



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	1	<b>for period</b>	11-9-09	<b>through</b>	11-15-09
<b>Prepared by:</b>	Jay Johnson			<b>Date:</b>	11-17-09

<b>ICDS Personnel on Site:</b>	Kristina Dahnert Jay Johnson Elizabeth Morton Dave Ferris Nicolai Mortensen Lou Albershardt Steve Polishinski
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### ACTIVITIES DURING PERIOD

- Lou arrived in Christchurch on Monday the 9<sup>th</sup>.
- Krissy, Steve, and I arrived in Christchurch on Tuesday the 10<sup>th</sup>.
- Dave and Elizabeth arrived in Christchurch on Wednesday the 11<sup>th</sup>.
- Nicolai arrived in Christchurch on Friday the 13<sup>th</sup>.
- Due to the weather delays causing a set back with getting camp opened, I held back the five of us that were scheduled to fly to McMurdo on Friday until Tuesday the 17<sup>th</sup>.

### SAFETY

- Nothing to report

### COMMENTS

(Problems, Concerns, Recommendations, Etc.)



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	2	<b>for period</b>	11-16-09	<b>through</b>	11-22-09
<b>Prepared by:</b>	Jay Johnson			<b>Date:</b>	11-22-09

<b>ICDS Personnel on Site:</b>	Kristina Dahnert Jay Johnson Elizabeth Morton Dave Ferris Nicolai Mortensen Lou Albershardt Steve Polishinski
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### ACTIVITIES DURING PERIOD

- Steve Flew to McMurdo on Monday.
- Krissy, Elizabeth, Dave, Nicolai, Lou, and I flew to McMurdo on Tuesday.
- Steve attended the Snowmobile Safety course on Tuesday afternoon.
- The remaining six of us attended Snowmobile Safety on Thursday afternoon.
- Steve attended Happy Camper on Wednesday through Thursday.
- The remaining six of us attended Happy Camper refresher on Wednesday afternoon.
- We had our inbrief with RPSC on Wednesday morning.
- Everyone except Steve attended the Environmental Field Brief on Thursday morning. Steve will take the course on Nov 23.
- In between courses and meetings, we worked in small groups packing the items we requested from the BFC, Coms, and filled out paperwork to get our cargo into the cargo system.
- Plans are in the works to get the first 2-3 people to WAIS Divide mid next week.
- Josh, Rob, Ben, and Patrick have arrived in Christchurch.
- Josh, Rob, and Ben were scheduled to arrive in MCM on Saturday, however due to the delay the rest of us are experiencing, I decided to hold them in Christchurch until the Nov. 27<sup>th</sup> flight.

### SAFTEY

- The (7) 10# CO<sub>2</sub> extinguishers from UW Safety have been inspected by the Firehouse and have been entered into the Haz Cargo system for shipment to WAIS Divide.

### COMMENTS (Problems, Concerns, Recommendations, Etc.)

- Our put-in to WAIS Divide is currently one week behind schedule.





## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	3	<b>for period</b>	11-23-09	<b>through</b>	11-30-09
<b>Prepared by:</b>	Jay Johnson			<b>Date:</b>	11-30-09

<b>ICDS Personnel on Site:</b>	Kristina Dahnert (WSD) Jay Johnson (WSD) Elizabeth Morton (MCM) Dave Ferris (MCM) Nicolai Mortensen (WSD) Lou Albershardt (MCM) Steve Polishinski (MCM) Patrick Cassidy (MCM) Josh Geotz (MCM) Robb Kulin (MCM) Ben Gross (MCM)
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### ACTIVITIES DURING PERIOD

- Patrick arrived in MCM on Monday.
- Krissy, Nicolai, and I flew to WAIS Divide on Wednesday.
- Josh, Ben, and Robb arrived in MCM on Friday.
- Work in the arch started by removing the tarps from equipment and removing snow that accumulated in the building over the winter. There were only small amounts of snow near the power panels. There was a large drift in front of one of the big doors because the vent turn downs were not removed for the winter and the snow load ripped them off the arch. This left two large holes for snow to enter in.
- The generator was brought on line Thursday afternoon.
- Leveled the control room to compensate for the floor heaving by adding another 1 ½" thick board under the side nearest the arch wall. There is now a total of 3" of shim.
- Adjusted the screen cleaning system to realign the tilt stage with the vibrator table.
- Leveled the centrifuge. Added another ¾" to the back edge for a total of 1 ½" of shim.
- Powered up the tower hydraulics. The slot walls will need some trimming so the tower can be tilted. The slot opening through the floor has clearance to the tower so it will not need any modifications. The carpenters will start the slot work next week.
- The end of the arch was buried up to the peak of the roof. The equipment operators were finishing digging out the doors on Sunday evening.

