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27 September 2012 Our ref.: L137-12-09

Komati Power Station
Private Bag
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FOR ATTENTION: Mr. Thabo Mogashwa

Dear Sir,

Komati Groundwater Qualities - Feedback

Although there are elevated concentrations recorded of elements such as Manganese, Iron and Magnesium, for the purposes of this short letter, in summarising the groundwater contamination at the ash dam at Komati Power Station only the effects of sulphates will be taken into consideration. The only boreholes from the ashing area that exhibit clear contaminant impacts with regards to SO_4 are at boreholes AB04 (Monitoring borehole north-west of ash dams and south of dam AP02.), AB01 (Monitoring borehole north and downstream of old rehabilitated domestic waste site.), AB07 (Monitoring borehole north and downstream of seepage recovery dam AP03.) and AB55 (New Deep monitoring borehole Ash Area).

The elevated in the SO4 concentrations (around 2009) at the first three of these boreholes may be attributed to surface spillages affecting the groundwater. These spillages or surface water run-offs may have occurred due to the then insufficient surface water drainage systems that were not in place during the period when the Power Station was being refurbished. With the proper installation and operations of the surface water trenches, decreasing trends in the SO_4 concentrations are observed at most of these boreholes. Limited impacts upon the groundwater are visible when one moves away from the pollution source. Virtually no impacts are visible at AB57 (New Deep monitoring borehole Ash Area), AB53 (New Deep monitoring borehole Ash Area) down gradient from borehole AB04 (serving as early detection and which is polluted). These concentrations were used in the calibration of the numerical model, which in turn indicates that migration seems to be localized. However, it should be noted that any geological system is extremely complex and without a detailed mapping and understanding of the system, it is unknown if structures such as intrusions or fault zones may exist that can act as a preferential pathways by which contaminants may be transported into the aquifer beyond detection by the current monitoring system.

With regards to the Cr^{6+}, with the extremely low total chromium concentrations being detected (which are regularly analysed for as part of the monitoring program), Cr^{6+} concentrations are therefore expected to be even lower.

The elevated Manganese concentrations may be of concern as it can both be attributed by the geology or the ashing operations with further investigations therefore required.

The Ashing Area.

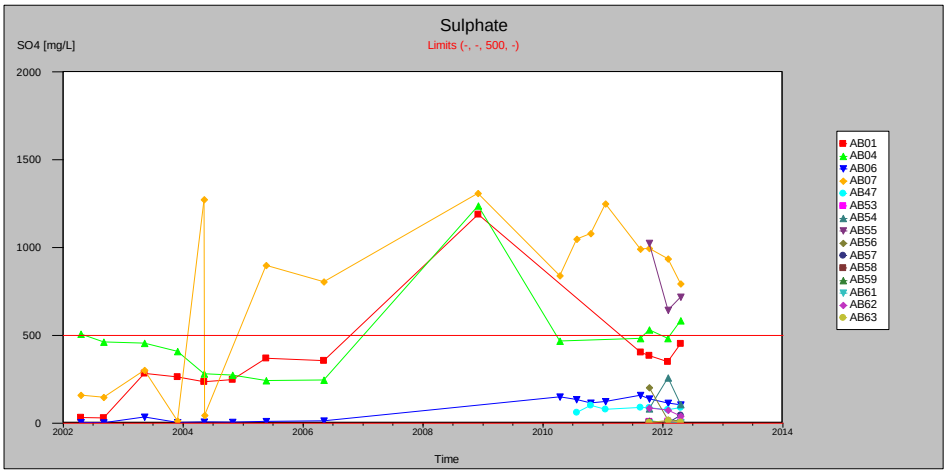

Figure 1. Sulphate time series of boreholes of the Ashing Area.

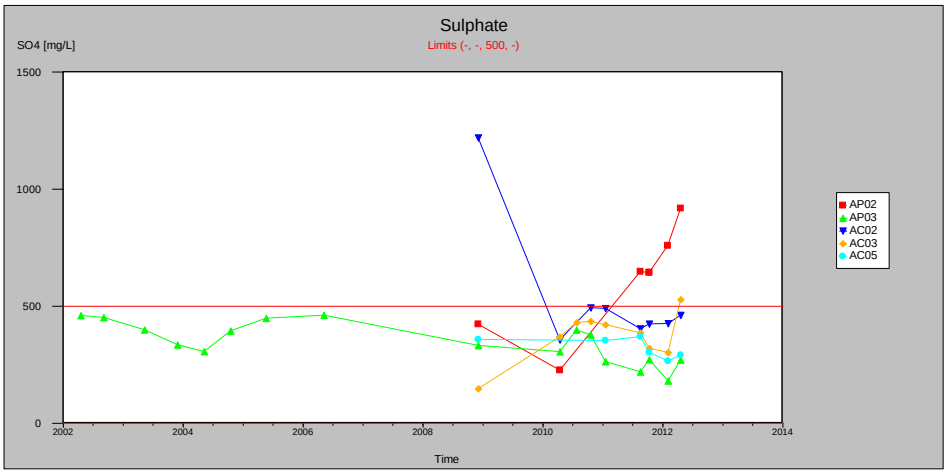

Figure 2. Sulphate time series of boreholes of the Ashing Area.

Conclusion

Although it may be a narrow minded view by considering only sulphates for the purposes of this letter, it none the less indicates that the major pollution remains localised in the vicinity of the pollution sources. Lateral movement seems to be extremely slow with limited impact. Movement to the deep aquifer system is however more difficult to ascertain and quantify. An understanding of the deep aquifer is needed to determine if the pollution may migrate vertical with the possibility of impacts upon aquifers or users further down gradient from the site.

Recommendations

It is imperative that a detailed aquifer investigation is requires in order for the classification and vulnerability determination of both the shallow and deep aquifer systems. This would entail a comprehensive investigation and understanding of the geology and geological formations such as intrusions or fault zones that may act as preferential flow path for both groundwater and pollutants. Such investigations would also focus on the properties of the upper superficial system through which seepage can occur, as well as the properties of the deeper geology (aquifer host). The purpose of the classification of the aquifer is furthermore aimed at identifying the risks of the aquifer being contaminated, which in turn can be translated into potential health risks. In short, the risks are minimised if there is no exploitable aquifer, no impacts upon downstream surface- or groundwater resources, or its users.

Should you have any queries or suggestions, please feel free to contact GHT Consulting with regards to.

Yours sincerely,

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