

## EM INTERPRETATION – SHD21 – Body 1 and Body 2

A previous borehole EM interpretation (Asten, 1999) suggested that a conductor lies between holes SHD1 and SHD2. Hole SHD21 was sited to test for this conductor. Three transmitter loops were used in conjunction with this hole (Loops 1, 2 and 9, shown on Plate 1), and the conclusion drawn from the data is that there are in fact two separate conductors in the vicinity of this hole, labelled Body 1 and Body 2 in the previous section.

Evidence for Body 1 is best shown on profiles for holes SHD2, Loop 9, and SHD21, Loop 9 (Figures 1 and 2). The signature of an offhole conductor is clear, about 100m offhole from 670m downhole in SHD21, and 50 to 80 m offhole from 470m downhole in SHD2. The decay rate of this anomaly is shown in Figure 3; it is close to a  $t^{-3.6}$  decay consistent with a current channelling response. This type of response is expected in view of the large offset of loop 9 from the holes.

Body 1 may have connection with a small electrical conductor which intersects SHD21 at 780m. However the bulk of the conductor is clearly offhole, and has a cross-section geometry constrained by the estimated distances from the two boreholes.

The strike direction of Body 1 is estimated from the U and V components of SHD21, Loop 9. The minimum in U and maximum in V at ~800m implies strike towards north-west with Body 1 located south-west of hole SHD21. Interpretation is complicated by the fact that the signature of Body 2 overlaps the signature of Body 1, over the interval 750m to 900m.

Evidence for Body 2 is best shown on profiles for hole SHD21 Loop1 (Figure 4), but it is also visible on SHD21 Loop2 (reduced amplitude) and SHD1 Loops 1 and 2. Modelling SHD21 Loops 1 and 2 with an inductive plate target indicates that the body must dip steeply east in order to decouple with Loop2 and thus show the x2 reduction in amplitude observed in field data. The smooth slopes on the anomaly profile, the rate of decay place constraints on size, conductance and distance to the body. Figures 5 and 6 show field and model data for SHD21 Loops 1 and 2, where the model is a plate below the hole, dipping 75 deg east, size 300m (strike) by 200 m, and conductance 25 Siemens. This is an acceptable match in the A-component, but is not satisfactory in the U and V components. Unfortunately, U and V components were not acquired for the better-coupled Loop 1 since the existence of Body 2 was not recognised until later. U and V data for the poorly-coupled Loop 2 are ambiguous and noisy. The U and V components on the older SHD1 Loop 1 and 2 data are not helpful either, since they are excessively noisy. Without U and V data for SHD21 Loop1, the strike angle and strike length of Body 2 are poorly constrained, but the independent knowledge of geological strike, and the existence of significant alteration and mineralisation in hole SHD16 to the north-west, favour the model of a strike to 330 deg. This strike direction produces the geometry for Body 2 as described in the Summary of Interpretation above.

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