**Dissolved oxygen measurement methods aboard the RV Brooks McCall May 2010**

The RV Brooks McCall has been onsite at the MS Canyon 252 on three separation occasion during May, 2010. The dissolved oxygen data has been collected using several methods throughout these three segments.

**Segment 1: May 8, 2010 – May 12, 2010**

On this cruise there was no profiling DO sensor deployed. All data from this cruise segment was acquired with the LaMotte 5860 DO Field Kit. Three Niskin bottles were available, and samples were collected at 1 meter, 275 meter, and 550 meter depths. DO results with the LaMotte kit could not be compared to other available instrumentation.

**Segment 2: May 13 – May 17, 2010**

A new CTD unit with full ocean depth rating was acquired while in port, including a SBE DO Sensor. DO profiles were acquired with each cast. It was also discovered that an Extech DO700 handheld probe was available, and this was used to perform some measurements in an attempt to validate the SBE data and the LaMotte data. The Extech probe generally showed good agreement with the SBE data for the corresponding depth, however the LaMotte Field kit data was significantly lower and did not appear to represent the structure of the dissolved oxygen profile as seen with the SBE instrument and replicated with the Extech probe. Figure 1 presents the results from Station B25 data. The agreement between the Extech probe and the SBE sensor appeared quite good while the LaMotte kit results were quite different. As a result of the lack of agreement observed by the LaMotte kit, it was believed that the Extech probe was providing more reliable results.

Figure 1. Dissolved oxygen data from station B25



**Segment 3: May 19 – present**

Dissolved oxygen measurement during Segment 3 were initially performed with the Extech probe and verification with the SBE data. A request was made to perform a series of colorimetric tests using fresh LaMotte kits and replicate samples. Three samples were collected from the same Niskin bottle at two depths. Each of the samples was analyzed using a separate LaMotte kit. Extech probe measurements were also made. This was performed for three separate stations. The data are presented in the following figures. Station B35 showed reasonable agreement between all three dissolved oxygen methodologies, but stations B34 and B37 showed poorer agreement. The results from the LaMotte kits showed a larger range of variability overall.

Figure 2. Station B34 Dissolved Oxygen Data



Figure 3 Station B35 Dissolved Oxygen Data



Figure 4. Station B35 Dissolved Oxygen Data



A more suitable method for validating both the SBE sensor and Extech probe data would be to employ a true Winkler titration system for these shipboard measurements, or preserve samples onboard for outside analysis. The results from these analyses are indicate normal, typical levels of dissolved oxygen for the Gulf of Mexico. The low dissolved oxygen values from previous LaMotte kit measurements may be the result of reagent degradation or operator error.