



PROJECT SITUATION REPORT

Project: DISC Drill Test-Summit Greenland
Project Manager: Alex Shturmakov
Report No: 1 **For period:** 4-23-06 **through** 4-29-06
Prepared by: Jay Johnson **Date:** 4-29-06

Weather Conditions: Temperature range -40°C to $+10^{\circ}\text{C}$, wind 5-35 knots. Summit weather this week varied from clear calm days with night dipping to -40°C to windy days with periods of near white out conditions.

ICDS Personnel on Site: Jay Johnson
Kristina Dahnert
Michael Jayred
Other Personnel on Site: Brent Folmer (Westphal & Company Inc.)
Ed Alexander (Westphal & Company Inc.)

ACTIVITIES DURING PERIOD

Brent Folmer arrived at Summit on Sunday 4-23-06 along with the summer camp staff. Due to pore weather at Summit the rest of us didn't arrive until Tuesday 4-25-06. We are all doing well and are now acclimated to the altitude. The widely varying weather conditions this week made it challenging to get all flights in and work started. The 109th added two extra flights on Saturday to make up for lost flights during the week. I am very happy to report that all DISC cargo from the first round of shipping is here at Summit station. All cargo has arrived in excellent shape and without damage. The DISC tent wintered over well with only some minor damage to the two large doors. I did an inspection of the snow excavation done after I left last season and found the slot did not meet spec. The end of the slot towards the winch pit needed to be extended approximately 3 feet at the bottom and 6 feet at the top. The VECO construction folks will have this work done by early next week. The MECC and shipping container are set in place, our brake Weather Port is up, and the generators are installed in the gen shack. Brent and Ed along with VECO electricians are busy getting the electrical system installed. If all stays on track we should have power around midweek. The MECC does not have power or heat yet, but it is otherwise operational. Jayred, Krissy, and I have been busy getting cargo staged and clearing workspace in the DISC tent. We also have about half of the crane cable chain trays installed.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)





PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland		
Project Manager:	Alex Shturmakov		
Report No:	2	For period:	5-1-06 through 5-6-06
Prepared by:	Jay Johnson	Date:	5-7-06

Weather Conditions:	Temperature range -38°C to $+3^{\circ}\text{C}$, wind 5-21 knots. The weather this week overall was a little milder than last. On Friday night we saw the last sunset until fall.
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ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred
Other Personnel on Site:	Brent Folmer Ed Alexander

ACTIVITIES DURING PERIOD

The DISC building electrical didn't get up and running this week. When Brent and Ed went to install breakers in the new main power distribution panel they found it didn't fit both style of breakers that we have. A new panel will be coming in on the first flight next week. Other than this snag all cable trenching is complete, the 208v panel and transformer are wired, and the building electrical system is installed. We are now looking at having power mid next week.

The building ventilation system is in the process of being installed. Hand rails are complete around the slot and the removable floor sections over the tower base have been built. Slot excavation was completed early in the week. Jayred, Krissy, and I have got the casing extended and all but one section of the drip pans installed. All of the crane rails are in and both crane cable chains are installed. The blue gantry crane is wired and ready to run. We dug a tunnel under the building for the slot ventilation hose and other utilities to service the winch pit area. The slot ventilation fan is ready to be placed. Both fiberglass pads for the tower base are placed and leveled. The control room is in the building, but can't be put into final position until the yellow gantry is assembled. The week was finished out with a safety drill at the DISC structure. The Summit medical staff responded and we practiced removing an unconscious person from the slot using our retractable life-lines.

COMMENTS (Problems, Concerns, Recommendations, Etc.)

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PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland				
Project Manager:	Alex Shturmakov				
Report No:	3	For period:	5-8-06	through	5-13-06
Prepared by:	Jay Johnson	Date:	5-14-06		

Weather Conditions: Temperature range -25°C to $+3^{\circ}\text{C}$, wind 2-20 knots. A bit breezy starting off the week, but a beautiful second half.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Laurent Augustin John Robinson
Other Personnel on Site:	Brent Folmer Ed Alexander

