# APPENDIX VII

# PORE WATER COLLECTION PROCEDURE FOR AMMONIA MEASUREMENT

**Pore Water Collection Procedure for Ammonia Measurement**

**Set up of surrogate (or "dummy") containers**

Porewater ammonia measurements should be made in surrogate chambers (chambers with no animals added) for each homogenized sediment treatment level (control, reference, dredged material site). Total and un-ionized ammonia levels must be monitored in the pore-water on days 1, 3 (or 5) and 10 during the test. Therefore, three additional containers (one for each monitoring day) should be maintained for each sediment treatment (control, reference, dredged material site).

**Collection of Pore water:**

Interstitial pore water should be extracted by centrifuge using the methods described in Burgess et al. (1993) or in Ferretti et al. (2000). Here, up to 200 ml of sediment (typically 100 ml is sufficient) is placed in a 250 ml teflon centrifuge tube and centrifuged at 4°C for 60 minutes at 4,000 rpm (2520 G) or 30 minutes at 8000 rpm. In general, about 20 ml of interstitial water would be needed to measure ammonia with an ion-selective electrode. Ferretti (personal communication) observed that 100 ml of sediment is usually sufficient to capture 25 to 50 ml of pore water. Alternatively, interstitial pore water may be collected using peepers (see Section 6.2.1 of EPA 2001d).

**Analysis of Ammonia:**

Total and un-ionized ammonia must be analyzed on the sediment interstitial water using the ion-selective electrode method (Merks, 1975) following the manufacturer's instructions or the colorimetric method as described in (Bower and Holm-Hansen, 1980). Acceptable detection limits are 0.1 mg/L. Un-ionized ammonia can be calculated using the dissociation model of Whitfield (1972) as programmed by Hampson (1977).

Bower, C.E. and T. Holm-Hansen. 1980. A Salicylate-hypochlorite Method for Determining Ammonia in Seawater. Can. J. Aquat. Sci. 37: 794-798.

Burgess, R.M., K.A. Schweitzer, R.A. McKinney, and D.K. Phelps.1993. Contaminated Marine sediments: Water column and Interstitial Toxic Effects. Environmental Toxicology and Chemistry12: 127-138.

Ferretti, J.A., D.F. Calesso, and T.R. Hermon. 2000. Evaluation of methods to remove ammonia interference in marine sediment toxicity tests. Environmental Toxicology and Chemistry19(8): 1935-1941.

Hampson, B.L. 1977. The Analysis of Ammonia in Polluted Sea Water. Water Research 11: 305-308.

Merks, A.G.A. 1975. Determination of Ammonia in Sea Water with an Ion-Selective Electrode. Netherlands J. Sea Res. 9: 371-375.