- The MECC has been moved into place, was set up, and it is fully operational.
- Both gantry cranes are up and running.
- Moved the floating crane rail ~2" in the mid area (away from the slot) to put the rails at the proper spacing. The rail has been moved a total of 5" which is an indication of how much the building has been squished at the mid point.
- The centrifuge controller has been installed and it powers up, but the nitrogen hasn't been hooked up so we haven't been able to fully test it yet.
- Removed the crown sheave and pulled the bearing hub to machine it for the new bearings. I found the hub is 1/2" narrower than the drawings from Inter Ocean called it out to be. The new bearings are too wide to work with the existing hub. I ended up adding a second set of the existing bearings so the hub now has four bearings. The second set of bearings will help share the load and hopefully get us by until a new solution can be worked out.
- Checked the bore hole fluid level. It measured 242.5' (74m) from floor level. The level at the end of last season was 246' (75m). The increase in fluid level is most likely due to the bore hole slightly shrinking over winter. Assuming even hole closure, a hole diameter change of .0025" would give 1m of fluid rise.
- Installed the level wind control arm. The potentiometer housing hit the junction box mount when the sheave is pivoted up. Shortening the mount solved the problem.
- Installed the batch controllers in the fluid handling system and tested it. Fluid has not been added to the system yet, but the controls all work.
- Reorganized the power and signal cables connecting the winch, winch power cabinet, and control room to separate the power and signal cables so they don't cross talk.
- WAIS celebrated Thanksgiving on Friday evening.
- We did a two hour late start on Saturday and then worked a full day on Sunday.

### **SAFTEY**

- Nothing at this time.

### **COMMENTS**

**(Problems, Concerns, Recommendations, Etc.)**



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	4	<b>for period</b>	11-30-09	<b>through</b>	12-06-09
<b>Prepared by:</b>	Jay Johnson			<b>Date:</b>	12-06-09

<b>ICDS Personnel on Site:</b>	Kristina Dahnert (WSD)
	Jay Johnson (WSD)
	Elizabeth Morton (WSD)
	Dave Ferris (WSD)
	Nicolai Mortensen (WSD)
	Lou Albershardt (WSD)
	Steve Polishinski (WSD)
	Patrick Cassidy (WSD)
	Josh Geotz (MCM)
	Robb Kulin (MCM)
	Ben Gross (MCM)

### ACTIVITIES DURING PERIOD

- Elizabeth, Dave, Lou, and Patrick arrived at WAIS Divide on Wednesday.
- Set the computer equipment up in the control room.
- Installed the winch power cabinet and powered up the winch.
- The carpenters cut back areas of the slot walls to provide clearance for the drill tower. At this point the slot opening through the floor has adequate clearance to the tower.
- Unpacked the winch DNF crate and Sonde crate.
- Set up the tensioner and spooled the new cable onto the winch. The tensioner and cable spooler are going to be sent back to MCM and stored on the WAIS cargo line. The old cable is going to be sent back to MSN by way of the vessel.
- The new level wind control is working well. The turn around limit switches need some continued fine tuning; otherwise it did a flawless job of tracking during spooling.
- Organized the shelving in the arch containing the safety equipment and spare parts.
- Extended slot end wall drip pan.
- Removed the slot drip pan section that surrounds the casing. Shortened the casing by 10" and reinstalled the drip pan. Cleaned the slot drip pans and replaced the cable wiper brushes on the hole cover.
- Cable termination is nearing completion. The Farmore connection is installed and the optical connectors have been installed on both ends of the cable. Monday we will polish the fibers and pot the Farmore connector.
- Did a through cleaning of the winch, level wind, and tower base to remove cable

debris and snow.

- The hot air blower for the screen cleaning system still doesn't work. The control board was replaced over the summer, however Steve tore into it and found the blower motor is bad and a few components that are not part of the control board are also burned out. We are having the carpenters build us a fitting so we can implement our back up heater in place of the hot air blower.

### **SAFTEY**

- Installed and calibrated the air monitor
- Placed the fire extinguishers in the arch

### **COMMENTS**

**(Problems, Concerns, Recommendations, Etc.)**



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M			
<b>Project Principal Investigator:</b>	Dr. Charles Bentley			
<b>Report No:</b>	5	<b>for period</b>	12-7-09	<b>through</b> 12-13-09
<b>Prepared by:</b>	Kristina Dahnert		<b>Date:</b>	12-13-09

<b>ICDS Personnel on Site:</b>	Kristina Dahnert Jay Johnson Elizabeth Morton Dave Ferris Nicolai Mortensen Lou Albershardt Steve Polishinski Patrick Cassidy Josh Goetz Robb Kulin Ben Gross
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### ACTIVITIES DURING PERIOD

- Ben, Josh and Robb arrived at WAIS Divide on Monday.
- Finished terminating the drill cable and potted the Farmor connector. All 12 fiber connections work well when connected to the winch drum and sonde.
- Filled the bulk fluid tanks and positioned them outside the Arch.
- Connected and aligned the core transfer truss sections, the receiving table and the cutting station.
- Checked screw and bolt torque on the core barrel, both screen barrels and the tower.
- Hung the drill on the tower and aligned it with the borehole. The tower foot on the screen cleaning side was lowered and shifted towards the control room. This is as far as it can be moved without requiring major rework of the slot and handrails.
- Created a schematic for the Fluid Handling System.
- The carpenters lengthened the slot opening by 1m and have modified the access hatch to allow for an extension of the drill tower.
- Software work and updates continue. The new motor handoff procedure works well and does not stress the winch as did the previous method.
- Attempted to use a special box built by the carpenters to connect the backup heater to the screen heating tube. This box restricted air flow too much, so we have now returned to using the warming box from last season.
- Tested the centrifuge, chip blower and fluid handling system. All are working well and all staff have been trained on operation of this equipment.
- The side door of the Arch (the "moose" door) has been excavated and is now



operational.