ACTIVITIES DURING PERIOD

On Monday the second group of DISC personnel arrived along with the drill sonds and electronics. Our new main power distribution panel (MDP) also came in. Jayred was house mouse on Monday and Brent was out sick. Krissy and I finished up work in the slot, installed the last drip pan, and helped settle in our new crew members while Ed began installation of the new MDP. Brent and Ed had the new panel installed and the building electrical system fully up and running by Tuesday afternoon. The blue gantry crane we assembled last year fired up without a hitch and we immediately put it to work. The yellow gantry crane is now assembled and up and running too. The control room has been moved into place and we are in the process of moving the electronics into it. We have the yellow tower base installed and aligned with the pilot hole. The winch level wind, drum, and motor section are in place and ready for wiring this next week. Tower hydraulics and actuator are connected and running and the winch power cabinet has been placed. Power is wired to the cabinet. Wiring from the cabinet to the winch will be done this next week. The slot ventilation fan is installed and part of the ductwork is in. The tower trusses and crown sheave are assembled and installed on the trunion. We ran the tower through its full range of motion for the first time on Saturday. It moves very smoothly and controllably. VECO has finished up all of the handrails and stairs for the winch pit. They also built NICL's Weatherport, which is connected to the end of the DISC building. Paul and Nicolai spent some time organizing the electronics shop and ran diagnostics on the instrument sections. I assisted John with organizing the machine shop and setting up the mill and lathe. The MECC is now fully operational. Krissy has all of our safety equipment organized, fire extinguishers placed, and safety/warning signs put up. The DISC fire alarm system is also installed and operational.

It was a very busy week at DISC and a huge amount of work was completed. We finished up the week a bit tired, but very pleased with our accomplishments. All of our planning and attention to detail back in Madison is paying off now with a smooth assembly.

COMMENTS
(Problems, Concerns, Recommendations, Etc.)

We are experiencing a problem with one of our generators cycling. It appears to be fuel system related and is totally independent of load. Pat, the mechanic here, is working on trouble shooting it.



PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland		
Project Manager:	Alex Shturmakov		
Report No:	4	For period:	5-15-06 through 5-20-06
Prepared by:	Jay Johnson	Date:	5-21-06

Weather Conditions: Temperature range -32°C to -11°C , wind 5-18 knots.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Laurent Augustin John Robinson
Other Personnel on Site:	Brent Folmer Ed Alexander

ACTIVITIES DURING PERIOD

This week we finished up unpacking the last of our crates. The tower is now fully assembled and the barrel rollers are aligned. The barrel sections quick connects line up well and spin together with little effort. We have the optics tables set up for working on the drill and barrel sections. The barrel turning fixture is also assembled and in use. One of the VECO carpenters built and installed a hole cover for us. The last of the slot ventilation hose is in and that system is working well. The air monitor is mounted in the control room. Last thing yesterday Krissy and I finished up running the sampling tubes. We will start it up on Monday. All of the computer equipment is in the control room. Paul and Nicolai are waiting on some extension cables for the computer equipment so the last rack can be put into place. The CT monitor is mounted in the control room and hooked up.

Before the cable was un-spooled from the winch we manually ran it to make sure motor and level wind drives were functioning properly. One of the level wind hard stop switches was not working which turned out to be a terminal block issue in the control cabinet. The temperature in the winch pit sits between -20°C and -23°C . The gear lube in the gearboxes will hardly flow at this temp and it puts so much friction in the system that the penetration drive motor would barely turn over. We do not have the means here to continuously heat the gear boxes to the 20°C requested, so Bill and I decided to replace the gear lube in the two small gear boxes with Mobil HFA hydraulic fluid. We left the gear lube in the large gearbox because we were having problems getting the drain plug out and it seemed to work ok. The small motors perform much better now and under manual control the winch is running well. After the winch test we ran the cable through the sheaves and connected it to the drill. The fiber optic and high voltage connections from the computer to the instrument section checked out. Paul and Nicolai

have established communications with the instrument section. The pump motor is running well, but there is a problem with either the hall effect sensors in the drill motor or the way motor control is processing the data from them. Paul and Nicolai are not sure yet if this problem is due to a failed hall effect sensor or an issue with the motor driver board.

This week we have also gotten the screen cleaning system, centrifuge, and fluid handling assembled. The screen cleaning system, with its many pieces, went together without a hitch and is working well. We are having some difficulty getting and holding a prime in the fluid handling system pump.

The problem we were having with our generators last week seems to be solved. The problem with the generator cycling turned out to be a combination of two problems. First was the fuel lines were icing up and second the generator had a bad injector. The injector has been replaced and the fuel lines are now insulated and have a heat trace on them.

On Tuesday John Robinson was using a 4 ½ inch angle grinder with a cut off wheel on it to cut a chain when the grinder slipped and he cut the top of his left hand between his thumb and index finger. The cut was through only the upper layer of skin but required nine stitches to close it. His hand is doing fine now and has no sign of infection.

Brent Folmer's dad passed away this week so he will be flying home on Monday to be with his family. Ed will be able to fill in and complete the electrical work.

Today (Sunday) we hosted an open house at DISC for all people here at camp. Kathy Young baked some goodies for everyone. We gave a tour and answered questions about the project. It went over very well and most of camp attended.

The DISC drill system is now completely assembled. As soon as we resolve the problem with driving the drill motor we will be able to start drilling.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)





PROJECT SITUATION REPORT

Project: DISC Drill Test-Summit Greenland
Project Manager: Alex Shturmakov
Report No: 5 **For period:** 5-22-06 **through** 5-27-06
Prepared by: Jay Johnson **Date:** 5-28-06

Weather Conditions: Temperature range: -35°C to -12°C , wind 1-13 knots.

