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Alameda County
Environmental Health



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December 12, 2007

Mr. Jerry Wickham
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: Proposed Method for Dissolved Oxygen Measurements
3609 International Boulevard
Oakland, California
Fuel Leak Case #RO0000265

Dear Mr. Wickham:

On behalf of the owner, Mr. Abolghassem Razi, SOMA Environmental Engineering, Inc. (SOMA) has prepared this proposed method for Dissolved Oxygen (DO) measurements at 3609 International Boulevard, Oakland, Alameda County, California (the Site).

This proposed method responds to your letter to Mr. Razi, dated October 19, 2007, requesting a proposal for DO measurement that is more consistent with accepted industry practice.

Proposed Method for Dissolved Oxygen Measurements

SOMA proposes to utilize a Multi-Probe System (MPS), YSI Incorporated YSI 556 MPS or equivalent to perform DO measurements. The instrument utilizes a steady state polarographic sensor to measure DO. The groundwater sample is collected in a closed system via the downhole well pump. The pump delivers a continuous low-flow rate to the flow-through cell of the MPS instrument to ensure homogeneity and to ensure that oxygen can freely diffuse into the electrode. The presence of oxygen causes the electrode to deliver a current to the oxygen monitor, which amplifies the current and converts it to a voltage output that is directly proportional to the concentration of oxygen in the sensor chamber. The instrument's DO concentration range is zero to 50 mg/L (parts per million-ppm) with an accuracy of 0.2mg/L+/- (zero to 20 mg/L).

Instrument Calibration for Dissolved Oxygen

The instrument sensors for properties such as temperature, conductivity, etc. are calibrated in accordance with the manufacturer's requirements. The DO calibration is accomplished by reading ambient air at 100 percent oxygen saturation. The DO concentration is measured while the sensor is suspended above de-ionized water to ensure 100 percent air saturation. The reading is automatically corrected for temperature via the instrument temperature sensor and the operator enters the local barometric pressure into the instrument. The reading is compared to the specific instrument's DO chart, which illustrates the correct instrument DO concentration, in milligrams per liter (mg/L), for 100 percent air saturation at a given barometric pressure

and temperature. The instrument reading of DO in ambient saturated air should be within 0.5+/- mg/L of the instrument chart reading for 100 percent air saturation. The acceptable calibration DO concentration is then accepted and the instrument is ready to measure the groundwater DO concentration. The DO sensor will be calibrated, at a minimum, at the start of the day of groundwater sampling and calibrated again following three consecutive well sampling events or more often based on field conditions.

Field Measurement of Dissolved Oxygen

The YSI Multi-Probe System or equivalent as described above will be used to collect field groundwater chemical parameters, including DO. Prior to sampling groundwater at a monitoring well site, all downhole equipment is decontaminated by brushing or rinsing with de-ionized water andalconox or equivalent laboratory quality cleaning solution and rinsed with de-ionized water. This procedure is repeated at each new monitoring well sampling location prior to groundwater sampling.

The depth to groundwater is measured from the top of the casing to the nearest 0.01 foot using an electronic interface probe and recorded in the field log. The well borehole groundwater volume is then calculated.

Prior to sample collection, each well is purged using a battery-operated, 2-inch-diameter pump (Model ES-60 DC). During purging, groundwater is measured for parameters such as DO, pH, temperature, electrical conductivity (EC), and oxygen-reduction potential (ORP) using the YSI Multi-Probe instrument or equivalent. The well pump is connected via a closed system of tubing to the Multi-Probe flow cell and sensor. The purge flow is maintained at a relatively low flow rate to ensure absence of turbulence or entrained air bubbles that may result in erroneous sensor readings. Purging of wells continues until the parameters for DO, pH, temperature, EC, turbidity, and ORP stabilize, or three casing volumes are purged. Stable parameter readings are determined when a variation of 10 percent or less and 0.1+/- pH unit variation or less is obtained when compared to the two previous recordings of the parameters.

If you have questions or require additional information or clarification, please contact the undersigned at (925) 734-6400. SOMA looks forward to receiving your approval to implement the proposed method for dissolved oxygen measurements described above at this site.

Sincerely



Richard McKinney, PG
Senior Geologist

