Report Prepared by Marsh J. Youngbluth

HAWAII UNDERSEA RESEARCH LABORATORY (HURL)

QUICK LOOK REPORT MISSION NO.

MISSION STATUS

Location: Dive 045, Offshore of Barbers Point, SW Oahu, Hawaiian Islands

Mission Date: 26 January 1988, 1130-1530 h, Terry Kirby (pilot)

Maximum Depth: 600 m

Project Title: Vertical Distribution and Abundance of Pelagic Zooplankton

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Scientific Data Acquired: Prepare an abstract outlining your objectives, techniques, findings, etc.

My objectives were twofold: 1) document the vertical distribution of of zooplankton, particularly the gelatinous groups and 2) interface to the PISCES V submersible, the equipment needed to photograph and collect pelagic animals.

With the assistance of HURL Mar Ops staff and an HBOI Ocean Engineer, several devices were adapted to operate from the PISCES V submersible. These devices included: a Fresnel/Photosea camera and strobe package, a Hasselblad camera and strobe system, a 12-bin rotary suction sampler, two detritus samplers and four Birns snooperette lamps. This equipment enabled the PISCES V submersible to conduct research in the water column.

The first dive was exploratory. Our findings were limited to the upper 600 m, primarily because the PISCES V submersible developed a short in the power system. After aborting the dive early, the HURL Mar Ops team found that a battery cable had eroded, causing the functional loss of one set of battery cells. Repair of this problem required that the whole battery pack be removed from the vehicle. This work and attachment of the Hasselblad system took 5 days to complete.

Few zooplankton were sighted. Small copepods were the most numerous animals in the uppermost 100 m. Two aggregate chains of salps, ca. 2 cm high and 30 cm long, were between 200-300 m. Euphausiids, probably Euphausia spp., appeared below 300 m but were never abundant. Midwater fishes, especially species in the genus Cyclothone, were common below 300 m. A few myctophid fishes, all of which were about 5-7 cm in total length, occurred between 400 and 600 m. Several filter-houses of appendicularians, varying in diameter from 1-10 cm, were observed throughout the 600-m water column. Smaller filter-houses predominated in the upper 100 m. A few abandoned filter-houses were seen from 300-600 m. Aggregates of marine snow appeared from the surface to 600 m. These globular-shaped particles were 1-3 mm in diameter.

The Fresnel/Photosea camera and the rotary suction sampler did not work well. The Fresnel package was designed to accommodate a Benthos camera and two Edgerton 200 wattzsec strobes. We tried to adapt a Photosea stereo camera and a single Photosea 100 watt•sec strobe. The pictures that we obtained were poor but nonetheless confirmed our visual observations that copepods were not tightly aggregated at the base of the mixed layer.

Very little suction was developed by the pump on the rotary sampler. After this dive we determined that the flow of hydraulic fluid was restricted somewhere in the network of lines on the PISCES V submersible. We were able to solve this problem by doubling the number of lines feeding the pump. We plan to replace the existing pump with a smaller displacement unit before our next cruise, so that the additional hydraulic lines can be used for detritus samplers. In the future we will also need to mount the rotary sampler above the viewports.

We were pleasantly surprised by the amount of room and arrangement of control panels inside the PISCES V submersible. Visibility was adequate through the viewports, actually much better that from the ports in the sphere of the MAKALI'I submersible. Our previous water column work has been conducted with the JOHNSON-SEA-LINK submersible and we did have to adjust to the experience of not having a full 120° of view. There is sufficient overlap in the field of view between the center and side viewports on the PISCES V submersible for the pilot and scientists to observe animals simultaneously.

Overall, the dive was considered successful despite the low density of zooplankton and the breakdown in the power system of the submersible.