- Levelled the optics table.
- Assembled the thin kerf core barrel.
- Ran the drill to the bottom of the hole for two cleaning runs. A filter bag was installed in three screens for one of the runs.
- Excessive amounts of void filler from the new cable are dirtying the borehole and drip pans. Successful attempts to clean the cable have been made by applying ScotchBrite pads to the cable during tripping. Extensive progress has been made, but void filler may continue to present challenges.
- Greased the winch motors.
- Four cores were drilled this week! During the first two runs, the drill had difficulty penetrating even at 1 mm/s, thus both runs were aborted with core lengths of 0.699 m and 0.456 m. Front shoes .192" were used. Both cores had random pitch spiral grooves.
- Removed the stabilizer bumps on one set of core dog cages. Void filler may have been lodging behind these bumps causing the drill to cut sideways.
- Replaced the .192" hight front shoes with .181" height rear shoes for the third run. Still low penetration even at 0.8 mm/s. Spirals continued on the core.
- Installed .146" hight rear shoes on the fourth run for a more aggressive penetration. This proved to be too aggressive, causing an over-current of the cutter motor. The core, however, has a smooth OD and 0.6 m was recovered.
- The pump on the Y Motor Section wouldn't hold grease after the third drill run. It was replaced with the pump from the Z Motor Section. Upon inspection of the original pump, the seal was still good and the issue was caused by the seal retaining nut backing out.
- On Sunday we remachined the crown sheave hub for the new bearings and installed the sheave back on the tower.
- Added a one meter extension on the tower in preparation for running the longer thin kerf barrel.

### **SAFTEY**

- Elizabeth has been trained and has started doing Confined Space permits for slot work as well as completing the Daily and Weekly safety checklists.
- A safety walkthrough of the Arch was conducted on Saturday with all of the core handling and drilling staff as well as the two camp medics.

### **COMMENTS**

**(Problems, Concerns, Recommendations, Etc.)**



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	6	<b>for period</b>	12-14-09	<b>through</b>	12-20-09
<b>Prepared by:</b>	Kristina Dahnert			<b>Date:</b>	12-21-09

<b>ICDS Personnel on Site:</b>	Kristina Dahnert Jay Johnson (left WSD Friday, 12/18/09) Elizabeth Morton Dave Ferris Nicolai Mortensen Lou Albershardt Steve Polishinski Patrick Cassidy Josh Goetz Robb Kulin Ben Gross
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### ACTIVITIES DURING PERIOD

- Everyone remained on 1<sup>st</sup> shift on Monday. Each new member of our crew rotated through the control room along with a crew member from a previous season. We drilled three cores, all over 2.5m. The first two runs were done using .179" height rear button shoes. The last run was done using .175" shoes for a more aggressive cut.
- Tuesday and Wednesday we started two shifts. First shift consisted of the normally-scheduled 1<sup>st</sup> shift, plus Jay and Krissy. Second shift was a combination of the six others scheduled for the upcoming 2<sup>nd</sup> and 3<sup>rd</sup> shifts.
- Started using the thin kerf core barrel with .165" rear button shoes and the new J1 cutter head. These shoes proved to be too aggressive and over-heated the cutter motor. Core length was 1.490m on the first run with this barrel.
- 0.186" shoes were tried next. Penetration was slow at 2.15mm/s, but core length was 3.127m.
- 0.181" shoes were tried to increase penetration a bit and resulted in a 2.75-2.85mm/s penetration speed. Core length was 3.171.
- Pump speeds have ranged from 2500rpm-3000rpm. We are running the pump while tripping down hole and have achieved a descent speed of 1.0m/s.
- We have successfully increased winch ascent speeds to 1.5m/s, however due to misaligned end wraps during cable spooling, we need to slow down to 0.5m/s at the end of each wrap. This problem should correct itself when we complete this last misaligned wrap (~300m).
- New, shorter anti-torque blades were installed to access the thin kerf barrel hole. Hole diameter is now 163mm down from the original 170mm. Blades are being adjusted accordingly, as they seemed to be tight in the borehole leading to a

stick-slip situation during descent and penetration.

- Tested new two-stage pump. Temperatures on this pump run about 10°C higher than the single-stage pump, but it too was run at 2500rpm during descent. Core length of 3.369m was achieved. While the core lengths were between 3.3-3.5m with this configuration, there were no obvious indications that the new pump was causing the increased core length. After two more shifts, we returned to the single-stage pump. This reduces pump temperature and torque significantly.
- A drift issue with the Weight on Bit (WOB) sensor was discovered during two runs mid-week. While we were still able to drill a core using the tension reading, Anti-torque section A was swapped in for Anti-torque B. The WOB sensor in section A is functioning well.
- The second cutter head for the thin kerf barrel (J2) was installed. Jay machined the core dog cages for both 'J' heads to allow more clearance with the borehole wall. We now have a variety of shims available for the core dog cages to adjust our clearance to the borehole wall as necessary.
- Thursday was our first day of three shifts. The first shift of Elizabeth, Lou and Steve runs from 7:00am-3:30pm. The second shift of Patrick, Dave and Robb runs from 3:00pm-11:30pm. The third shift of Nicolai, Josh and Ben runs from 11:00pm-7:30am.
- Tested the new screen fill tubes for two runs. The chips were still wet, and not anymore densely packed in the upper screens. These tubes proved troublesome to clean and did not increase core length. They are no longer in use.
- Due to the tightness of the drill in the borehole, we have been starting the cutter during descent, around 40m from the bottom. A small amount of reaming can be seen on the cutter current during this time.
- We have been stopping payout 1-2 times during coring due to heating of the cutter motor. As the temperature approaches 50°C, we stop the winch and allow the pump to cool the cutter as the drill starts to free-hang. This leaves a small opaque and a small shiny band on the core, but does not affect core quality per core handler feedback.
- Our current and most stable drill configuration consists of the single-stage pump and the thin kerf core barrel with .181" rear button shoes. We can occasionally drill to a delta depth of 3.50m of core before the pump current descends or a cutter becomes packed, however we have typically been coring 3.2-3.3m each run, so as not to pack the cutters and over-current the cutter motor. This is still a 0.5-0.6m increase in core length in comparison to last season.
- Jay made a tool for use in removing the screen valve. It works well in removing the valve that fits tightly in one of the screen barrels.
- Fluid mixing has begun. The fluid level in the borehole is being kept between 90-110m.
- A problem occurred when using the fluid catch valve to obtain a sample of the borehole fluid. This was likely caused by a 3.473m core and a packing of the screens, which seems to be too much when using this valve. Thus, all of the chips flowed back into the borehole. This resulted in a subsequent vacuuming-only run, with no core collected. Dave reports that borehole density is right where it should be.
- On Friday night, we said goodbye to Jay as he left on the 8:30pm flight. He spent one night in McMurdo, one night in Christchurch and one night in Sydney before returning home on the 21st. We thank him for all of his hard work and