ICDS Personnel on Site: Jay Johnson
Kristina Dahnert
Michael Jayred
Bill Mason
Nicolai Mortensen
Paul Sendelbach
Laurent Augustin
John Robinson
Scott Hamon

Other Personnel on Site: Ed Alexander

ACTIVITIES DURING PERIOD

- Flight week - this week Summit had three flights. Scott Hamon came in on Monday. Brent Folmer flew out on Monday along with VECO's carpenters and electricians. They were replaced by incoming science groups. On Tuesday ten students and two professors from the University of Michigan came in for an overnight. Wednesday flight was a cargo flight. I gave tours of DISC to the 109th flight crews on all three flights while the planes were being unloaded. A few people from VECO and Kanger also came in on a turn around flight and I gave them a quick tour as well. I gave a more in depth tour to the students and their professors who were fascinated by the project.
- Generators - The generators ran well this week. The fuel system issues have been solved. We now have our own fuel bladder at DISC. It was filled with the fuel off load from Tuesday's flight.
- Air monitor -The air monitor is now up and running full time. Krissy did a system calibration and is having difficulty getting the oxygen sensor to come into calibration. She has been in contact with the manufacturer to remedy the issue. We were all curious as to how flammable Isopar-K actually is under our conditions, so we did a couple of controlled tests to find out. Our conclusion was that you have to have an open flame in contact with the fluid for the better part of a minute before the Isopar-K will put off enough vapors to ignite.
- Fluid handling - The fluid handling system is now fully operational. Scott solved the problem we were having last week with priming the pump. The

hose reel that is used to add fluid to the borehole was installed and plumbed this week. This reel was not designed for lifting. It barely has enough pulling power to lift the 80 plus meters of hose we pay down the borehole and it doesn't have a break or drum lock of any kind. I had John make a safety locking pin that will be set when hose is payed out.

- Slot fan – After leaving the slot fan running for a few days straight the bearings in the motor began to squeal. The ambient air temperature was fine for the motor, but the air being pulled from the slot is about -40°C and this was too cold for the grease in the bearings. John took the motor apart and replaced the bearing grease with low temp grease.
- Drill – The problem we had last week with running the drill motor in the “Y” motor section turned out to be a bad hall sensor in the motor. It is going to be traded for the good one in Madison on the next flight period. We are currently using the “A” anti-torque section, the “K” instrument section, and the “X” motor section. We hung the upper sonde from the ceiling and ran the pump in Isopar-K to verify it was working properly. The pump ran strong to 2200 rpm. If we tried to run at higher speeds we saw rpm fluctuation and even stalling. This appears to be correctable by changing motor controller parameter settings. The full drill minus the cutter head was then hung on the tower. We ran the drill to the bottom of the pilot hole and touched it off the bottom to verify borehole depth. This also gave us a chance to see how the weight on the bit load cell was working. After drilling fluid was added to the borehole we ran the drill down to within one meter of the bottom of the hole to run the drill and pump motors some more. At this point we found the drill motor didn't like to start in the forward direction, but it would run in reverse while in the borehole. Sometimes you could jog the motor in reverse and then start it in forward and it would run. In either case once it was running it would run strong. When the drill was at the surface the drill motor ran ok. Is it a thermal issue, a mechanical issue, an electrical issue? We spent the last few days of the week trying to figure it out. The motor would act up as soon as it was lowered into the hole and if you let it soak for a while it would still work when brought back to the surface, so it didn't seem to be a thermal issue. After much debating we think it is an electrical issue and not something binding in the motor or gear box. Nicolai did some research into the type of motor we are using and found that if either the motor phases or the hall sensors signals are flip flopped a condition like we are seeing could be the result. On Saturday we pulled the instrument section apart so Paul and Nicolai could check the wiring. They haven't been able to verify the motor phases yet, but they did find a discrepancy in the wiring for the hall sensors. We are currently waiting to hear from Madison if this is intentional, if there is a drawing error, or if this is a real problem before we go any farther.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- I would like to have two switches added to the tower. These switches would be tripped when parking the tower in either the horizontal or vertical position and disable the respective function on the joystick of the pendant control. When the tower is parked horizontal it will provide the operator repeatable stopping point. Right now when you take the tower vertical it hits the hard stop but the actuator can keep pulling so one can damage or bend the lower section of the tower if they are not paying very close attention. Implementing a limit switch that when tripped would disable the vertical function of the joystick would prevent accidental tower damage. Depending on what is involved electrically, this modification could be done on site.
 - Tower hard limit switch – We found a problem with the logic of the tower hard limit switch with the winch control in manual operation. The winch does stop when the drill trips the switch like it should. The problem is after the tower hard limit switch is tripped and you move the pay in/out lever on the manual winch control it does not disable the drill (winch) motor or turn off the light on the top of the winch control cabinet. It does disable the trip (150hp) motor and the brake like it should. When you push the tower override button with the hard limit switch tripped the light and therefore the motor drives are disabled. This is the exact opposite of what the over ride switch is suppose to do.
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PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland		
Project Manager:	Alex Shturmakov		
Report No:	6	For period:	5-29-06 through 6-03-06
Prepared by:	Jay Johnson	Date:	6-04-06

