



## PROJECT SITUATION REPORT DISC Drill 2010-11 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	1	<b>for period</b>	11-15-10	<b>through</b>	11-21-10
<b>Prepared by:</b>	Kristina Dahnert	<b>Date:</b>	11-21-10		

<b>IDDO Personnel on Site:</b>	Kristina Dahnert Josh Goetz Mike Jayred Jim Koehler Steve Polishinski
--------------------------------	-----------------------------------------------------------------------------------

### ACTIVITIES DURING PERIOD

- Mike arrived in Christchurch on Tuesday, 11/16/10.
- Jim, Josh, Steve and I arrived in Christchurch on Wednesday, 11/17/10.
- Jim, Mike, Steve and I attended the 4-hour Happy Camper refresher course in Christchurch. Josh was accidentally omitted by Raytheon and will complete the course in McMurdo on Wednesday, 11/24/10.
- We all attended clothing issue at the CDC on Thursday, 11/18/10.
- All five of us flew to McMurdo on Friday, 11/19/10 as originally scheduled. We flew down on the Australian Airbus A319 as opposed to the C17.
- We all completed our Environmental Briefing, Science Inbrief and Crary Lab Safety Walkthrough (new for 2010-11 Crary Lab key card holders) on 11/20/10.
- We scheduled snowmobile refresher training for Tuesday, 11/23/10.
- On Saturday we met our new WAIS Divide Cargo Coordinator, Cindy Stephens. Cindy is new to the ice, so we are trying to simplify our cargo forwarding process.
- On Saturday, a few of the crew and I met with Woody Haywood, the Science Construction Manager, to discuss slot cutting plans. His crew entered the Arch late this week through the upper access panel and is ready for us to move the tower and gantry cranes.
- On Sunday, we assembled all sleep kits and boxed all BFC-issued items.
- As of this report, Jim and I are manifested to fly to WAIS one day early on Monday. I have TCNed the immediate cargo needed, including the tower pendant and gantry crane VFD's which will fly with us.
- Mike, Josh and Steve will remain in McMurdo and will focus on cargo forwarding. Mike will act as the T-350-M POC and will retain the pager if I fly on Monday.

### SAFETY

- Nothing to report

### COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- Nothing to report



Weekly Report #2 - DISC Drill 2010-2011

Project: T-350-M

Project Principal Investigator: Dr. Charles Bentley

Report No: 2 for period 11-22-10 through 11-28-10

Prepared by: Kristina Dahnert Date: 11-28-10

IDDO Personnel on Site:

Patrick Cassidy (MCM as of 11/26/10)

Kristina Dahnert (WSD as of 11/22/10)

Dave Ferris (MCM as of 11/26/10)

Josh Goetz (MCM as of 11/19/10)

Mike Jayred (MCM as of (11/19/10)

Jim Koehler (WSD as of 11/22/10)

Nicolai Mortensen (MCM as of 11/24/10)

Elizabeth Morton (MCM as of 11/26/10)

Steve Polishinski (MCM as of (11/19/10)

John Robinson (MCM as of 11/26/10)

ACTIVITIES DURING PERIOD

MCM Update:

o Josh, Mike and Steve located and re-TCNed cargo in MCM early in the week

for transport to WAIS.

o I have been in daily phone contact with Don Voigt, Geoff Hargreaves and

Mike back in MCM.

o Josh, Mike and Steve completed Snowmobile Refresher training at the MEC

on Tuesday, 11/23/10.

o Josh completed his Snow School Refresher on Wednesday, 11/24/10.

o Picked up Comms equipment and TCNed for Thursday flight to WSD.

o Nicolai arrived in MCM on Wednesday, 11/24/10.

o Dave, Elizabeth, John and Patrick arrived in MCM on Friday, 11/26/10.

o Thanksgiving was celebrated on Saturday, 11/27/10.

o Geoff, Heidi Roop, Josh, Mike and Nicolai are scheduled to fly to WSD on

Tuesday, 11/30/10.