direction in getting us up and running and we will miss him! Thank you, Jay!

- On Saturday, the camp celebrated a great week with a beach-themed party. A good time was had by all!
- On Sunday, it was our turn for house-mousing. Sundays are a bit more involved than other days, as those assigned need to heat up the lunch and dinner meals in addition to the normal mousing tasks. Every shift was able to participate and a great job was done by all. Sunday also included the 2<sup>nd</sup> annual WAIS Divide Coffee House, a time when people can show off their various talents of singing, playing instruments, etc.
- Sunday was an extremely productive day for both 2<sup>nd</sup> and 3<sup>rd</sup> shift (1<sup>st</sup> shift's day off). A total of nine runs were completed!
- Final driller's depth for the week: -1631.167. Total meters drilled this week: 113.833.

### **SAFTEY**

- The startup checklist was completed. This includes startup tasks for RPSC, NICL and ICDS.
- Elizabeth continues to complete the daily and weekly safety checks. No issues have been witnessed during these checks.
- The NICL air monitor has been registering a 'Trouble' alarm since a power recycle. Krissy and Brian will work to resolve this issue. If the monitor is still in distress, one line from the DISC Drill monitor will be used on the NICL side during operations. This line is already in place under the floor from the 2007-08 season.
- John, an RPSC electrician, has been upgrading the Arch fire alarm system with cold weather-rated equipment. This work should be completed shortly and pull stations were tested late in the week. The smoke alarm in the control room was also tested.

### **COMMENTS**

**(Problems, Concerns, Recommendations, Etc.)**

- Happy Holidays, Everyone!



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	7	<b>for period</b>	12-21-09	<b>through</b>	12-27-09
<b>Prepared by:</b>	Kristina Dahnert			<b>Date:</b>	12-27-09

<b>ICDS Personnel on Site:</b>	Kristina Dahnert Elizabeth Morton Dave Ferris Nicolai Mortensen Lou Albershardt Steve Polishinski Patrick Cassidy Josh Goetz Robb Kulin Ben Gross Mike Waszkiewicz (visitor)
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### ACTIVITIES DURING PERIOD

- The new tool made to remove the screen cleaning valves has worked so well so as to loosen and break off the 'T' portion of the valve handle. Both of the handles have been welded back on and work well.
- Filled bulk fluid tanks twice this week. Three more Air Force pallets (48 drums total) of Isopar K are staged in McMurdo and ready for a flight to WAIS Divide. We will then have enough fluid onsite to finish this season and drill two weeks next season.
- Winch speeds have now reached 1.2m/s on descent and 1.6m/s on ascent. We are still slowing down for the misaligned wraps on the winch drum.
- Our biggest concern this week is inclination of the borehole. While last season saw a dramatic rise up to 3.5°, we are now up to just over 5° and are quickly working to alleviate this increase. Some fixes attempted include:
  - Removing the stabilizers at the top of the core barrel, as these likely only serve to keep our inclination increasing at the current rate, but would not allow us to regain vertical.
  - The core dog cages on the currently in-use J2 cutter head have been taken down .030" from the original .019" clearance that Jay had machined them. Current clearance to the borehole wall is .049". This was done in two separate machinings (.010" and .020").
  - The small collars and screen spacers used during our attempts at using the screen fill tubes have been re-inserted. On the collars, we have re-introduced the stabilizers removed from the top of the core barrel. This collar was then inserted between sections four and five on the top of the screen barrel and above the center of mass of the drill. The thought is that giving the

cutter head more clearance, putting stabilizers above the drill's center of mass and reducing the probable bowing of the drill in the hole will allow the drill to head back towards vertical.