Weather Conditions: Temperature range -28°C to -12°C , wind 2-10 knots.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Laurent Augustin John Robinson Scott Haman
Other Personnel on Site:	Ed Alexander

ACTIVITIES DURING PERIOD

- Drilling – We drilled our first core on June 1. We did more coring runs on Friday and Saturday. The total length of core drilled this week was 18.27 meters for a borehole depth 121.56 meters. Right now core length is averaging 2.6 meters before the drill loses penetration due to the screens filling. When we clean the screens the upper screens are fairly well packed whereas the bottom two to three are loose but full. Bill's calculations show that we need a 37 meter fluid head above the pump for the pump to achieve its maximum pressure. Currently we only have 13 meters of fluid above the pump. As we drill deeper we will be able to add more fluid to the borehole and therefore achieve higher pump pressures and pack more chips into the screens. The cores drilled so far have had a very smooth exterior and the core breaks have been clean. All cores have been in one piece.
- Drill electronics – It has been verified that all the wiring and connections from the instrument sections to the motors were correct. A bad ground connection was found in the instrument section and as far as we can tell it was the root of our problems last week. The drill and pump motors have been running well this week. Almost all data feed back from the instrument section is laden with noise which makes reading actual values some what of a guess. Nicolai has been working on adding some noise filtering in our spare instrument section and he also updated the software with new code that is suppose to help clean up the motor currents signals. Late on Saturday we swapped instrument sections and Monday we will try it out. Paul spent some time this week rearranging graphs, indicators, and numerical data on the sonde control

screen to match our need and make it easier to read.

- Drip Pans – We added a drip pan at the drill head end of the slot. Fluid was running onto one of the steps on the end wall of the slot when the drill was tilted horizontal. John made up eight more feet of drip pan that leans against the end wall of the slot and directs fluid into the existing drip pans. He also fabricated a drip pan to go under the screen cleaning wash station to catch drips when the centrifuge bucket is not in place.
- Yellow gantry crane – We moved the pendant control from one side of the crane to the other. It is now on the winch side of the crane. This made it much easier for the crane operator to see what is going on when picking and placing barrels on the tower.
- Tower – This week Ed wired the switch into the tower hydraulic control to stop the hydraulics when the tower is vertical. While setting the switch the tower got over driven and six of the bolts that mount the actuator to the tower were sheared. This is exactly the situation that the switch is to prevent. We were able to replace the mounting hardware and return to operation. After the repair we did an inspection of the tower and found no other damage. The switch is now adjusted and working properly.
- Core tray – Scott and Jayred built a wood core tray and stand so we have a place to inspect the core we are drilling.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- Winch control – In doing drill runs this week we have found out that if you don't have the full weight of the drill on the cable when you do a motor hand off the hand off will fail. We found this problem when in the coring phase and the drill loses penetration. You have to pull the drill up a little bit before doing the motor hand off. The problem with doing this is that it can cause a double core break. When this failure occurs the control program goes into a safe state and you lose the cable pay out reading. The only way to recover from this is switch the winch back to manual control and bring the drill back to the surface and start over. You can't restart in the middle of the program.
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PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland				
Project Manager:	Alex Shturmakov				
Report No:	7	For period:	6-05-06	through	6-10-06
Prepared by:	Jay Johnson	Date:	6-11-06		

Weather Conditions: Temperature range -28°C to -12°C , wind 1 to 13 knots.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Laurent Augustin John Robinson Scott Haman
Other Personnel on Site:	Ed Alexander

