

## Annexure A

### Preliminary investigation

Although there are no electrical 50 Hz lines to the SQUID hut noted as Priority 1 (depicted above), the 50 Hz noise is significant, thus the physical grounding in the area of the SQUID hut was investigated. A ground pin was inserted near the SQUID hut, but due to rocky soil it could not be inserted deeper than 20 cm. It is suggested that SANSA has very poor soil for grounding or that significant grounding problems exist. During routine maintenance and testing of the back-up diesel generator at SANSA, the opportunity arose to take measurements in the absence of any ESKOM power to the facility. Figure 2 below shows a number of oscilloscope readings with and without ESKOM power taken at the SQUID hut. Channel 1 was connected to the 20 cm deep ground peg and Channel 2 was grounded on the SQUID rig. The signals measured are therefore not SQUID output signals, but ground signals. Figure 2(a) shows readings with ESKOM power. The ground peg measures peak-to-peak voltage of 19.6V on Ch1 and 6.6V on Ch2. Figure 2(b) shows the same measurements when the diesel generator is operational, with Ch1 peak-to-peak voltage of 14.4V and 2.56V on Ch2. The moment ESKOM came online again the voltages increased respectively to 19.2V and 4V peak-to-peak, as shown in Figure 2(c).

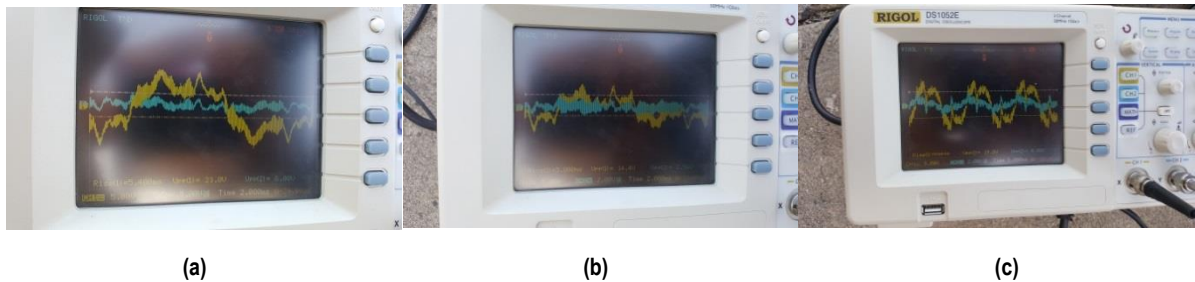


Figure 2: (a) Ground voltage measurements with ESKOM power, (b) with diesel generator power and (c) with ESKOM power again after the generator test

Another interesting result from the ESKOM-free tests at SANSA was obtained with a Bartington magnetometer at another location at SANSA, called the Bee hut. Figure 3 below shows the few seconds when the diesel generator was switched off, only UPS's running, and ESKOM switched on again. The reduction in noise in the absence of the generator and ESKOM speaks for itself. However, it can also be seen that the general noise level is lower during generator use than during ESKOM use.

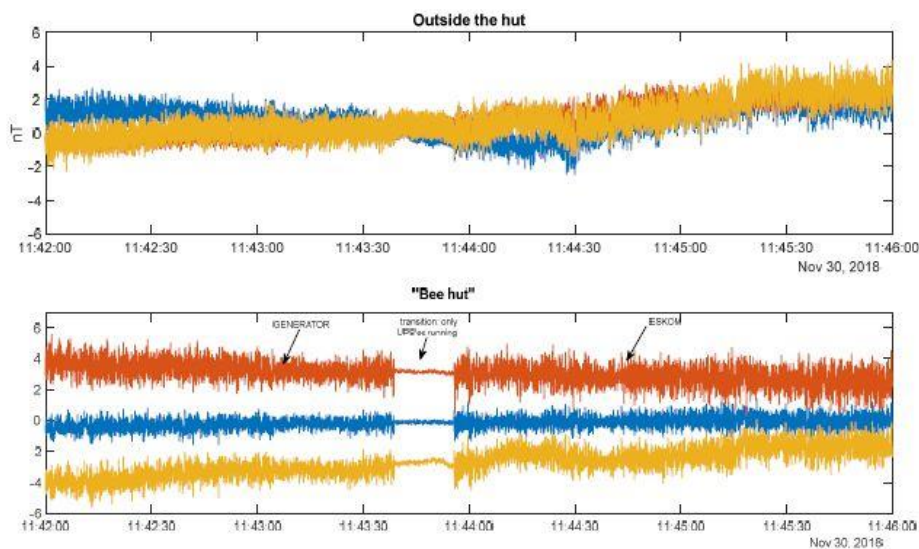


Figure 3: Magnetic noise recorded during generator/ESKOM power switchover.

For more information on these initial measurements, please contact Elda Saunderson ([esaunderson@sansa.org.za](mailto:esaunderson@sansa.org.za)).