Application of OIP Tool for Quick Assessment of Environmental Liability

Victor Vanin Sewaybricker and Rubens Spina (GEOKLOCK, São Paulo, SP, Brazil)

Background/Objectives. Mapping of LNAPL may be expensive by means of traditional investigations. If exclusively based on monitoring wells, the correct sizing of the zone affected, which usually extends below the water level, is difficult, inaccurate, and time-consuming. There are situations, such as real estate negotiations, when the agility and accuracy of the environmental liability assessment are essential. In this scenario, the application of real-time and high-resolution tools can be very advantageous. In this study, the OIP (Optical Image Profiler) tool was used for mapping of LNAPL in an industrial site located in the state of Sao Paulo/Brazil, which was in a final sales phase.

Approach/Activities. Data from traditional investigation previously carried out indicated the occurrence of LNAPL in a monitoring well located downstream from former cutting machinery. The apparent LNAPL thickness measured was of about 0.2 m and was not delimited. The OIP probe was used to supplement the mapping and estimate the environmental liability. First, a sample of the LNAPL found was collected and tested for fluorescence response. The response was positive. In 1 day of fieldwork, 26 drillings were carried out, amounting to about 120 m drilled. On the next day, data assessed were processed and interpreted, providing the final report, with the estimate of the environmental liability (worst case), as well as the suggestion of further target investigations, aiming at the quantification of the real risk originated therefrom.

Results/Lessons Learned. The work pointed out that the average depth of the soil affected by oil is 2.2 m (water level at about 1.5 m deep), with some deeper points (~ 3.5 m) in the southern portion of the area assessed. There were persistent secondary peaks of fluorescence detected below 4 m deep, including regions where no primary peaks were noticed in shallower portions. Also taking into account that in such elevation an organic clay layer was found and that the fluorescence pattern showed characteristics (glow and texture) other than those verified in portions where knowingly there was oil, such secondary peaks were deemed interferences rather than contamination. The impacts determined in the soil are distributed in an approximate 6-meter radius around the well where the presence of LNAPL was originally verified. The works carried out evidenced that the OIP tool is robust, of simple operation and high productivity. It may provide detailed information, with great agility, supporting effective decision-making in cases involving the mapping of LNAPL. Nonetheless, it seems to be susceptible to interferences from high content of natural organic matter. The final report recommended the collection of some soil samples for confirmation of the interpretations based on primary and secondary peaks of fluorescence.