ACTIVITIES DURING PERIOD

- Drilling – This week we drilled a total of 161.05 meters. The borehole depth is 282.61 meters. On Wednesday we started working in shifts. We are running two shifts each eleven hours long with one hour off for lunch. The longest continuous core we have drilled was 2.91 meters long. The average core length we can drill before the screen barrels fill, the head plugs, and we lose penetration is 2.6 meters. To reduce the risk of sticking the drill due to the head packing we are typically drilling 2.5 meter cores. Being that we are not using the densifier component of the drilling fluid here in Greenland, the low fluid density may be having an effect on the drill's ability to transport and pack chips into the screen barrels. The sweet spot for the cutter head right now is 100 rpm with a 5mm/second feed rate. We are trying different speed and feed combinations to see if we can drill faster and still maintain quality one piece cores. Once in a while we are getting cores that have a break in them and a chip pack of up to ten centimeters between the pieces. The only theory we have right now is that if the core breaks while drilling the pump is lifting the core and pulling chips into the gap. We have decreased the pump speed from 3000 rpm to 2000 rpm to see if it will lessen the problem. A core barrel was assembled without core sleeves and tested. The core quality was the same as the barrel with sleeves, but the cores were broke into two to four pieces most likely do to the lack of sleeves to support the core on the trip up the bore hole.
- Motor section – We have been having an increasing problem with our drill cutter motor not wanting to start. Generally if you jogged it in reverse then started it in forward it would run. Once running it would stay running reliably.

The motor eventually didn't want to start at all. We were thinking it was something mechanical until we swapped in our spare motor section and it is acting the same. Right now we can get it to run, but it takes a few tries.

- Screen cleaning – We have found that drying the screens between runs aids in chip removal. After the chips have been removed from the screens we are placing them in front of the hot exhaust air from our load bank for about ten minutes. This melts the build up that forms on the inside of the screens. We haven't seen any noticeable gains in pumping efficiency or drilling depth, but the chips come out of the screens easier.
- Scoop cutters – We tried out our scoop cutters this week. They took more torque to cut than the flat cutters. The core had deep scores in it, was broke into three pieces, and deep fractures were evident. Not the results we were hoping to see. I am going to inspect the head and cutters to see if something is out of alignment.
- Winch – We have found that the winch will only run reliably up to 0.7 meters per second. Running at speeds above that and the level wind drive faults. The night shift has had the level wind fault out consistently at lower speeds where it runs fine on day shift. The only difference between day and night shift is the temperature in the building drops 20 to 40° overnight. I have added heat tape (120 watts) and insulated the level wind motor and gear box to see if it will help. I also added heat tape (120 watts) and insulated the winch drill motor and gear box because the motor was squealing when the temp was 10° F or colder. Paul has added a feature in the software that captures the max tension on the crown sheave while doing a core break. It is working very well.
- Instrument section – Nicolai and Paul worked last Sunday and part of Monday to download software updates to the instrument section we installed at the end of last week. They were unable to get all of the files to update so we had to reinstall the original instrument section.
- Ed Alexander's last day – Wednesday was Ed's last day at Summit.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- Winch control – The level wind drive has faulted five times this week. When this happens you have to bring the drill up using the manual winch control. Moving the lever in the pay in direction the winch control lets the drill free fall for about 50 centimeters before taking control and reeling in cable. This hasn't caused any real problems yet but it needs to be fixed.



PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland		
Project Manager:	Alex Shturmakov		
Report No:	8	For period:	6-12-06 through 6-17-06
Prepared by:	Jay Johnson	Date:	6-18-06

Weather Conditions: Temperature range -28°C to -8°C , wind 2 to 19 knots.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Laurent Augustin John Robinson Scott Haman John Fowler
Other Personnel on Site:	

ACTIVITIES DURING PERIOD

- Personnel – On Wednesday Laurent Augustin and John Robinson left camp and John Fowler came in. John will be working with us until the end of the season.
- Drilling – This week we drilled a total of 175.933 meters. The borehole depth is 458.543 meters. The average core length was 2.19 meters. The longest core drilled this week was 3.08 meters. The average core length we are able to drill has decreased as we have drilled deeper. We have been running each drill run until we lose penetration. The screens are full when a three meter core is drilled, but when we lose penetration with shorter cores it is due to the head plugging only. The screens still have space in them for more chips. This week we have been experimenting with feeding the drill fast enough for the drill to ride on the shoes. When we do this the cable tension and motor current graphs smooth out. We have had the best luck drilling long cores by dropping about 1000n of tension off the crown sheave at the beginning of the drill run and holding that tension for the remainder of the run. We have been running the cutter between 60 and 90 rpm and the pump from 2000 to 3000 rpm during this week's tests. Feed rates have ranged from 5 to 10 mm/s. Running the drill on the shoes has greatly reduced the number of fractured cores.
- Core dog cages – When the cutter head gets packed with chips the core dogs also get chips packed behind them so they can't retract when pushing the core out. To solve this problem I milled a notch in each core dog cage so any chips

that get packed behind them can be cleaned out or will push out of the openings when the core is pushed out. This modification is working very well.