- We have been stopping 15m from the bottom each run, turning the cutter up to 100rpm and reaming down to 0.3m from the bottom.
- We have been running with very low penetration speeds, between 1.3-1.5mm/s.
- All of these efforts seem to have deterred an increase in inclination for now, but the issue is being monitored at all times.
- At the beginning of the week, we had been doing 12 runs per day with total core production of 40m per day. This has been scaled back to 20m per day in light of the inclination problem and subsequent extended run times.
- The crown sheave has again started to make a slight knocking noise after core break. Only a few knocks are heard per run and are not as loud as those heard last season. The noises seem to dissipate after a few hundred meters of travel.
- The drill depth passed that of sea level early Wednesday morning!
- We are still using rear button shoes, but various heights have been tried. We are currently using .186" shoes (includes .010" shim). This limits penetration speeds to between 1.3-1.4mm/s, but allows weight-on-bit (WOB) to remain light.
- All 930m of core drilled last season, including all of the brittle ice, is now in McMurdo. Approximately 500m of ductile ice from this season will also be shipped out. This will max out the amount of core the SafeCore containers can transport this season.
- Christmas was celebrated on Friday night, 12/25/09. The cooks again outdid themselves and a white elephant gift exchange was enjoyed by all. Each shift moved their day off to accommodate the camp's schedule.
- Final driller's depth for the week: -1800.212. Total meters drilled this week: 169.045.

### **SAFTEY**

- The DISC Drill air monitor began registering 'Trouble' early in the week. The sampling lines were unplugged for two days and re-inserted. Residue in the lines may have been the culprit, as they have now dried and the monitor is functioning well.
- The NICL air monitor is still registering 'Trouble'. We will now use one line from the DISC monitor to run samples from the NICL side. We are confident, after 3+ years of data, that vapor levels during operations on both sides of the Arch are permissible and safe.

### **COMMENTS**

**(Problems, Concerns, Recommendations, Etc.)**



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M			
<b>Project Principal Investigator:</b>	Dr. Charles Bentley			
<b>Report No:</b>	8	<b>for period</b>	12-28-09	<b>through</b> 01-03-09
<b>Prepared by:</b>	Kristina Dahnert		<b>Date:</b>	01-03-09

<b>ICDS Personnel on Site:</b>	Lou Albershardt Patrick Cassidy Kristina Dahnert Dave Ferris Josh Goetz Ben Gross Robb Kulin Nicolai Mortensen Elizabeth Morton Steve Polishinski Mike Jayred (RAM Drill – returned to WSD on 12/31) Jim Koehler (RAM Drill – returned to WSD on 12/31) Mike Waszkiewicz (visitor – left WSD on 12/31)
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### ACTIVITIES DURING PERIOD

- Inclination appears to have stabilized this week. While we have even seen slight improvements in our average inclination numbers over the past few days of drilling, it is still too early to say if we are in fact heading back toward vertical. Our efforts this week include:
  - Ream one pass per run starting at 6m from the bottom. This is done using the Trip motor, 100rpm on the cutter, 3200rpm on the pump and at a penetration speed of 0.1m/s.
  - We have modified a set of cutters, giving them more side-cutting ability. This was done by taking down part of the relieved edge on the outside of the cutter, leaving a 4/10mm wide x 3mm long relieved edge.
  - We have re-attached stabilizers to top of core barrel, as flex in the drill between the new upper stabilizers on the screen barrel and the lower core dog cages still allowed too much flex in the drill. Clearance distance to the borehole wall on these mid-range stabilizers is .071". Upper stabilizer clearance is now .010" and core dog cage (lower stabilizers) is currently at: .070".
  - Current average inclination ranges between 4.7-5.2°. The season max of 5.4° has not been seen in approximately 25 runs.
  - Late on Sunday, the inclinometer began showing spikes and inconsistencies not reflected in the accelerometers. The trouble is likely with this sensor only. The plan is to change out this instrument section very soon.

- Immediately after installation of the newly-machined cutters, the core diameter decreased to 116mm. This was only seen for approximately two drill runs, whereafter the drill settled in and the diameter returned to 121mm+.
- Core surface has also been more rough with the newly-machined cutters, but Anais assures us these grooves do not pose a threat to overall core quality. The core handlers are keeping us informed of any potential surface fractures caused by these cutters.
- Penetration rates have increased from 1.3mm/s to up to 3.5mm/s. Higher speeds have reduced cutter dropouts and decreased run times.
- We are still using rear button shoes and have re-inserted a second .010" shim under each shoe. Current shoe height is .196".
- As with last season, the nitrogen purge line for the centrifuge appears to have a leak. Efforts were made to locate the leak, but it is now common practice to turn off the nitrogen tank in between runs when the centrifuge is not in use.
- One core dog and spring were replaced after the core dogs slipped on two cores. All four dogs now appear to be working well.
- Fluid level in the borehole is being maintained between 90-110m, as with the previous season.
- Questions have arisen this season as to the drill's ability to correctly determine azimuth. Nicolai has reviewed the program that calculates azimuth and has found errors. While he could, in theory, fix the program this would mean stopping drilling for a 1-2 days. Currently the priority has been balancing efforts to reduce inclination as well as increase production rates, and azimuth will be revisited if necessary. In the meantime, the core handlers have started butting core ends together and have a method for marking a consistent azimuth.
- Mike Waszkiewicz departed WAIS Divide for McMurdo on Thursday, 12/31/09, after an 8-day visit.
- Mike Jayred and Jim Koehler returned to WAIS Divide from the Thwaites Glacier traverse on Thursday, 12/31/09. Due to one of the two Tuckers breaking on the drive back, the drill was left 130 miles from WAIS Divide and is being retrieved this week. Upon its return, it will be packed for retro to McMurdo.
- The New Year holiday was celebrated on Friday night, 1/1/10. Appetizers and a large prime rib dinner were followed by a charity raffle. Prizes included an I-Touch, a music CD, Antarctic photography posters and a signed "Red Parka" painting done by visiting artist Anna McKee.
- Weather onsite has been windy with many days of flat light.
- The crew was in good health (finally) and in good spirits, but it appears the next round of stomach flu has arrived from McMurdo. We will keep our fingers crossed, but everyone is doing a great job in keeping production moving along. Way to go, Team!
- Big news of the week: Late on Sunday we reached 2000m!
- Final driller's depth for the week: -2001.749. Total meters drilled this week: 177.477m. (Correction: Last week's final depth should have read -1824.272.)

