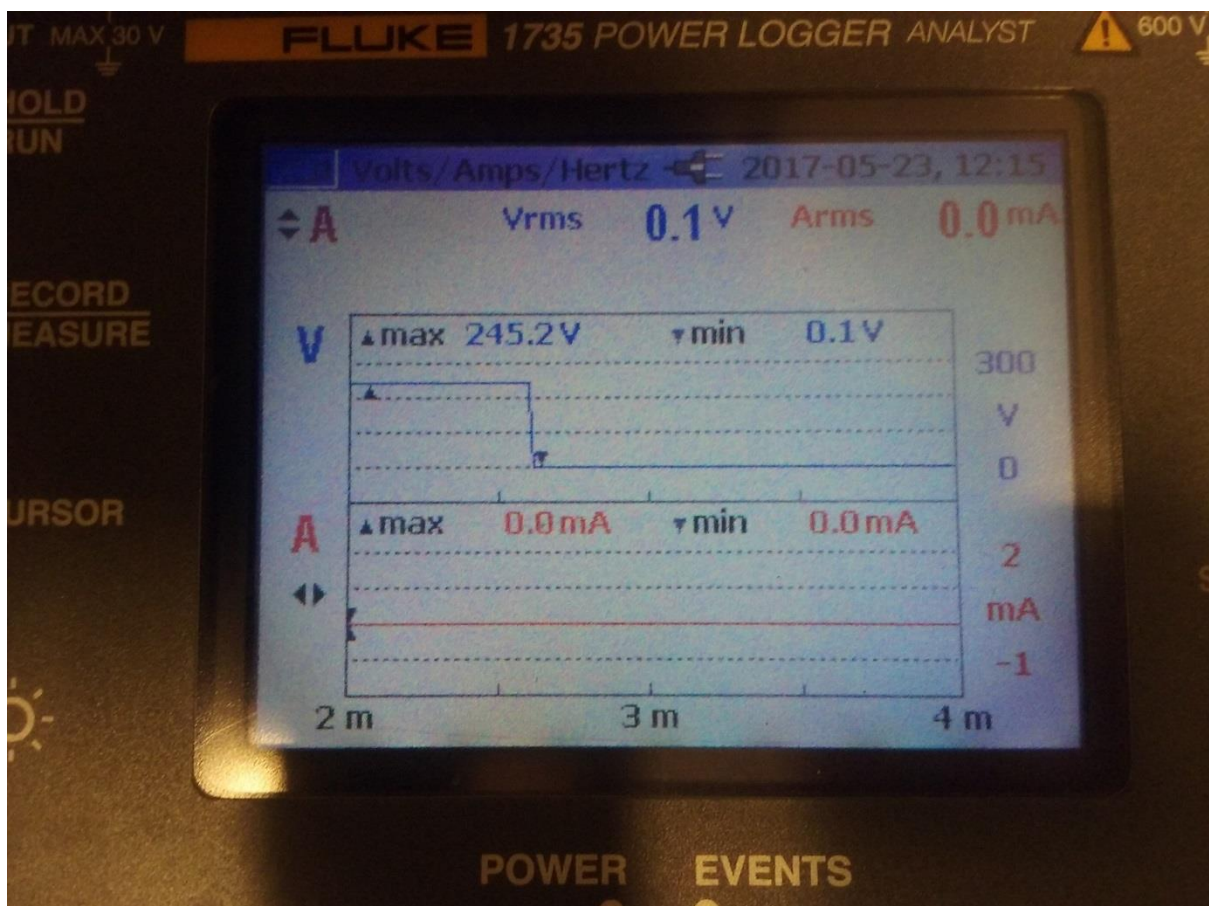
There is evidence of an arc occurring in the main switchboard. This must have been caused by a serious overvoltage event. See photos below.

It apparently happened on the day of change over from 6.6 kV to 11 kV. The transformer feeding the site is a selectable 6.6 / 11 kV type. Maybe when 11 kV was applied, the tap setting was still on 6.6 kV?