- Instrument section – Due to the problems with getting the cutter motor to start, we switched from instrument section K to section J at the beginning of the week. Section J initially ran better, but then we began having problems getting the pump motor to start. This is the same problem we were having with the cutter motor and the K instrument section. Nicolai opened up the K instrument section. While he was looking for problems, the solder on the side of a connector on the cutter motor controller board fell off. All eight solder joints on the connector were bad. He fixed the connector and we put this instrument section back in service. It has been working without problems since the fix. Current drill configuration is “A” anti-torque section, “K” instrument section, and “Z” motor section.
- Winch – The level wind on the winch continues to fault out now and then. We are typically tripping down hole at only 0.5 m/s to avoid having to restart a drill run due to the level wind faulting. The latest problem is that when you are in computer mode with the winch tripping down hole and you tell it to stop it can take up to 30 meters for the winch to stop. Sometimes it will stop in less, but not predictably. Paul changed the deceleration rate parameter in the computer and the winch stops better now, but the problem isn't truly fixed.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)



PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland		
Project Manager:	Alex Shturmakov		
Report No:	9	For period:	6-19-06 through 6-24-06
Prepared by:	Jay Johnson	Date:	6-25-06

Weather Conditions: Temperature range -21°C to -8°C , wind 3 to 30 knots.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Scott Haman John Fowler
Other Personnel on Site:	

ACTIVITIES DURING PERIOD

- Drilling – This week we drilled a total of 160.311 meter. The bore hole depth is 618.85 meters. The average core length was 2.42 meters. The longest core drilled in one trip was 2.67 meters. Three cores were drilled with an average length of 4.155 meters from a depth of 458.54 to 470.91 meters. They were drilled by removing the core dogs for first 2 meter run and then replacing them for the second run. All three cores were pushed from the core barrel in one piece. Drilling cores with this method is more difficult and risky than drilling a single 4 meter core because the drill must be rethreaded over the first 2 meter core. The drilling of these three cores has proved the DISC drill is capable of retrieving high quality 4 meter cores in one piece. These cores went to NICL for the ductile ice acceptance test. All cores drilled this week have been made available to NICL for setup and testing of their equipment.
- Cutter head and core barrel – I modified one of the cutter heads by opening up the cutter windows. We wanted to see what effects changing the fluid flow around the cutters would have on drilling. After several drill runs it was concluded that we saw no change in core length, quality, or chip collection. Up until now we have been drilling without the first core sleeve in the core barrel. The core sleeves started about 31 cm up from the cutters. We tried adding the first sleeve which extends down to the face of the cutter and found it caused the cutter head to plug with chips within the first .4 meters of coring. With the latest configuration we have core sleeves down to within 6.3 cm of the cutters and this is working well. Another modification I did was to add more relief to the inside edge of the cutters (the edge of the cutter that is closest to the core). The added relief eliminated a white colored 45° helix pattern we were seeing on the

outside of the cores and also reduced the quantity of small surface fractures. Over the past week we also tested the three different height shoes (.6°, .8°, and 1.2°) we have for the cutter head. All cores drilled during the shoe tests were of very similar quality. The only visible difference was the change in pitch. Our preferred drilling parameters are the cutter set at 80 rpm with a starting feed rate of 9.5 mm/s and the pump running at 2100-2300 rpm. This sets a good balance between motor current draws and drilling speed.

- Winch tests – As I have written over the past weeks, when we run the winch at .7 m/s the level wind drive faults out sporadically. With technical support from Madison Paul confirmed controller parameters and running feed back data. Everything looked to be set and operating as it should, yet every now and then the system would fault. On Friday we ran tests with the winch running at higher speeds to monitor how the level wind was tracking the winch drum. We ran the winch tripping down at speeds up to 1.4 m/s and tripping up at speeds up to 2.0 m/s. No faults were incurred. Depending on which way the level wind is being loaded the carriage bounces around a bit upon winch start up. The lead screw also makes creaking noises (ie. Stick-slip between the screw and nut) when the level wind changes direction despite the screw having proper lubrication. This is due to the pore design of the level wind section. These symptoms will most likely get worse with time. Other than these observations the winch ran smoothly.
- Instrument section K – We have been running instrument section K all week with out any problems until we did the winch tests. After concluding the winch tests we went to do a drill run and found the pump motor controller wouldn't talk to the computer. The cutter motor was working fine. After several attempts to establish communication the drill was pulled up and the instrument section was removed. Upon removal of the bulk heads we found four out of five of the Glenair electrical feed thoroughs were leaking internally. The inside of the instrument section was completely wet with Isopar-K. I would guess an ounce or two of fluid had gotten in. Worse yet there was visible signs and smells of burnt electrical components. Nicolai removed the electronics and did a full diagnosis. He found the OVP circuit of the MPS and the filter capacitors on the cutter motor driver board had destructively failed. He determined that the electronic failures were not due to the Isopar-K leak but rather the drilling fluid back driving the pump during the during the winch tests. The pump motor effectively turned into a generator back feeding power into and overloading its control circuits. Nicolai is currently trying to salvage, clean, and repair this instrument section.
- Instrument section J – Nicolai found a similar problem with this instrument section as we had with K. The P3 connector on the pump motor driver board had bad solder joints. Upon putting it back in service we found one of the micro controllers doesn't always like to boot up. We have only done two drill runs with it so far and both times it took a few attempts to get the controller to come up. So far once running the micro controller has stayed on line.
- Shift work – This was the last week of working two shifts. Given our current

drilling depth, current goal of 730 meters, and quantity of drilling fluid left, I decided to drop second shift so we don't run out of work before the DV visit during the week of July9th.

