IODP Expedition 327: Juan de Fuca Ridge-Flank Hydrogeology

Week 2 Report (12–18 July 2010)

19 July 2010

OPERATIONS

Hole U1362A

The first stage of operations for Hole U1362A consisted of deploying a reentry cone with 20 inch conductor casing attached, drilling a hole a few meters into basement, and then cementing a string of 16 inch casing to isolate the sediment column above the basement. Based on the results of the jet in test conducted last week, a 53 m string of 20 inch casing was made up and latched into a reentry cone. The reentry cone was deployed through the moonpool at 1700 hr on 12 July 2010 and Hole U1362A (prospectus Site SR-2A) was spudded at 2345 hr that day. The cone reached the seafloor at 1100 hr on 13 July. The drilling bottom-hole assembly (BHA) was assembled using a 18-1/2" tri-cone drill bit and an under reamer with its cutters set to a maximum diameter of 21.5 inches. The drill string was lowered to the seafloor and the reentry cone was reentered at 0245 hr. After drilling for 17 h at an average rate of penetration (ROP) of 18 m/hr, the hole was terminated at 2913 m below rig floor (mbrf) or 241 m below seafloor (mbsf). The hole was cleaned with repeated mud sweeps and the drill string was pulled out of the hole at 0920 hr on 15 July. The depth of the basement contact was inferred to be at 2908 mbrf (236 mbsf). Frequent referral to the tide tables for this time period contributed to keeping the drilling depths consistent as throughout our time on site the tidal fluctuation resulted in a 3 m change of the sea level reference datum used by the driller. The rig floor was prepared for running casing and by 1415 hr on 15 July ~230 m of 16 inch casing was assembled with each joint being welded together. Once the casing running tool was attached, the casing was lowered to the seafloor, and Hole U1362A was reentered for a second time. The casing hanger was landed at 2315 hr with the casing shoe at 230 mbsf, ~6 m above the basement contact. The bottom of the hole was cemented with 42 barrels of cement pre-blended with Cello Flake and a 1.6% by volume calcium chloride accelerator. The drill string cleared the rig floor at 0930 hr on 16 July, ending the initial stage of operations at Hole U1362A.

Hole U1362B

The first stage of operations at Hole U1362B was identical to Hole U1362A. An identical 53 m string of 20 inch casing was made up and latched into another reentry cone. Hole U1362B (prospectus Site SR-2B) was spudded at 2135 hr on 16 July. The cone reached the seafloor at 1005 hr on 17 July. The drilling BHA was assembled as before, the drill string was lowered to the seafloor and the reentry cone was reentered at 0056 hr on 18 July. Drilling commenced at 0230 hr and continued until 1700 hr at an ROP of 25 m/hr. The hole was terminated at 2922 mbrf or 250 mbsf, with the basement contact inferred at 242 mbsf. The hole was cleaned with repeated mud sweeps and the drill string trip back to the surface was initiated at 2245 hr on 18 July. The *Ocean Ranger* arrived at 0715 hr while the drilling process was underway. This 117 ft long seagoing tug came alongside the port side at 0730 hr and all cargo (completion packers, CORK components, lab supplies, and some food) was transferred along with three Transocean crew members. The *Ocean Ranger* left for Seattle at 0920 hr.

SCIENCE RESULTS

Scientific laboratory training and outreach activities dominated the second week of the expedition. An orientation was given on sampling policy, SampleMaster, and core flow. Mid-week, upper oceanic crust material was recovered from the bit during drilling operations at Hole U1362A. A science meeting was held to discuss the shipboard and shore-based sampling strategy

for this material. The petrologists started describing legacy core from Leg 168 holes in this region, worked on finalizing the core description template, and described the material recovered from the drill bit. The physical properties team has been training on the thermal conductivity, pycnometer, and *P*-wave velocity instruments. The outreach officers were trained on the digital imaging track and commenced imaging Leg 168 cores. The CORK specialists continued preparing their equipment for deployment. Science teams handed in the first draft of their laboratory methods for review.

The engineering staff and CORK specialists completed all plumbing that was possible with the CORKs in their current position on the deck. Lines were pressure tested and a few leaks were fixed. The engineers are in the process of organizing the cargo delivered by the *Ocean Ranger.*

OUTREACH

The weekly outreach curriculum continued with "Drilling, Coring, Logging, and CORKing," a multi-day Darcy's Law experiment, a presentation on Osmosamplers (osmotically driven fluid samplers) and associated experiments, illustration classes, an introduction to IODP databases, training on how to record audio podcasts, and a reading assignment on "How People Learn" published by the National Research Council.

TECHNICAL SUPPORT AND HSE ACTIVITIES

HSE activities: The weekly fire and boat drill was held as scheduled.

Laboratory activities:

Technical staff continues to provide support for various science, education and engineering projects. Ongoing lab projects include the following: Internet Café remodeling: old carpet removed, new flooring installed, and new book shelves being built; section half multisensor logger hardware upgrade project: hardware installation completed, motion control hardware testing begun; whole core multisensor logger software upgrade project continues; moisture and density/pycnometer software upgrade project: meetings held to discuss user and database interface; installation of the reverse osmosis water tank in the chemistry lab completed; installation of the analytical gas monitoring system completed and tested; refurbishment of interstitial water squeezers: press stands disassembled for sand blasting and painting.