

**July 12, 2004**

**IODP EXPEDITION 301: JUAN DE FUCA HYDROGEOLOGY  
WEEK 2 REPORT**

**OPERATIONS**

Hole 1301A - Installing 10-3/4 inch casing into basement: This week we finished drilling a 14-3/4 inch hole for the 10-3/4 inch casing at 0015 hours on 5 July. The 14-3/4 inch hole reached 107.1 m into basement 3037.0 mbrf (369.5 mbsf). During the wiper trip before pulling out of the hole, an interval of rapid drilling penetration rate (~304-357 mbsf) required more than 20 hours of reaming and mud sweeps before we felt the hole conditions were reasonable enough to attempt emplacing the casing. We filled the hole with sepiolite mud, raised the bit up inside the 16-inch casing, and then tried to lower the bit back into open hole without rotation or circulation to mimic the casing installation. At 348.5 mbsf the bit met some resistance and we had to wash back down to the bottom of the hole. We circulated cuttings out of the hole with mud (50 barrels), filled the hole with mud, pulled out of the hole, and recovered the drill string at 0400 hours on 6 July.

Installing 10-3/4 inch casing: We reentered Hole 1301A with a 360.4 m-long string of 10-3/4 inch casing (~98.4 m into basement) at 1415 hours on 6 July. We worked the casing shoe past a tight spot at ~4 m below the 16" casing shoe (~3 m into basement) and by 2030 hr we had lowered the casing to 355.8 mbsf (93.4 m into basement). This was ~4 m above where the casing hanger would land in the reentry cone. After we halted circulating to install the cementing manifold before landing the casing, we could not lower the casing. We could raise the casing with difficulty but could not lower it until the casing shoe was back up to 309.5 mbsf (47.1 m into basement) when all drilling parameters returned to normal. We inferred that rocks falling out of the fast drilling interval were causing the problems. We lowered the casing again and at 0000 hours on 7 July reached 3010.8 mbrf (343.3 mbsf) but we could not advance any further. At 0400 hours on 7 July we decided to recover the casing string and attempt to deploy a shorter casing string and make Hole 1301A the shallow basement-monitoring hole.

We assembled a 273.3 m-long casing string that would extend 10.9 m into the upper portion of basement above the zone of poor hole conditions. This would also be fairly close to the sediment-basement interface to ensure a good cement seal up into the 16-inch casing. This reentry took longer (~45 minutes) and required the sonar due to poor visibility from drilling mud around the reentry cone. The 10-3/4 inch casing was successfully installed and cemented in place. The casing running tool was released at 0035 hours on 8 July and the drill string was recovered at 0800 hr. We decided we would return to Hole 1301A to conduct hydrologic (packer) experiments and install the CORK after starting operations at Hole 1301B.

HOLE 1301B: 47° 45.2276' N, 127° 45.8269' W (preliminary); Water depth: 2666.5 mbrf

Reentry cone and 20-inch casing installation: Hole 1301B was located 35 m from Hole 1301A on a bearing of N10.56°E. The scientists wanted the two holes as close as possible. At 2000 hr 8 July, Hole 1301B was started by washing in the 20-inch casing and 6.5 hours later we landed and released the reentry cone. The drill string was recovered at 0900 hours on 9 July.

16-inch casing installation: We used an 18-1/2 inch drilling bit ~8 m below a 20 inch underreamer (U/R) to drill the hole into which the 16-inch casing would be installed. During routine pre-deployment testing in the moonpool, the U/R did not work and we had to rebuild it. Hole 1301B was reentered in < 1 minute and we drilled to 2933.0 mbrf (266.5 mbsf) when the pilot bit encountered basaltic basement (4.1 m shallower than Hole 1301A). We drilled to a total depth of 2944.0 mbrf (277.5 mbsf; 11 m into basement) and the 20-inch U/R hole extends to 268.5 mbsf (2 m into basement). We then made a series of wiper trips and mud sweeps to prepare the hole for the 16-inch casing, filled the hole with mud, and retrieved the drill string which was back on board at 0600 hours on 11 July. We are now just about to land and cement the 16-inch casing.

### **SCIENTIFIC RESULTS**

No new results, only drilling operations.

### **EDUCATION**

The second weekly installment of the Teacher-at-Sea's daily journal (text and photo) has been sent to shore. The first lab brief has been produced and is being reviewed by shipboard staff and scientists before transmittal to shore.

### **TECHNICAL SUPPORT AND HSE ACTIVITIES**

Lab activities: Marine Lab Specialists continue to bring the labs up to operational status (mainly fine-tuning) and are working with scientists to be prepared when core is recovered. The core entry area was set-up for initial microbiology sample processing. Methods for capturing images of hard rock samples taken for destructive microbiological analyses prior to core imaging have been devised as well as digital whole-core photographs for secondary data QC check. The planned helicopter transfer will provide the opportunity to obtain some required supplies for the microbiology lab. Problems in reconciling the shore and ship versions of the inventory database have been corrected. The latest core description software version is being tested. Hard rock sampling plans have been finalized and remaining sampling classes were held. All downhole logging tools have been checked/calibrated and are ready for use.

Computer System Managers configured and installed the driller's PC (required for primary core data entry), configured logging computer systems for ability to FTP data to shore/from shore, shack computer systems, installed tape library system (essential back-up for database, servers), assisted with resolution of inventory database problem, implemented TSF Captain and OIM email accounts, and performed a multitude of routine trouble-shooting, repair, and upgrading tasks.

The Electronics Technicians have been trouble-shooting and repairing the rig-floor WOB filter electronics. A long-standing problem of temperature control in the science lounge has been fixed.

Core recovery:                      None  
Samples collected:                None

HSE: A fire drill was conducted 5 July with the laundry room as the fire location. Those not involved in the emergency response mustered at lifeboats followed by a Captain's orientation to the emergency satellite location and communications devices. IODP Laboratory Staff Emergency radios were setup, repaired, and distributed.