WSD (WAIS Divide) Update:

o Jim and I flew to WAIS on Monday, 11/22/10 to assist carps with the Arch

assessment and slot rework.

o We entered the Arch on Tuesday, 11/23/10 with the carpenters through the

upper hatch and ladder. Performed additional assessment of Arch and took

photos on Wednesday while 225kW generator was up for 4 hours.

o The Arch has sustained significantly more damage/heaving over winter

than anticipated. A summary of the major impacts is as follows:

¶U The floor and surrounding slot walls have bowed in on both sides of the

tower, pinning the tower in place. A few railing sections warped when

forced against the tower base and auxiliary struts.

¶U The slot walls have bowed in significantly, down to approximately 2.5°

of clearance in certain places.

¶U The floor heaved significantly between the slot entrance and the core

transfer truss and one panel popped loose. Deformation and heaving in

this region is approximately 1/8" per foot side to side from the original

leveling of the building.

¶U The end wall of the DISC side with the large doors shows vertical

deformation. Since single steel channels were not used in construction,

the two vertical channels are buckling inward at the tie plates level with

the top of the large doors.

¶U The "Moose Door" entryway on the side of the Arch has pulled away from

the Arch approximately 8 inches and has settled with a downward slope.

The entryway remains intact, however, and no snow can be seen above.

¶U The bulkhead wall between NACL and DISC has settled further. The floor

panel on the NACL side immediately under the core truss has released and

now sits level, with open space underneath.

¶U The floor on the NACL side appears to have wintered well.

The basement

access hatch near the DISC/NACL bulkhead wall was sticking up approximately 6 inches due to heaving of the ship's ladder below.

The

ladder base has been modified and the hatch now closes flush with the

floor.

¶U The NICL core basement floor shows some heaving in the center and the basement walls have bowed, but this should not require significant rework if any. Geoff Hargreaves will better assess the basement when he arrives this next week.

o The original put-in construction plan was to cut the drill slot wall back 12 inches on the control room side. Due to inward bulging of the slot on both sides, we have been unable to move the tower until the slot walls are cut back on both sides. Currently, the floor and slot wall are being cut back 8 inches on the screen cleaning side and 12 inches on the control room side. Initial cuts have released inward pressure on the tower struts and base and they appear to have re-straightened themselves.

o Arch dig out began 24-hour operations on Tuesday, 11/23/10 on the NICL side, with the D4, the 953 and the Piston Bully assisting. Full dig out was completed in approximately 24 hours with additional grooming the next two days. Dig out of the DISC end and moose door side began on Friday, 11/26/10.

o De-tarped drill components and shelves in the Arch.

o Removed snow from the Arch around the electrical panels.

o Assisted Carps with removal of slot railings.

o A generator technician arrived from MCM on Thursday and troubleshooted

the PLC on the generator control system. Both 225kW Cat generators are

now online and are providing power to Arch operations as well as to town.

o Three IT/Comms personnel arrived from MCM on Thursday, 11/25/10. They

will work to set up the camp email system as well as the VHF radio. Email

should be in place early this coming week.

o The MECC has been moved into place and set up between the gen mods and the Arch Jamesway.

- o VFDs for both cranes were installed and both cranes were powered up and run the length of the building. The floating track on the screen cleaning side was pushed out another 2" to compensate for the fixed track on the other side. The cable chain assembly does not interfere with crane travel, however the control room will need to be shifted an inch or two toward the slot for clearance of the blue gantry crane.
- o Re-leveled two winch drip pans to help fluid flow toward the borehole.
- o Powered up tower hydraulic unit. A few drips were seen and a few unusual noises heard, but after putting a space heater on the system for an hour drips are no longer present and the system sounds normal.
- o VHF base station installed in control room. The Arch external antenna wintered well.
- o Gave preliminary tours of the Arch and MECC to camp personnel on Saturday afternoon. Additional tours will be scheduled once drill operations have begun.
- o Thanksgiving celebrated on Saturday, 11/27/10.

#### SAFETY

U Nothing to report

#### COMMENTS

(Problems, Concerns, Recommendations, Etc.)

