Expedition 321T: Juan de Fuca Cementing Operations
Week 2 Report (28 June – 5 July 2009)

5 July 2009

OPERATIONS:

Arrival on Site U1301
The ship arrived on location at midnight on 29 June covering the 1154 nmi distance at an average speed of 8.4 kts. This was slightly slower than the 9.0 kts originally estimated for the transit, largely as a result of encountering a force 8 gale.

Cementing Operations
Cementing objectives did not require a significant amount of time in the hole nor any appreciable depth below seafloor (~1-1.5 m). Therefore it was determined that the vessel would position using GPS input only. After lowering thrusters and stabilizing the ship over the location coordinates, the cementing Bottom Hole Assembly (BHA) was picked up. The drill string was run to a depth of 1376.2 m below rig floor (DRF) and the VIT/subsea TV was deployed. The drill string trip was then completed to a depth of 2664.3 m DRF and spaced out for re-entry. The lo-torque valve and cementing system integrity was pressure tested and at 1030 hr on 30 June 2009 vessel maneuvering for the first re-entry attempt began. The re-entry target was a single (1 of 12) pie shaped window in the Hole U1301B CORK platform. The platform was re-entered at 1215 hr that same day after 2 hours and 15 minutes of maneuvering. The driller's task was made more complicated by the fact that the top of the cone rim was 1.1 m below seafloor depth (DSF), which meant drill string activity around the cone/platform vicinity stirred up the mud and obscured visibility for several minutes. At 1300 hr the actual cementing mixing operation was initiated and by 1350 hr a total of 60 barrels (bbls) of 15.8 pound per gallon (ppg) class G neat cement blended with Cello-flake lost circulation material (LCM) was mixed up with fresh water and displaced into the pipe. This was chased with 20 barrels of fresh water using the Halliburton cementing pump followed by 120 barrels of sea water displaced with the Triplex rig pumps. The drill string was pulled clear of the top of the re-entry cone (TOC) at 1420 hr 30 June with ~10 barrels of cement still falling from the drill string. This was done to avoid the potential of pumping water into the re-entry cone and diluting the cement slurry.

The cementing unit was cleaned and the tanks flushed while offsetting the ship the 35 m to Hole U1301A. Re-entry at Hole U1301A began at 1530 hr. This time the re-entry target was more challenging: one of eight 12 inch diameter holes in the old style "solid" CORK platform. Re-entering through one of these holes required using the cement stinger to push through the steel grating that had been tack-welded in place below the platform on Expedition 301, requiring careful timing and control of weight on bit. The Hole U1301A platform was re-entered at 1815 hr after only 2-3/4 hr of maneuvering time. The cone rim at this site is at 1.4 m DSF and covered with a layer of fine sediment. A total of 114 bbls of 15.8 ppg "blended" cement was mixed up and displaced in the same manner as in Hole U1301B.

Return to Hole U1301B and Hole U1301B
Hole U1301B platform was re-entered for the second time at 2250 hr requiring only 65 minutes. Preparations for mixing the second batch of cement for the hole started immediately. 70 bbls of 15.8 ppg "blended" cement was displaced into pipe, chased with 20 bbls of fresh water using the cementing pump, and an additional 120 bbls of sea water using the rig pumps. The pipe was pulled clear of the TOC at 2355 hr 30 June again with ~10 barrels of cement still falling from the drill string. After the second cement job, visual observations at Hole U1301B indicated that the re-entry cone appeared to be full of cement as well as the surrounding area outside of cone**.** The cementing unit was cleaned and the tanks flushed while offsetting the ship 35 m back again to Hole U1301A. Visual observations at Hole U1301A indicated that the re-entry cone was full of cement as well as the surrounding area outside of cone. The cementing equipment was rigged down, the subsea TV/VIT was recovered back aboard, and the drill pipe was tripped back to the surface ending cementing operations at Site U1301 at 0900 hr 1 July.

Transit to Victoria, Canada
The vessel departed Juan de Fuca Site U1301 at 0730 hr 4 July bound for Victoria, B.C., Canada. Expedition 321T officially ended at 0800 hr 5 July 2009 with the first line ashore Ogden Point Berth South-A, Outer Harbor, Victoria, B.C., Canada. The transit was made at a slightly slower speed since time was available. The 195 nmi transit from Site U1301 to the Victoria pilot station was made in 1.0 day at an average "reduced" speed of 7.8 kts.

SCIENCE UPDATE:
Cementing Operations
IODP Expedition 321T included only cementing operations. No scientific data or samples were collected. Expedition 321T completed all planned operations, more quickly and with less difficulty that had been anticipated. We were fortunate to have excellent weather and sea conditions; in an area where working conditions can be poor, even during an optimal weather window. Researchers will visit the two CORKs in August 2009 with the submersible, *Alvin*, to download data, determine if the observatories are now sealed, and replace downhole instrument strings in preparation for completing the full suite of interdisciplinary experiments.

School of Rock (SOR)
SOR activities continued through out the week. The week began with a laboratory experiment measuring porosity and hydraulic conductivity. Participants conducted experiments on various marine samples, calculated fluid flow and discussed results. This activity was followed by introductions to borehole observatories and fluid and heat flow in ridge flank settings. The rest of the week was mainly focused on studying microfossils and their environments from ODP cores. Related activities included making smear slides, identifying microfossils and taking photos of microfossils under the microscope for use in their classrooms.

SOR participants received a debriefing from the Chief Scientist, Operation Superintendent, Captain. and Head Electrical Engineer about the ship's dynamic positioning system and overall cementing operations. One of the highlights of the week was the first SOR video conference from the *JOIDES Resolution* to Japan. About 1000 Japanese high school students participated in the video conference.

TECHNICAL SUPPORT ACTIVITES

Ongoing activities include inventory updates, storeroom organization and cleaning laboratories. The breathing air piping on the core receiving platform was relocated to under the support structure and core rack holders were re-aligned. Isolation valves were installed in argon and helium lines throughout laboratory area. Final shipment preparation including packaging and documentation were completed.