## SAFETY

- The DISC air monitor is still functioning well and we continue to use Port 3 for vapor readings from the NICL side of the Arch. Despite Brian Bencivengo's attempts to troubleshoot the NICL monitor, it appears the problem is internal.



The monitor will be retroed at the end of the season for repair.

**COMMENTS**  
**(Problems, Concerns, Recommendations, Etc.)**



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	9	<b>for period</b>	01-04-10	<b>through</b>	01-10-10
<b>Prepared by:</b>	Kristina Dahnert			<b>Date:</b>	01-10-10

<b>ICDS Personnel on Site:</b>	Lou Albershardt Patrick Cassidy Kristina Dahnert Dave Ferris Josh Goetz Ben Gross Robb Kulin Nicolai Mortensen Elizabeth Morton Steve Polishinski Mike Jayred (RAM Drill – left on Friday, 1/8/10) Jim Koehler (RAM Drill – left on Friday, 1/8/10)
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### ACTIVITIES DURING PERIOD

- After the inclinometer failed in instrument section 'K' last week, we are now using section 'L'. This section appears to be working well and the inclinometer is reading similar to the other one when it was still functioning. Current drill configuration consists of Anti-torque section 'A', Instrument section 'L' and Motor pump section 'Y'.
- Inclination has shown some improvement this week. We appear to have corrected the hole by 0.5°, with an average inclination now of 4.6°. Our efforts this week regarding inclination include:
  - We are no longer reaming 6m prior to the start of each run, as the cutter current did not reflect active cutting. Removing this method now saves approximately 20 minutes per drill run.
  - We continue to use modified cutters, giving them more side-cutting ability. As the machined notch on each cutter was susceptible to wear, we plan to increase the size of this notch on any new cutter sets to 0.8mm x 4mm. We are currently using our third set of newly-machined cutters. A fourth set is in production.
- Core quality remains excellent, though with a slightly rougher surface. Typical core lengths range between 3.25m-3.40m.
- Core production per day ranges from 29m-35m, with 9-11 drill runs completed per day.
- Penetration rates remain around 3.5mm/s, but increases in speeds up to 4.9mm/s have been used at the end of coring runs to avoid cutter dropouts.
- Tripping speeds continue to max out at 1.2m/s on descent and 1.6m/s on ascent. For the majority of the week, we were still forced to slow payout to 0.5m/s on ascent

at the turnarounds. We exposed a new lower layer of cable this week, which was also found to have loose wraps. Nicolai and Robb worked with the winch on Saturday evening in an attempt to alleviate this issue and were successful at re-tightening the troublesome lower layer. We are now slowing only through one of the turnarounds. We are still keeping an eye on the winch on ascent, but have happily decreased our ascent time.

- We have experienced a few software crashes and winch faults this week, however crews are better prepared to recover from these faults this season.
- We continue using rear button shoes with two 0.10" shims. Shoe height is .196".
- An issue occurred with the new thin-kerf core barrel this week. Upon removing the barrel from the FED (Fluid Extraction Device used by NICL), it was noticed that two barrel sections were loose and spun independently of one another. Upon investigation, the set screws were loose at one section and the barrel threads had only loosened slightly. Difficulty pushing this particular core out was due to the fiberglass tube at this junction sitting at an angle inside the barrel. As we do not need a full 4-meter core barrel, this section was simply removed. All set screws were checked for tightness and will be now checked once per day.
- The small plastic hose ends on the centrifuge nitrogen purge were removed, snipped and re-inserted. This appears to have fixed the nitrogen leak and the tank now remains on at all times.
- Instrument section 'L' appears to be more accurate and consistent at determining azimuth, but this sensor still requires further investigation and testing.
- The shipping container skis were assembled and attached on Wednesday. Placing them under the container proved a bit more challenging than expected, but was completed with the help of Ben, Josh, Krissy, Theresa (the camp manager), Charlie (the camp mechanic) and Jason and Mark (the camp equipment operators). Both the D4 and 953 were used in this endeavor.
- Mike Jayred and Jim Koehler left WAIS Divide on Friday, 1/8/10. Kendrick Taylor arrived on Friday as well. The first LC-130 arriving in camp on Friday had to overnight due to a fuel leak. A second LC-130 arriving that night retrieved the air crew and three people leaving camp. A third plane on Saturday brought the necessary parts to repair the grounded Herc.
- Sickness has plagued much of the camp and our crew this season. We have had 3.5 sick days, which is 3.5 more days than all previous seasons combined. I have been able to fill in for these shifts, and shared a 3rd shift with Lou while Nicolai was out of commission. Despite the bugs going around, everyone has done a great job of keeping things moving along!
- Jane Marquard, the WAIS Divide Cargo Coordinator based in McMurdo, arrived in camp on Saturday, 1/9/10, for a weekend visit.
- Dave Ferris prepared his 2nd annual Mediterranean feast for the camp on Saturday night. The delicious dinner was enjoyed by all!
- The 3rd annual West Antarctic Olympic Games were held on Sunday 1/10/10. Events included 'ECW Gear Twister', 'Frisbee Toss', 'Outdoor Paddle ball' and 'Two-hole Mini Golf' complete with animatronic windmill and wheel of wonder.
- Final driller's depth for the week: -2194.799m. Total meters drilled this week: 193.050m.

