

## C. VERTICAL AND HORIZONTAL CONTROL

### C1. Vertical Control

National Ocean Service (NOS) existing tide station at Los Angeles, Outer Harbor, California (941-0660) was used for the survey in accordance with Attachment #7, dated September 1, 2000, of the Project Instructions.<sup>9</sup> Zone PAC9 with a time corrector of 0 minutes and a range ratio of 0.97 was the only zone applied to the tide data. Zone PAC10 is on the border of the survey area and was not used for the few soundings that fell in the zone.

The NOS tide station experienced no down time during periods of hydrographic survey. All data were successfully retrieved and are included on the tape with the HDCS processed data.<sup>10</sup>

Detailed descriptions of the vertical control used can be found in the Vertical and Horizontal Control Report for Project OPR-L325-KR-00.<sup>11</sup> There were no deviations from those listed in the project-wide report.

Evaluation of the tides applied was accomplished through crossline comparisons, comparing adjacent lines during Caris subset editing, and analysis of the sun-illuminated images generated from one-meter shoal-biased multibeam data. Crossline comparisons are discussed in section B2.a of this report and represent all errors associated with the survey. It is difficult to associate a precise vertical error due to tides. Errors observed are a composite from various sources such as measurement error, tides, heave, refraction, transducer draft, settlement and squat. In accordance with the Specifications and Deliverables (June 2000), the minimum error expected as result of tides is 0.2 meters with a maximum allowable error of 0.45 meters. NOAA verified tides were reviewed for spikes and blunders and compared to predicted tides. Verified tides matched predicted tides extremely well, with a standard deviation of 0.038 meters and a maximum deviation of 0.10 meters. No obvious errors as a

result of tide zoning or misapplied tides were apparent after analysis of sun-illuminated images.<sup>12</sup>