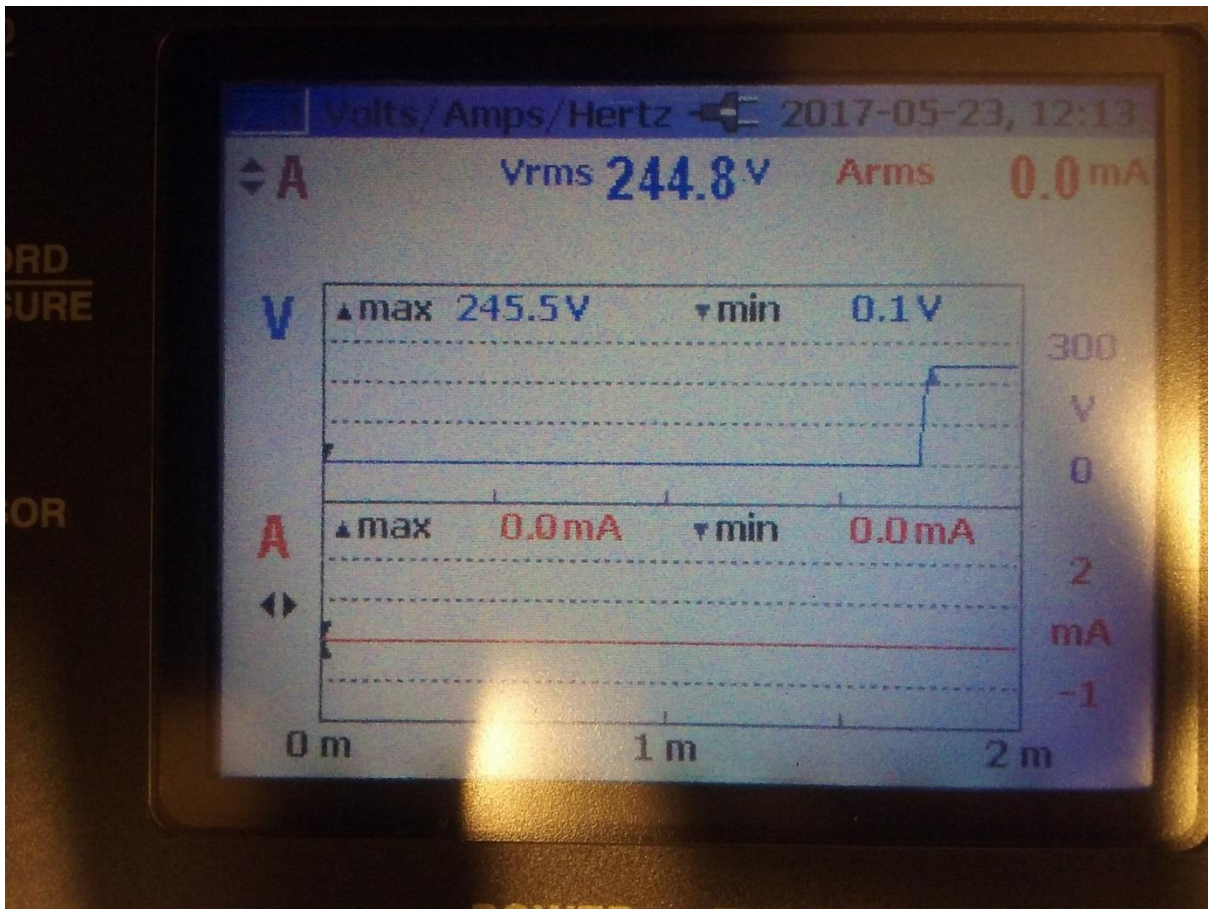
The most recent appliance failure appears to have happened during the Siemens solar inverter testing. Nothing in resort wiring or switchboard suggests a serious problem here in the resort.