COMMENTS
(Problems, Concerns, Recommendations, Etc.)



PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland		
Project Manager:	Alex Shturmakov		
Report No:	10	For period:	6-26-06 through 7-01-06
Prepared by:	Jay Johnson	Date:	7-02-06

Weather Conditions: Temperature range -25°C to -5°C , wind 3 to 21 knots.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Scott Haman John Fowler
Other Personnel on Site:	

ACTIVITIES DURING PERIOD

- Drilling – This week we drilled a total of 79.869 meters. The bore hole depth is 698.723 meters. Average core length was 2.41 meters. The longest core drilled this week was 2.567 meters. Between the depths of 638.35 and 633.72 three ~2 meter cores were saved by NICL to be possibly used for our brittle ice acceptance test. Our intent is to drill three more cores to replace these when we hit 730 meters. The first three cores were saved in case something was to happen causing us to discontinue drilling before reaching 730 meters. We are starting to see more cores with a fracture in them when they are pushed from the core barrel. However, it is rare to see more than one fracture in a 2.5 meter core. We have yet to see core with poker chipping.
- Cutters - I modified a set of cutters by adding a ~1mm radius to the inside corner. NICL reported seeing very little change in the number or orientation of surface fractures on the cores drilled with these cutters as compared to cores drilled with sharp corner cutters.
- Core orientation – This week we tested and verified that we are able to orientate core breaks using instrumentation.
- Instrument section J – We have been running this section all week. One of the micro controllers continues to require several attempts to come on line. We only have to power it up in the morning and then it's left on all day. Once

it is booted up it will stay running. This instrument section has been working well otherwise.

- Instrument section K – Nicolai spent most of the week inspecting, cleaning, and repairing the electronics. He has completed the repairs and it is ready to be tested. To do a full test we will have to install it in the drill.
- Work schedule – We switched back to one shift this week. This has put our drilling pace and fluid usage on track to complete the last of the drilling and testing by July 13th.
- Power monitoring – On Friday Nicolai set up a data logger in Lab View to log power usage from our CT monitor. Next week we will collect data.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)



PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland		
Project Manager:	Alex Shturmakov		
Report No:	11	For period:	7-03-06 through 7-08-06
Prepared by:	Jay Johnson	Date:	7-09-06

Weather Conditions: Temperature range -28°C to -6°C , wind 0 to 17 knots.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Scott Haman John Fowler
Other Personnel on Site:	

ACTIVITIES DURING PERIOD

- Drilling – This week we drilled a total of 58.8 meters. The bore hole depth is 757.5 meters. Average core length was 2.38 meters. The average core length is a little bit shorter than in past weeks because we intentionally drilled several ~2 meter cores. Between the depths of 734.3 and 740.3 three ~2 meter cores were saved by NICL to be used for the brittle ice acceptance test. These three cores will replace the sample cores we drilled last week. Other than the cores that will be drilled during the DV visit, this week marked the end drilling operations for the season.
- Scoop cutter test – Three more coring runs were done with the scoop cutters this week. Each run was done with different cutter speed/feed combinations. All cores had a ribbed helical pattern on the outside. The pitch of the helix was cutter speed dependent. Aside from the helix pattern the surface of the cores had less surface fractures than cores drilled with the sharp or radiused corner cutters. The helical pattern is most likely being caused by the cutter head wobbling in the bore hole. We have guides on the outside of the cutter head to keep it from wobbling, but I suspect that scoop cutters are either cutting a larger diameter than the guides or the guides aren't large enough. This is just my theory. This next week I will indicate the cutter head to see what diameter the scoop cutters are cutting verses the diameter of the guides.

- Modified screen barrel test – Bill was interested to see what effects leaving screens out in the lower portion of the screen barrel would have on the drills ability to collect and store chips. I made a ring that bolted in between screen barrel sections to retain screens in the upper part of the barrel and leave the lower part of the barrel totally open for chip collection. Test runs showed no gains from leaving screens out. In fact core lengths got shorter as more screens were taken out. A second test we did was shortening the core barrel to 3.1 meters and adding two screens to the screen barrel. Cores drilled with this barrel configuration were no longer than ones drilled with two less screens, ~2.7 meters. We saw less of a chip pack on top of the core, but the screens weren't fully packed. With two extra screens we should have been able to drill a full 3 meter core. Have we found the pump's limit? What effect is drilling without the densifier having on chip transportation and packing?
- Power monitoring – Correction from last weeks report. Nicolai is using data logging software from Multitek, the manufacture of our power monitor, not Labview. He is generating graphs from the raw data using Mathcad. Data has been logged from several drill runs through out the week.

