Project: T-350-M
Project Principal Investigator: Dr. Charles Bentley
Report No: 8 for period 1-2-11 through 1-8-11
Prepared by: Kristina Dahnert Date: 1-9-11

IDDO Personnel on Site:
Patrick Cassidy
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Jay Kyne
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John Robinson

ACTIVITIES DURING PERIOD

- This week we are yet again mastering the art of assessing and repairing issues the drill sends our way. The drill sustained additional down time this week, but I am happy to report we are now drilling again.
- Early in the week on Sunday, drilling was progressing smoothly and we collected 30.5 m of core in one day alone!
- On Monday, we lost communication with the Sensor microcontroller in the instrument section during descent on one drill run. As the winch drives also faulted out during this time, both control computers were rebooted, suspecting an issue with the LabVIEW software. Once the drives rebooted, we began ascent to inspect the drill and the Sensor uC issue. On ascent, the Glassman high voltage power supply experienced a hard short. Ascent was slowed to 0.5 m/s and a floor operator watched the borehole cover as the winch and Glassman behaviors suggested a small chance the cable had contracted a kink or knot. At 600 m from the surface on ascent, a kink came out of the borehole. The kink was small enough to make it back through the three sheaves and the drill was returned to the tower and parked.
- After further investigation, the cause of the cable kink has been attributed to a number of factors including a faulty WOB sensor, pushing descent tripping speeds and the collision of the sonde in the borehole with large floating ice chips from the previous rough core break. The drill went down hard as of Monday, 1/3/11, at 6:30pm.
- On Tuesday, the sonde was cut from the drill cable and the cable was run 600 m out the back door of the Arch with

assistance from the drillers and the use of an Alp snow machine. The cable was cut approximately 2 m above the kink and caliper measurements taken to ensure the remaining cable was not damaged. The 600 m of cable was wrapped onto an empty spool and will be retroed to Madison.

- On Wednesday, a new Farmor fitting was terminated onto the cable and the outer layers stripped back in preparation for fiber optic termination.
- Jay Johnson arrived in McMurdo on Tuesday, 1/4/11, at 4:00am via C-17. He then flew to WAIS Divide on Wednesday evening, 1/5/11, arriving at 10:30pm.
- Fiber optic termination was successfully completed on Thursday, 1/6/11 and the Farmor potted with epoxy.
- As the weight-on-bit (WOB) sensor was drifting in Anti-torque section 'A' due to a fluid leak, Anti-torque 'B' was swapped in. This section was found to have a bad connection in the fiber optic rotary joint (FORJ). The unused extra port was utilized with the gray fiber now connecting to the blue connection port.
- Instrument section 'L' was attached for preliminary testing, as this will serve as our spare section once it is fully refurbished. The cutter motor would not enable during testing. A likely cause of this is a bad DDC module, so this section was again reopened for replacement of the module and further testing.
- Instrument section 'J' and Motor pump section 'Z' were again assembled on the drill, the same sections in use before the cable kink occurred.
- The drill was sent down the hole on Friday morning, 1/7/11, at 4:00am. This represents 81.5 hours of down time.
- While the drill was down, the slot drip pans were cleaned and the borehole drip pan reshimmed for proper flow of fluid back into the hole.
- We have now implemented very conservative descent speeds with a 1.0 m/s max in the upper, wider portion of the borehole (from the 170 mm kerf barrel that was originally used) to a 0.75 m/s max in the narrow portion of the hole (from use of the 163 mm thin kerf barrel being used in the hole since 1530 m depth.
- A more conservative WOB check limit of 2800 N was implemented, but the WOB sensor in section 'B' appears to be suffering from the same 'drift' experienced by the other sections due to fluid leaking into the WOB housing. Safe descent speeds were established prior to the drifting of the WOB sensor and will not be exceeded. We are able to use the cable tension reading from the crown sheave load pin to ensure the drill is descending at a safe rate.

- Anti-torque section 'A' was disassembled and loose screws found in the upper housing. A small amount of fluid was found in the WOB housing as well as a stripped hole in the outer clamshell housing. This section will be reassembled and will serve as a spare to section 'B'.
- New cutters were installed, as a nick was found on the inside of cutter 'D'.
- Kendrick Taylor, Mark Twickler, T. J. Fudge (science tech) and two NSF filmmakers, Jeremy and Matt, arrived on Friday, 1/7/11. They were given a preliminary tour of the MECC, Arch Jamesway and the Arch on Saturday, 1/8/11.
- Weekly preventive maintenance (PM) checklists are being completed.
- Bulk fluid tanks were filled
- The Pengo cable tensioner, the P05 cable spooler, the P05 controller and the spare drill cable in McMurdo were TCN'ed for travel to WAIS Divide. The Pengo arrived at WSD on Friday, 1/7/11.
- In light of the down time this week Monday through Thursday, we will work through the weekend and skip the day off on Sunday.
- Final driller's depth for the week: -2856.012 Total meters drilled this week: 95.306 m

SAFETY

- A very minor injury report was filed when a driller suffered a shoulder strain while lifting a barrel of snow into the snow melter in the galley. The medic prescribed Ibuprofen as needed and avoidance of certain work tasks in the drill Arch. This injury was not related to DISC Drill operations or the Arch facility.
- The two old air monitor sampling tubes that were removed from the slot and centrifuge areas were heated and blown out with Nitrogen. These two 50 ft. lengths will now serve as spares if needed.

COMMENTS
(Problems, Concerns, Recommendations, Etc.)

- We were under the impression from the manufacturer that the cable put on the winch drum last season was 3800 m in length. Having cut off approximately 600 m of cable, we believed we only had approximately 3130 m of cable remaining. Upon further calculation, it appears there is still approximately 3400 m of cable on the drum and that the usable length is around 3365 m. This length would allow us to accomplish our original depth goal of 3300 m, however we are now time-limited with only so many days remaining in the field season.