As can be seen below there is no sign of voltage ringing or overshoot, even when gen sets trip off.

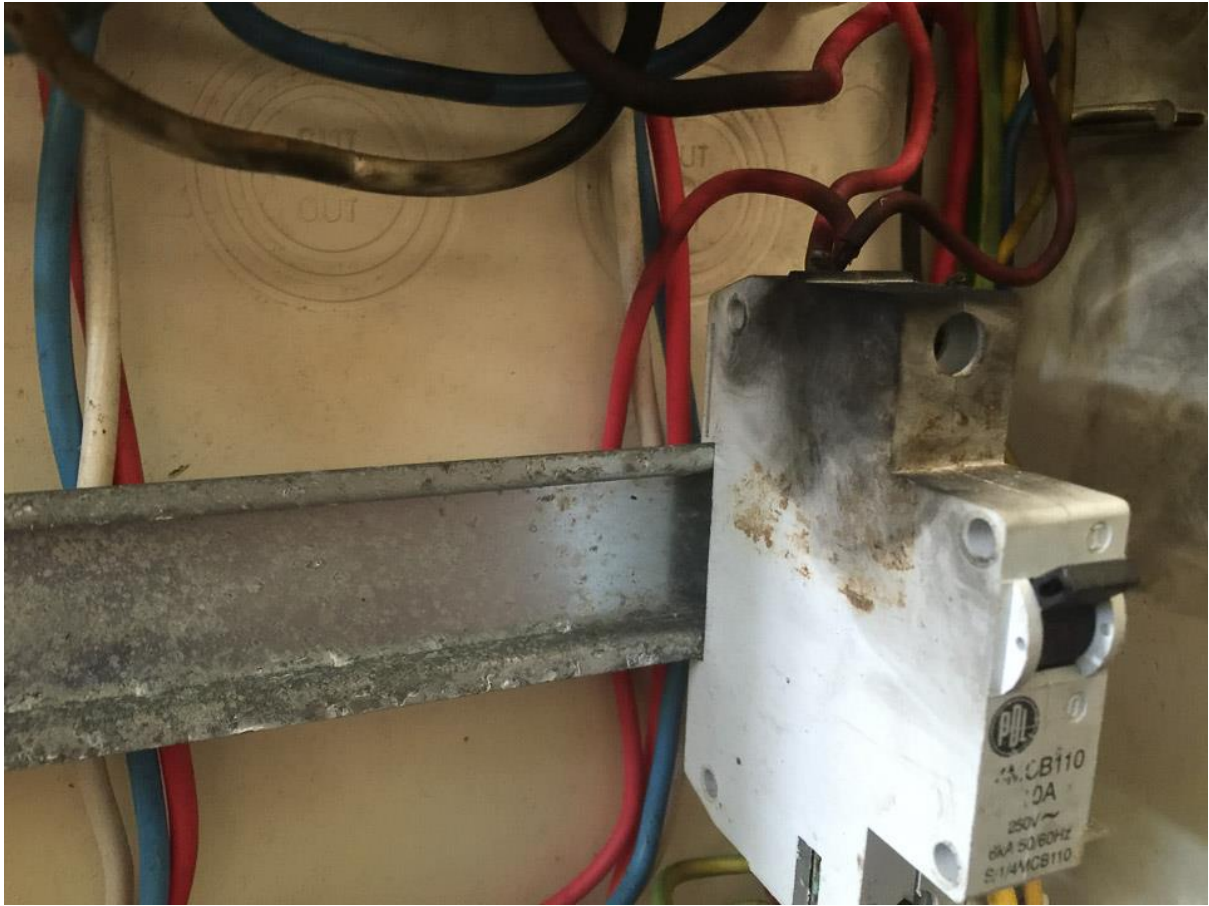
Here are some photos below of the voltage of one phase during feeder switching on and off. One shot is a complete trip off of the gen sets as they tripped on reclose of feeder. As can be seen, there is no sign of ringing or voltage overshoot.