U As mentioned above, the Arch has sustained significantly more damage/heaving over winter than anticipated. I have been in continuous contact with the camp manager, Paulene, the Science Construction crew at WSD, DISC/NICL/SCO personnel in MCM, as well as Matthew Kippenhan in Denver. A plan is in place for all Arch repairs, but patience on everyone's part is needed at this time. While we will filter in DISC, NICL and SCO personnel to WSD as soon as possible, please note that the

Arch is a construction zone at this point and access will be limited. The NICL side should, however, be free for bringing ice up from the basement and preparing it for transport to MCM. Geoff will assess this when he arrives this week.

U A concern arose this week when the two put-in electricians flew back to MCM after initial setup of the power grid. While everything appears to be running as expected, there are still many systems that have yet to be powered up, including many drill components, the RPSC ventilation system in the Arch, the refrigeration units on the NICL side, etc. Shaun, the primary camp mechanic, is well-versed in the operation of the generators, but between maintenance of all camp equipment, large and small, as well as generator concerns, his time is fully committed. In previous years at WSD, both Camp and Arch operations have been able to keep electrician Todd Rampendahl busy throughout the entire season. I have requested rotational electrician support be brought in from MCM, as simply having an electrician in MCM on call could detrimentally affect drilling operations for several days should an electrical problem be encountered.

Project: T-350-M

Project Principal Investigator: Dr. Charles Bentley

Report No: 3 for period 11-29-10 through 12-5-10

Prepared by: Kristina Dahnert Date: 12-5-10

IDDO Personnel on Site: Patrick Cassidy (MCM as of 11/26/10)

Kristina Dahnert (WSD as of 11/22/10)

Dave Ferris (MCM as of 11/26/10)

Josh Goetz (WSD as of 12/1/10)

Mike Jayred (WSD as of 12/1/10)

Jim Koehler (WSD as of 11/22/10)

Nicolai Mortensen (WSD as of 12/1/10)

Elizabeth Morton (MCM as of 11/26/10)

Steve Polishinski (WSD as of 12/2/10)

John Robinson (MCM as of 11/26/10)

#### ACTIVITIES DURING PERIOD

- Elizabeth is now coordinating cargo forwarding in MCM
- Dave, Elizabeth, John and Patrick are scheduled to fly to WSD this

coming week

- Installed MECC doorstop and step
- Moved control room 2" toward slot for blue gantry clearance
- Installed mill and lathe digital readouts
- Dug out fan room in conjunction with D4 support
- Wireless system installed in Arch; Steve performed additional testing

and work on this system on Saturday and Sunday, as the Arch network would

not transmit back to camp and wireless was not available in the Arch

Jamesway or MECC as planned

- The large DISC Drill doors have now been opened and grooming continues outside

- Tower tilted vertical while shaving high spots of slot walls away; this

made way for the excavation bucket used by the carpenters

- Josh, Mike and Nicolai arrived at WSD on Wednesday, 12/1/10 along with

most of the remaining DISC Drill cargo. We are still waiting for the

Instrument sections that are in MCM. Two other non-essential pieces for

the core barrel warming bath have yet to arrive in MCM.

- Steve arrived at WSD on Thursday, 12/2/10 along with SCO Rep Don Voigt

and 4 science techs



- Re-leveled centrifuge, centrifuge collection tank, tower hydraulic unit, optical table and control room.
- Installed PLC and timer in centrifuge and tested system
- Installed batch controllers on fluid mixing tank
- Unpacked blue crate
- Installed new level wind drip pans
- The carps began excavation of the slot walls on Thursday, 12/2/10. This is a time-consuming process. The current plan is to continue cutting back the wall on the control room side and then only shave the other wall in high spots. Completely excavating both sides would tie up the blue crane and extend the carpenters work until at least 12/10/10, so only the one side will be fully excavated as originally planned. The floor and railings have been cut back on both sides, so the tower is now free at its pivot point.

- Organized electrical bench in MECC
- Organized parts and tested LVDT board; it is functioning well
- Updated wiring schematic for LVDT board
- Installed Arch ventilation VFD and tested system
- Set up drill fluid filling station out by the fluid berm
- Assembled screen barrels with new stabilizer sections
- Assembled core barrel
- Began grooming fluid berm and brought Isopar bulk tank down from winter berm

- Hung air monitor in control room
- Cleared snow blocks from the slot on Sunday to expedite the excavation.

