

GEOLOGIC DEVELOPMENT OF SALT RIVER CANYON

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Purpose: To study the geologic development of Salt River Submarine Canyon by obtaining cores from horizontal holes drilled into the reef walls (Report 79-2)

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Accomplishments: The principal objective of this mission was to accomplish the drilling of a number of holes horizontally into the reef wall of Salt River Canyon, a process previously considered impossible, to obtain material which might throw light on the geologic development of the Canyon. Drilling operations ran in two-man shifts. During the 6 days of the saturation mission, four holes were drilled in the west wall. Total length of core penetration was over 13.7 m with an average recovery rate of 50 percent (this means that of the 13.7 m of core, half was solid rock and half was either sand, rubble, or void space in the wall). The deepest hole penetrated 5.4 m into the wall. This is the first time any extensive horizontal drilling of this type has been attempted, and one of the holes represents the deepest lateral penetration into deep reef framework on record. The cores have been split in half and the core-logging is underway. Samples have been sent to the University of Texas for radiocarbon dating. The preliminary results are speculative at this point. The wall was highly porous and the voids well-connected. The short-term turbid plume was observed on various occasions to

emerge at sites away from the drilling operation. If it was easier for the turbid water to pass through the wall and emerge elsewhere than to return to the drill hole, then a free and open pore network is indicated. The coral samples collected were remarkably fresh. If they are Pleistocene in age (say 120,000 years b.p.), then this preservation is noteworthy. If they are Holocene (20,000-30,000 years b.p.), then one of the holes drilled records the thickest accumulation of Holocene material found to date.