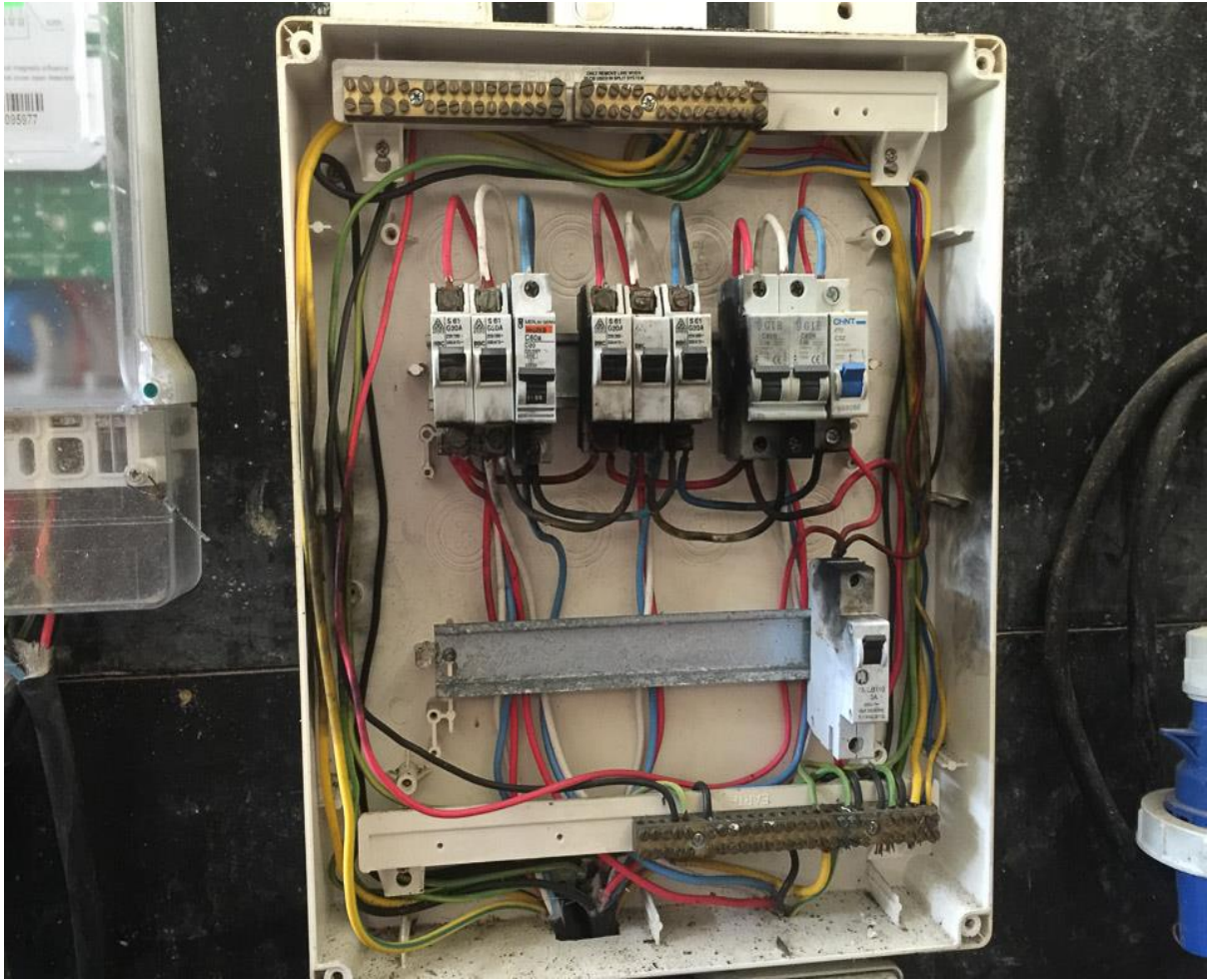
Feeder being turned off.



