

## **Appendix L**

### **Calculation of "Unionized Ammonia"**

### Notes on the Determination of "Unionized Ammonia"

The determination of "Unionized Ammonia" is based on the method as stipulated in the article entitled "*Ionization of Ammonia in Seawater: Effects of Temperature, pH and Salinity*" prepared by Carol E. Bower in 1977.

The following equation was used:

Percentage Unionized Ammonia =  $100 / [(1 + \text{antilog} ({}_pK_a^s(T) - \text{pH})]$ , in which

$${}_pK_a^s(T) = {}_pK_a^s(T=298K) + 0.0324(298 - T^{\circ}K)$$

Sample ID	27/11/00-SR1-f-T
Measurement result of pH	8.16, 8.16
Average pH value	8.16
Measurement of Temperature (°C)	22.1, 22.2
Average Temperature (K)	295.1
Salinity (ppt)	32
${}_pK_a^s(25^{\circ}C)$	9.35
${}_pK_a^s(T^{\circ}C)$	9.44
Percentage of "Unionized Ammonia", %	4.94
Lab measurement results of Ammonia-N, mg/L	0.055
Calculated "Unionized Ammonia"	$= 0.055 * 4.94\%$  $= 0.002717$  $= 0.003 \text{ mg/L}$