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<b>SAFETY</b>
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| <ul style="list-style-type: none"><li>• Two slot entries were performed this week. One entry was made to again adjust the fluid hose to casing junction. The second entry was made to retrieve a pair of sunglasses.</li><li>• The hose on the chip vacuum has been grounded to the motor. Users wearing leather gloves experienced minor static electricity prior to this, however it is standard procedure to wear the yellow Dailove gloves when vacuuming, which do not present an issue.</li><li>• Daily and weekly safety checks continue.</li></ul> |
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<b>COMMENTS</b>
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<b>(Problems, Concerns, Recommendations, Etc.)</b>
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## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	10	<b>for period</b>	01-11-10	<b>through</b>	01-17-10
<b>Prepared by:</b>	Kristina Dahnert			<b>Date:</b>	01-18-10

<b>ICDS Personnel on Site:</b>	Lou Albershardt Patrick Cassidy Kristina Dahnert Dave Ferris Josh Goetz Ben Gross Robb Kulin Nicolai Mortensen Elizabeth Morton Steve Polishinski
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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 5° to between 3.75°-4.50°.
- 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.)**



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	11	<b>for period</b>	01-18-10	<b>through</b>	01-24-10
<b>Prepared by:</b>	Kristina Dahnert			<b>Date:</b>	01-24-10

<b>ICDS Personnel on Site:</b>	Lou Albershardt Patrick Cassidy Kristina Dahnert Dave Ferris Josh Goetz Ben Gross Robb Kulin Nicolai Mortensen Elizabeth Morton Steve Polishinski Charlie Bentley (arrived 1/19/10) Tony Wendricks (arrived 1/19/10)
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### ACTIVITIES DURING PERIOD

- Last week was one of challenges. This week was one of drilling! After the crown sheave repair late last week, drilling resumed early Monday morning, much to the enjoyment of the crew and camp.
- Much in line with the documentation of the Byrd ice cores, we have been drilling through many, many cloudy/ash layers this week. This makes for exciting logging and nice backlit displays with the overhead lights off on the NICL side of the Arch. The greatest number of cloudy layers seen in one 3.30m piece of core was 31!
- We are happy to report that average inclination is now around 4°, approximately 1° less than before side cutters and other fixes were implemented.
- The current drill configuration remains Anti-torque section 'A', Instrument section 'L' and Motor pump section 'Y', though the pump is exhibiting a bit more oscillation in torque and other periodic difficulties. We continue to run with this section, as core length and quality have not been affected.
- For much of the week, we continued to use rear button shoes, still with one 0.10" shim and one .05" shim under each. Shoe height is .191". Late in the week we installed the skate shoes in order to test their adequacy and performance. Skate shoes with a 3mm pitch were installed. Core quality was still excellent and comparable to that drilled with the rear shoes. The skate shoes do, however, exhibit a more erratic cutter current. Rear shoes are still the preferred shoe choice.
- The small centrifuge hoist succumbed to electrical failure and became stuck in the 'going up' state. It was replaced by the spare hoist and the broken hoist will be retroed to Madison at the end of the season.
- The crown sheave is again 'knocking' periodically after core break and during



ascent. Visual inspections are made between each run to detect any issues. All three sheaves will be retroed to Madison for work this summer.

- Some preventive maintenance was performed this week, including greasing of the winch and tower zerts.
- We had many visitors this week. A few people quickly visited the Arch and camp and returned on the same plane, including Julie Palais, Alex Isern and Cara Ferrier. Those staying for several days up to one week included Matthew Kippenhan, Matthew Lazzara, Tony Wendricks and Charlie Bentley!
- We again had a Herc grounded at WAIS for several hours on Thursday night due to a fuel leak, though they were successfully able to return to McMurdo early the next morning with the remaining skid of ice core going out this season.
- On Saturday night, Charlie gave his "IGY: 1956-1959" talk in the Galley. The event was well-attended and complimented by a "Congrats, Charlie! 7 Decades on the Ice" cake.
- At the time of this report, we have very few drilling runs remaining for the season. We plan to end drilling operations on Monday, 1/25/10 after the completion of 1<sup>st</sup> shift. While delayed camp start-up, weather, and maintenance issues have all played a role and we will not meet the original season goal of 2600m, we are going to get very close and consider this drilling season a major success. A few members of our team will redeploy to McMurdo already on Monday and the rest will follow on Friday, 1/29/10 after packing up.
- Despite increasing depths, we had our highest production week ever! We also passed the mark of over 1000m drilled this 2009-10 season!
- Final driller's depth for the week: -2531.902m. Total meters drilled this week: 198.887m.

### **SAFETY**

- This week we filed two very minor injury reports. Both dealt with finger injuries that were easily treated. No further action is anticipated regarding these reports.
- Daily and weekly safety checks continue.