COMMENTS
(Problems, Concerns, Recommendations, Etc.)



PROJECT SITUATION REPORT

Project:	DISC Drill Test-Summit Greenland		
Project Manager:	Alex Shturmakov		
Report No:	12	For period:	7-10-06 through 7-15-06
Prepared by:	Jay Johnson	Date:	7-16-06

Weather Conditions: Temperature range -23°C to -8°C , wind 1 to 16 knots.

ICDS Personnel on Site:	Jay Johnson Kristina Dahnert Michael Jayred Bill Mason Nicolai Mortensen Paul Sendelbach Scott Haman John Fowler
Other Personnel on Site:	

ACTIVITIES DURING PERIOD

- DV visit – On Wednesday Alex Shturmakov, Kendrick Taylor, Matthew Kippenhan, and Sigfus Johnson arrived at Summit to see and review DISC operations. They were here all day Thursday and left mid day on Friday.
- Drilling – The only drilling done this week was during the DV visit. A total of four drill runs were done. The total length of core drilled this week was 7.2 meters. The final bore hole depth for the season is 765.77 meters. Six 25ml fluid samples were taken from the bore hole for chemical analysis back in Madison. At Sigfus's request we put shims under the cutter head shoes to decrease the cutter pitch to ~3mm for one of the runs. The theory was that reducing the chip size would help the chips flow and pack better in the screens. No improvements were observed on this run.
- Winch test – On Thursday after the drill runs were completed winch speed tests were conducted. Power usage was logged for all tests. The maximum safe speed that cable can be payed out when the drill is in the fluid is 1.0 meters/second. The winch maxed out at 2.86 meters/second while tripping up. All tests were conducted between surface and 650 meters. When attempting higher pay out speeds the cable is payed out faster than the drill can descend. We had this happen and it resulted in the cable twisting around itself forming a knot at about 250 meters above the drill. We saw no structural failures in the cable despite the numerous kinks in it. The knot had to be cut from the cable to bring the drill back to the surface. The recovery operation took about one hour and went smooth. The usable length of cable

on the winch is now about 950 meters and it would require retermination to be used again.

- Packing – On Monday and Tuesday we packed the MECC and organized the shipping container in preparation for reloading it. Tear down and packing within the DISC building began on Friday. All drill components are packed. The control room and winch wiring has been disconnected. The winch sections have been unbolted and they are ready to be hoisted from the winch pit. The winch control cabinet is fully unwired and ready for packing. The drill tower is disassembled and palletizing of it is under way. The screen cleaning, centrifuge, and fluid handling systems are packed. The optics tables are also packed.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)



PROJECT SITUATION REPORT

Project: DISC Drill Test-Summit Greenland
Project Manager: Alex Shturmakov
Report No: 13 **For period:** 7-17-06 **through** 7-22-06
Prepared by: Jay Johnson **Date:** 7-23-06

Weather Conditions: Temperature range -25°C to -3°C , wind 0 to 22 knots.

ICDS Personnel on Site: Jay Johnson
Kristina Dahnert
Michael Jayred
Bill Mason
Nicolai Mortensen
Paul Sendelbach
Scott Haman
John Fowler

Other Personnel on Site:

ACTIVITIES DURING PERIOD

- Packing – We continued packing this week. By the end of the day on Tuesday we had completed moving all items that required use of the gantry cranes and therefore we were able to shut down the generator for the season. On Thursday we officially finished packing. With a crew of eight people working 8.5 hour days it took seven days to pack the entire DISC drill system. Tear down and packing went very smooth.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)



PROJECT SITUATION REPORT

Project: DISC Drill Test-Summit Greenland
Project Manager: Alex Shturmakov
Report No: 14 **For period:** 7-24-06 **through** 7-30-06
Prepared by: Jay Johnson **Date:** 7-30-06

Weather Conditions: (Kangerlussuaq) Sunny with temps ranging from low 50's to mid 60's Fahrenheit.

ICDS Personnel on Site: Jay Johnson
Kristina Dahnert
Michael Jayred
Bill Mason
Nicolai Mortensen
Paul Sendelbach
Scott Haman
John Fowler

Other Personnel on Site:

ACTIVITIES DURING PERIOD

We flew from Summit to Kangerlussuaq on Tuesday via a Twin Otter. The sky was clear with unrestricted visibility, which made for breathtaking views as we flew over the ice edge and into Kangerlussuaq. Wednesday through Saturday was spent hiking, sight seeing, and relaxing. Today (Sunday) we are flying back to New York. Monday we will be parting ways and heading home. This is the last weekly report for the season.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)