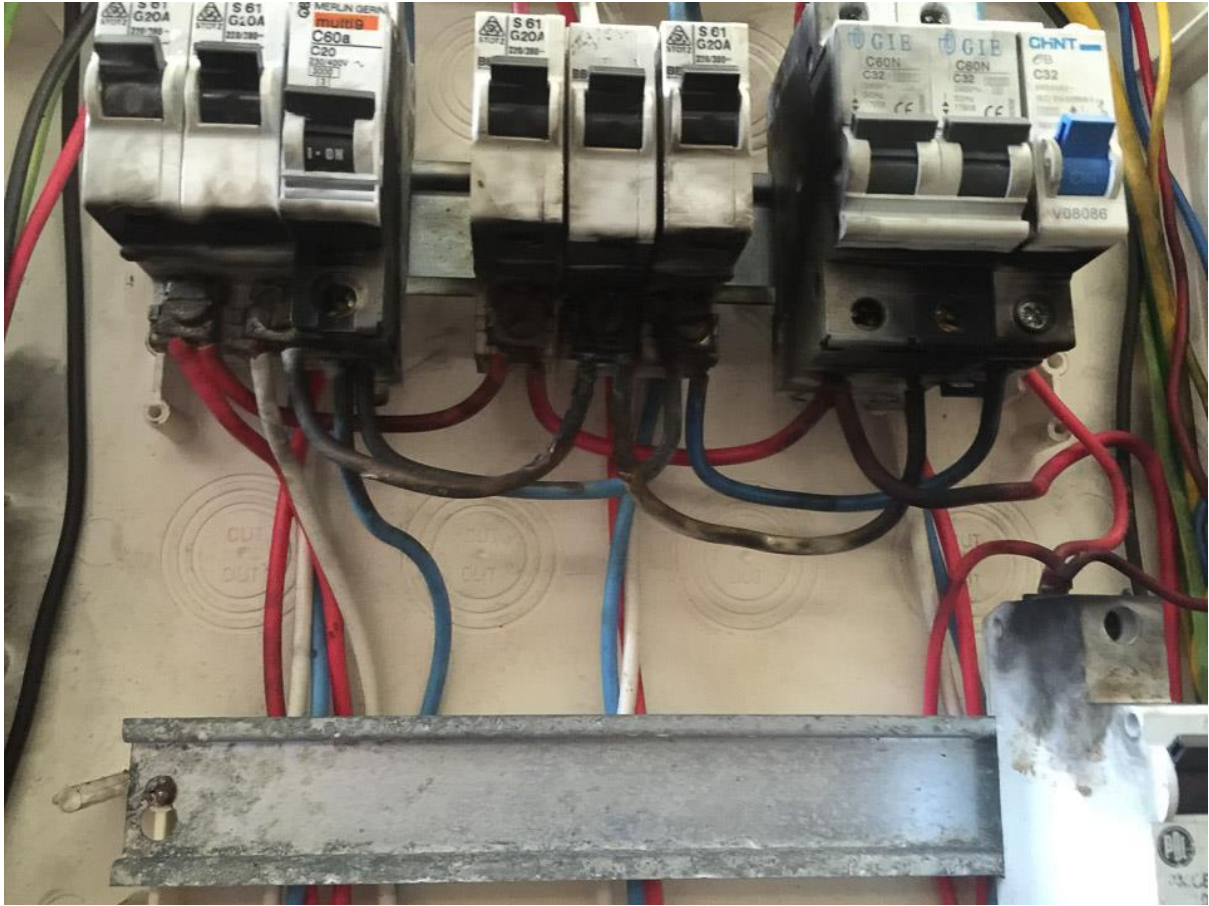
Feeder being turned on.