### **COMMENTS**

**(Problems, Concerns, Recommendations, Etc.)**



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	12	<b>for period</b>	01-25-10	<b>through</b>	01-31-10
<b>Prepared by:</b>	Kristina Dahnert			<b>Date:</b>	01-31-10

<b>ICDS Personnel on Site:</b>	Lou Albershardt Patrick Cassidy Kristina Dahnert Dave Ferris Josh Goetz Ben Gross Robb Kulin Nicolai Mortensen Elizabeth Morton Steve Polishinski Charlie Bentley Tony Wendricks
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### ACTIVITIES DURING PERIOD

- The first day of this week (Sunday) marked our last day of three-shift work.
- On Sunday night, a Driller's Debrief was held in the Science Rac Tent. All drillers were present, as well as Charlie and Tony. It was good to finally be able to gather as a group again. The meeting was quite productive and complimented by root beer floats!
- The following day, only 1<sup>st</sup> shift worked and drilling ended around 11:30am for the 2009-10 season. All drillers, core handlers, visitors and a few camp staff enjoyed champagne in the Arch.
- Despite early season weather/camp delays and periodic mechanical issues with the drill, we managed to drill 1050m of core this season. We finished approximately one drilling day's worth short of our 2600m goal. Final driller's depth for the season: -2564.370.
- Ben, Charlie, Dave, Robb, Steve and Tony all left for McMurdo (MCM) on Monday, 1/25/10. A carpenter crew of 14 from MCM arrived on the same flight to begin camp closeout.
- Camp buildings (Jamesways and Rac Tents) came down quickly throughout the week. Power lines in the main camp were also taken down.
- On Tuesday, the remaining six drillers began packing and winterizing equipment. Packing details follow.
- The shipping container was organized, making room for Arctic oven and blue foam storage.
- The sonde was removed from the drill cable and the sections were dried in the MECC before being packed.

- The freezer, fire extinguishers, air monitor, Glassman rack and stereos were all packed for winter DNF storage in MCM. Another DNF Hardigg case was also sent to MCM, consisting of high-priority items that will fly with the drill put-in crew next season. These items include VFD's to get the cranes up and running, as well as the tower controller, etc.
- The borehole fluid level was brought up to 75m. Remaining onsite fluid numbers were recorded for all barrels, bulk tanks, the mixing tank and the centrifuge collection tank. The fluid hoses were disconnected from the bulk tanks and pulled inside of the Arch. The bulk tanks were put up on berms for winter storage.
- All slot and winch pit drip pans were cleaned. The borehole cover was additionally covered with plastic and dunnage, to prevent any 2010-11 early-season carpentry work from negatively impacting the borehole.
- The chip hopper was disconnected from service, the black plastic lids were removed for the winter and the hopper was put up on a berm.
- All three sheaves (crown, reaction, levelwind) were removed. A custom shipping crate was built by one of the carpenters. The sheaves and associated parts will return to Madison for rework this summer.
- The winch cabinet crate was packed and moved into the main camp and plugged in for heat until its flight on Thursday.
- All equipment and racks in the Arch were tarped, though snow accumulation in the Arch is expected to be minimal over winter as the remaining exposed portion of the roof was purposely covered with snow at season startup.
- Elizabeth, Lou and Patrick flew to MCM on Thursday, 1/28/10 along with all DISC Drill retro cargo.
- Ben, Dave, Robb and Steve flew from MCM to Christchurch (CHC) on Thursday, 1/28/10.
- The MECC was packed on Thursday and stationed on a berm.
- All Arch doors and intake and exhaust ducts were tarped and boarded up for the winter.
- Josh, Krissy and Nicolai flew to MCM on Friday, 1/29/10.

### **SAFETY**

- One Miller MightEvac hoist sent home for inspection/repair.

### **COMMENTS**

**(Problems, Concerns, Recommendations, Etc.)**



## PROJECT SITUATION REPORT DISC Drill 09-10 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	13	<b>for period</b>	02-01-10	<b>through</b>	02-07-10
<b>Prepared by:</b>	Kristina Dahnert			<b>Date:</b>	02-07-10

<b>ICDS Personnel on Site:</b>	Lou Albershardt Patrick Cassidy Kristina Dahnert Josh Goetz Nicolai Mortensen Elizabeth Morton Charlie Bentley Tony Wendricks
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### ACTIVITIES DURING PERIOD

- On Monday, 2/1/10, we had our Project T-350-M outbrief at the Chalet in McMurdo. Those in attendance included Lou Albershardt, Charlie Bentley, Julie Bonneau (RPSC), Patrick Cassidy, Krissy Dahnert, Cara Ferrier (RPSC), Josh Goetz, Alex Isern (NSF), Nicolai Mortensen, Elizabeth Morton, Kevin Pettway (RPSC), Cara Sucher (RPSC) and Tony Wendricks. Krissy presented a summary of the season, issues encountered and basic requests for the following year. As there were no questions, the outbrief lasted only 20 minutes.
- All DISC Drill, Hand Auger and Koci Drill retro cargo was TCN'ed and readied for the vessel.
- The vessel arrived in MCM on Monday, 2/1/10, with an expected departure date of Sunday, 2/7/10 or Monday 2/8/10. Cargo can be expected back in Madison in mid-April.
- Charlie, Elizabeth, Josh, Lou, Nicolai, Patrick and Tony flew to Christchurch (CHC) on Tuesday, 2/2/10. Krissy had to remain in MCM due to illness.
- A season's-end celebratory gathering was held at Bailie's on 2/3/10 for those still in CHC.
- Krissy flew to CHC on Friday, 2/5/10.
- This concludes the weekly reports for the 2009-10 drill season.

### SAFETY

- Nothing to report.

### COMMENTS (Problems, Concerns, Recommendations, Etc.)

