IODP Expedition 327: Juan de Fuca Ridge-Flank Hydrogeology

Week 3 Report (19–25 July 2010)

26 July 2010

OPERATIONS

Hole U1362B

After drilling the 21-1/2 inch hole, the bit cleared the rotary table at 0600 hr 19 July and the rig floor was prepared for running casing. By 1100 hr that morning 18 joints of 16 inch casing (242 m in length) were made up and attached to the casing hanger. Hole U1362B was reentered at 1500 hr and the casing was washed down to a depth of 242.0 m below seafloor (mbsf). The bottom of the hole was cemented at 1900 hr on July 19 with 40 barrels of cement pre-blended with Cello Flake and a 1.6% by volume calcium chloride accelerator, with the goal of having 30 m of cement inside the casing and between the casing and the borehole wall. The drill string cleared the rig floor at 0330 hr on 20 July, ending the initial stage of operations at Hole U1362B.

Hole U1362A

The second stage of operations for Hole U1362A consisted of drilling a 14-3/4 inch hole to 346 mbsf for the 10-3/4 inch casing string with the goal of casing the upper 100 m of basement. The 14-3/4 inch drilling bottom-hole assembly (BHA) was assembled and Hole U1362A was reentered for the third time at 1525 hr on 20 July. The top of the cement plug was tagged at a depth of 2874 m (202 mbsf), which was within 2 m of the theoretical calculated depth of ~200 mbsf. This was a good indication that the cement job had been successful at cementing the lower 30 m of the hole. After drilling out the cement, basement drilling proceeded without incident to a depth of 298 mbsf by 1545 hr on 21 July, followed by a 1-1/4 hr period where the drill string was stuck. After the string was freed, several hours were spent washing and reaming the hole, and by 2315 hr the hole was relatively stable. Drilling continued until achieving the desired total depth of 3018 m (346 mbsf). After conditioning the hole further, by 0100 hr on 24 July it was deemed acceptable for running casing. The assembly of the 10-3/4 inch casing string began at 0930 hr. Twenty four joints of 10-3/4 inch casing were made up followed by a TAM Freecap swellable packer joint. The packer was deployed for the first time by IODP and was designed to provide an additional seal to the cement job and the casing hanger seal ring. The swellable packer is designed to absorb water and expand sealing off the space between the 10-3/4 and 16 inch casing strings. The drill string trip began at 1500 hr on 24 July. Hole U1362A was reentered for the fourth time at 1900 hr. The casing was washed to 2991 m (319 mbsf) before getting tightly stuck around midnight. After working the pipe for 4-1/2 hr it was eventually freed at 0430 hr on 25 July. Multiple attempts to advance the casing past 2983 m (311 mbsf) failed and at 1000 hr the decision was made to shorten the casing string. The drill string was tripped back to the surface by 1530 hr. The swellable packer was inspected and determined to be undamaged and to gauge so the 10-3/4 inch casing hanger and packer were laid out together as a unit. Two joints of casing were removed, reducing the length of the casing string by 27.5 m and resulting in an overall string length of 308.5 m. The swellable packer assembly was made up once again to the remaining casing string. Hole U1362A was reentered for the fourth time at 2310 hr on 25 July. A few problems were encountered advancing the casing string past the sediment/basement interface but after this point the installation went smoothly and the casing hanger landed at 0530 hr. The bottom of the hole was cemented with 40 barrels of cement pre-blended with Cello Flake and a 1.6% by volume calcium chloride accelerator, designed to fill the bottom ~60 m of the hole. The volume pumped was double the required amount to allow for potential significant loss of cement into the highly fractured formation. At 0730 hr on 26 July the drill string was tripped back to the surface, and the ship was offset back to Hole U1362B.

SCIENCE RESULTS

The petrologists continued their review of legacy core from Leg 168 holes in this region, and described additional upper oceanic crust material recovered from the bit at Hole U1362B. The physical properties team continued working with the thermal conductivity instrument and the *P*-wave velocity gantry. The outreach officers finished imaging Leg 168 cores and started on Expedition 301 cores. The CORK specialists continued preparations. The Co-Chiefs and Staff Scientist reviewed the laboratory methods drafts.

The engineering staff completed the plumbing of the two L-CORKs and pressure tested them except for the packer inflation line. Modifications were made to the lower bulkheads to allow for a new flow meter valve orientation. The plumbing of the Hole 1027C CORK was also completed and it was pressure tested except for the packer inflation and microbiology line. Modifications were made to the RS interface on the top plugs so they can be used with the electronic RS (ERS) tool in Holes 1027C and U1301B. The Logging Staff Scientist and Schlumberger Engineer have been testing and troubleshooting the ERS prototype tool to ensure it is ready for deployment.

OUTREACH

Outreach activities continued with a calibration exercise of the tracer gas injection system, a videoconference with the National Marine Educators Association annual conference in Tennessee, a presentation by Beth Orcutt on assembling colonization experiments for the microbiological studies planned for this expedition, a talk by Geoff Wheat on using ROVs in schools, hard rock description using Leg 168 cores and thin sections, a sample request tutorial, and a talk on the structure of ocean crust by Michelle Harris. An impromptu videoconference was conducted with the *Chikyu* on July 25.

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 laboratory projects include the following: Internet Café new bookshelves completed and installed, section half multisensor logger software upgrade started, whole core multisensor logger software upgrade continues with user testing, moisture and density/pycnometer software upgrade in progress, refurbishment of interstitial water squeezers in progress, started installation of shelving in hazardous supply room, installation of copier table started, laboratory documentation updates continue, and new software versions deployed for Sample Master, LimsOnLine, and DESClogik.