PROJECT SITUATION REPORT
DISC Drill 09-10 Season

Project:	T-350-M				
Project Principal Investigator:		Dr. Charles Bentley			
Report No:	10	**for period**	01-11-10	**through**	01-17-10
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ACTIVITIES DURING PERIOD

- This was a week of challenges! Various aspects of the drill put up a good fight this week, but I am proud to say both crew and the drill have weathered each of these challenges in stride and have emerged successful.
- Late on Sunday of last week, a failure of the J2 cutter head on the new thin kerf core barrel occurred. The attachment points for one of the cutters had fatigued, bowed out and peeled away from the head. Upon removal and inspection of this head, micro cracks were seen below the other three cutter attachment points. We believe that the fatigue at these points was caused by a combination of design as well as our taking down the core dog cage stabilizer pads in our effort to increase clearance in the borehole and thereby correct inclination. It appears that the force from the repeated core breaks caused these stress fractures.
- The spare J1 cutter head was installed and the core dog cages were shimmed out to .010” borehole clearance as opposed to the previous .070” clearance. Likewise, the mid-range stabilizers located at the top of the core barrel have been shimmed out to .020” clearance, as opposed to the previous .071” clearance. This should allow the borehole wall to absorb much of the force created at core break. A rigorous inspection of the cutter head is now performed between each run, with caliper measurements between opposing core dog cages recorded each run. This will allow us to detect cutter head degradation before a failure occurs.
- As we have now shimmed the core dog cages out, we continue to watch the inclination to ensure this modification does not put us back on an increasing inclination track. We are still using modified side-cutters and have excitingly seen decreases in our inclination numbers from around 5º to between 3.75º-4.50º.
- The current drill configuration remains Anti-torque section ‘A’, Instrument section ‘L’ and Motor pump section ‘Y’.

- We continue to use rear button shoes, now with one 0.10” shim and one .05” shim under each. Shoe height is .191”. This next week, we will try out the skate shoes for the first time in order to test their adequacy and performance.
- This week we faced both the failure and repair of two of our three sheaves. Mid-week, failure of the lower bearing on the levelwind sheave occurred. At the time, the drill was 1790m deep on ascent with a core in the core barrel. As opposed to trying to hold tension on the cable and remove the levelwind sheave for repair before continuing ascent, we carefully brought the drill out of the hole at a very slow speed of 0.1m/s. This process took just over 6 hours to return the drill to the surface, but was done in a very safe and effective manner. The core seemed quite content to remain in the hole for that extended period of time. The two bearings in the sheave were replaced and drilling resumed.
- The second sheave failure occurred later in the week when two bolts on the crown sheave were found to have fatigued and sheared. While we have experienced a knocking sound with this sheave over the past two seasons, inspection of the sheave had not resolved the issue and the bearings continued to function well. Efforts have been made to keep cable tension at a modest level during ascent this season. All bolts and shims (Speedi-sleeves) have now been replaced and the sheave re-inserted. It is our plan to bring all three sheaves, the two mentioned above and the reaction sheave, home at the end of the season for modification. This modification occurred over 2.5 drilling shifts and drilling will now resume.
- Core quality remains excellent and cutters are changed out approximately every 200m or as needed. We are currently using our fourth set of modified cutters. In order to minimize stress on our remaining cutter head, we are limiting core delta lengths to 3.45m. Accounting for cable stretch and payout encoding, this results in approximately 3.30m of core per run.
- Core production per day varied this week due to the various maintenance issues mentioned above. The lowest production day produced 16.5m while the highest production day saw 33.2m produced.
- Penetration rates currently run between 3.0-3.5mm/s.
- Tripping speeds are now consistent on ascent after the troublesome lower layer on the winch cable was re-tensioned on the drum. We are now slowing for only a small portion of the hole. Run times are between 2h 15min and 2h 30min.
- The small plastic hose ends on the centrifuge nitrogen purge were removed, snipped and re-inserted once again. A fitting was replaced where one of the hoses meets the centrifuge junction box, but there still appears to be a slow leak in the system. The tank is once again turned off between drill runs, but this does not affect operations.
- On Friday, two members of the media arrived. Robert Lee Hotz from the Wall Street Journal and Chas Firestone from UWire/Christian Science Monitor/Nature have been in camp for the weekend and plan to leave on Monday, 1/18/10. They have gathered some excellent pictures and video as well as had individual interviews with many members of our operation. The remaining members of the media that were expected unfortunately had to cancel their visit to WAIS Divide due to weather delays. The entire group, however, made it out to both South Pole and the Dry Valleys.
- On Sunday, the second WAIS Divide Coffee House of the season was held in the Galley. This gave some people in camp a venue to display their talents to the camp while enjoying delicious coffee drinks and snacks. Poetry, various musical

instruments, singing and videos all helped to make this Coffee House one of the best yet!

- I am happy to report that for the most part, both the crew and camp are healthy this week! While some of the challenges produced by the drill lead to interesting shift hours and sleep schedules, everyone remains safe, healthy, on track and focused on the goal.
- Final driller's depth for the week: -2333.015m. Total meters drilled this week: 138.216.

SAFETY

- Daily and weekly safety checks continue.

COMMENTS
(Problems, Concerns, Recommendations, Etc.)