C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey H12219 can be found in the *OPR-N324-FA-10 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

C.1. Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential correctors from the U.S. Coast Guard beacon at Fort Stevens, WA (287 kHz) were used during real-time acquisition. The Post Processing Kinematic (PPK) method was the primary method of horizontal positioning of MBES soundings on H12219. Correctors from the Neah Bay, WA CORS station were used for single-base post processing of all vessel-day POSMV files except DN 158 for vessel S220, which was processed using the PPP (Precise Point Positioning) method. Single Best Estimate of Trajectory (SBET) files and their associated error files (SMRMSG) were applied to all MBES data in CARIS HIPS using the single-base and PPP methods.

For further detail see the Acquisition and Processing logs for the particular days located in Separates I

C.2. Vertical Control

The vertical datum for this project is Mean Lower Low Water (MLLW) as specified in the Project Instructions. The operating National Water Level Observation Network (NWLON) primary tide station at LaPush, WA (9442396) served as control for datum determination and as the primary source for water level correctors for survey H12219. No subordinate water level stations were required for this project.

Water level corrections were applied to data using Discrete Tidal Zoning.

A request for delivery of final, approved tides for survey H12219 was forwarded to N/OPS1 on July 2, 2010, in accordance with the FPM. A copy of the request is included in Appendix V. On July 13, 2010 prelininary zoning was accepted as final zoning by COOPS in the Final Tide Note.[23]

As per the Project Instructions, all data were reduced to MLLW using final, approved tides from the LaPush, WA station (9442396) by applying tide file 9442396.tid and time and height correctors through the preliminary zone corrector file N324FA2010CORP.zdf. **It will not be necessary for the Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey data during final processing.**

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

Chart comparison procedures were followed as outlined in section 4.5 of the FPM and section 8.1.3-D.1 of the HSSD, utilizing CARIS HIPS and Notebook software program.

Survey H12219 was compared with the following charts listed in Table 6. Soundings generally agree with previously charted (18460) depths within one to two fathoms. Significant differences between