



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 Haman

Other Personnel on Site: Ed Alexander

ACTIVITIES DURING PERIOD

- Flight week - this week Summit had three flights. Scott Haman 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 over night. 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 manufacture 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 bore hole 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 bore hole 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 sond from the ceiling and ran the pump in Isopark 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 bore hole depth. This also gave us a chance to see how the weight on bit load cell was working. After drilling fluid was added to the bore hole 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 bore hole. 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 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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