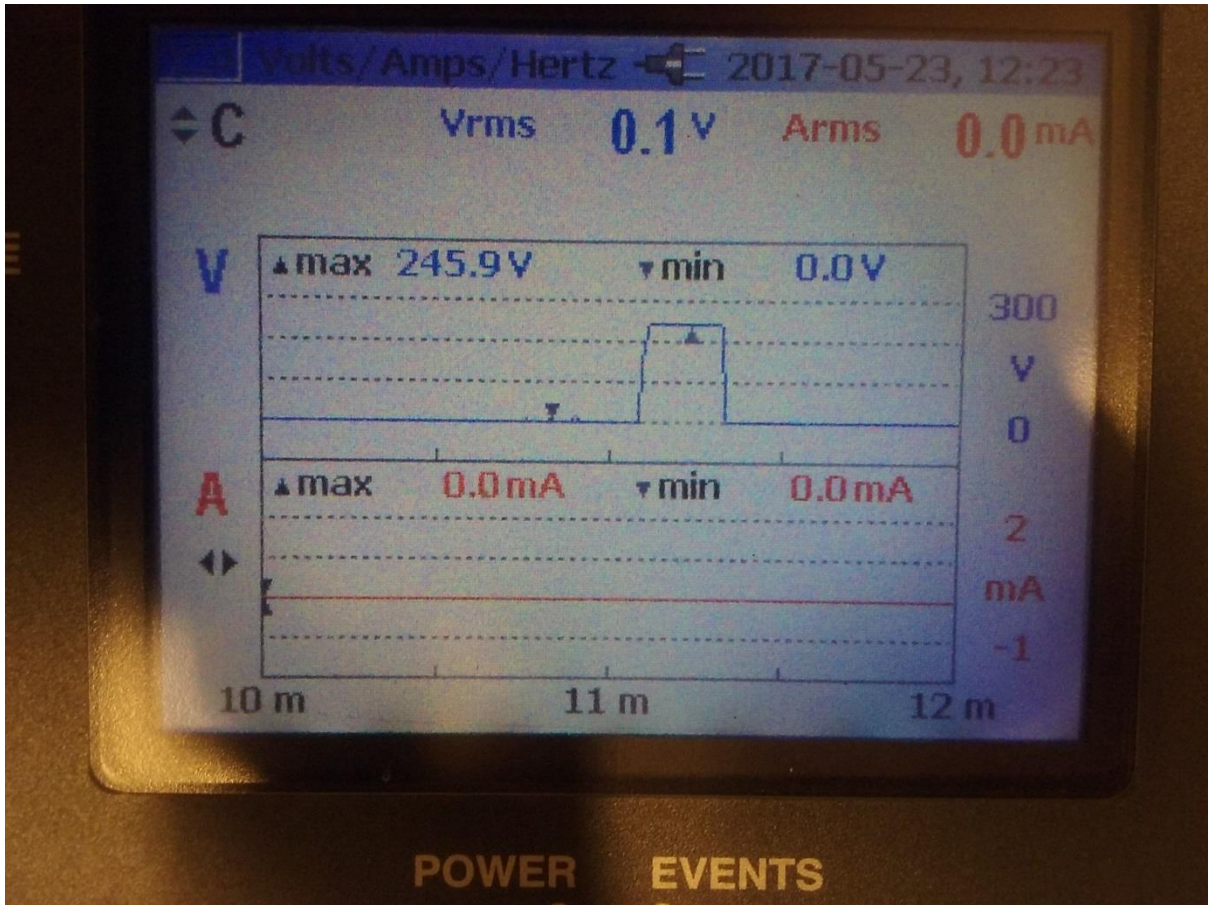
A close up of main switch board where one arc must of emerged from.



Board was well built.



Evidence of flashover in main switch board between phases. Note wiring insulation was not melted showing there were no high currents in wiring.



Feeder being turned on then complete station outage due to trip caused by statcom delay in starting.