The carps will chainsaw on Monday and four drillers will work after dinner to remove the blocks.

- Installed the crown sheave

#### SAFETY

- Nicolai sustained a very, very minor laceration while cutting a zip tie off of a hose. A report has been completed simply due to the increased healing time of Antarctic injuries and the increased risk for infection.

This report will be filed upon my return to Madison in February.

## COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- I have emailed Cara Ferrier in MCM and Matthew Kippenhan in Denver again regarding electrician support for WSD. We installed the Arch ventilation system VFD this week and the system appears to be working, but this was traditionally a RPSC responsibility. I have not looked at the fire alarm system yet, which is also a Raytheon system. While we are certainly willing to assist in any way possible, many of these tasks fall outside of our expertise and abilities.
- Slot progress continues, but semi-shift work is required to expedite the excavation. We now plan to remove snow on only the control room side. This was originally in the pre-season operations plan, but carpenter support is limited. While 6-8 carpenters were onsite for minor and cosmetic fixes to the slot last season, only 4 carpenters are onsite for both slot work and Arch repair this season.

Project: T-350-M  
Project Principal Investigator: Dr. Charles Bentley  
Report No: 4 for period 12-6-10 through 12-12-10  
Prepared by: Kristina Dahnert Date: 12-12-10

IDDO Personnel on Site:

Patrick Cassidy (WSD as of 12/8/10)  
Kristina Dahnert (WSD as of 11/22/10)  
Dave Ferris (WSD as of 12/8/10)  
Chris Gibson (MCM as of 12/9/10)  
Josh Goetz (WSD as of 12/1/10)  
Mike Jayred (WSD as of 12/1/10)  
Jim Koehler (WSD as of 11/22/10)  
Jay Kyne (MCM from Lake Vida)  
Nicolai Mortensen (WSD as of 12/1/10)  
Elizabeth Morton (WSD as of 12/8/10)  
Steve Polishinski (WSD as of 12/2/10)  
John Robinson (WSD as of 12/8/10)

ACTIVITIES DURING PERIOD

- 🍏 Moved winch cabinet into Arch with 953 and connected cables
- 🍏 Installed tower control box on back of winch cabinet
- 🍏 Installed computer and Glassman high voltage racks in control room
- 🍏 Checked torque on screen cleaning system, centrifuge and gantry bolts
- 🍏 Shoveled out bulk fluid tanks and fluid berm, filled tanks and plumbed tanks to Arch fluid system
- 🍏 Fluid system batch controllers calibrated and tested
- 🍏 Installed hose on hot air blower and tested system
- 🍏 Finished assembly of core barrel with cutter head
- 🍏 Installed new LVDT board in winch cabinet and tested level wind travel and limit switches
- 🍏 Restrung nitrogen purge hose for sonde
- 🍏 Slot excavation was completed on the control room side; prior to operations next season, the slot ventilation ducting will likely need to be excavated and recessed and the opposite slot wall cut back
- 🍏 Verified all winch cabinet connections and powered up cabinet
- 🍏 Powered up and adjusted winch brake pump unit
- 🍏 Edited winch layout block diagram and reviewed junction boxes and winch wiring for schematic updates
- 🍏 Installed stabilizer pads on core and screen barrels

- 🍏 Tightened hardware on turning fixture
- 🍏 Organized wire storage racks in Arch
- 🍏 Calibrated DISC air monitor
- 🍏 Installed manual winch control station
- 🍏 Elizabeth, Dave, Patrick and John arrived at WSD on Wednesday, 12/8/10
- 🍏 IT techs from McMurdo returned to repair the GOES satellite link and install wireless for the Arch Jamesway and MECC; many emails have been delayed for several days due to this work
- 🍏 Moose door excavated and now open
- 🍏 Met with camp, SCO and NICL management to discuss shift work operations, meals and house mousing.
- 🍏 Picked weight off of winch drum and shifted tower, winch and level wind toward control room side; also re-leveled tower feet
- 🍏 Installed new 1 hp motor in brake fan unit and tested system
- 🍏 Installed level wind and reaction sheaves
- 🍏 Cleaned slot drip pans and re-leveled borehole pan
- 🍏 Re-wired hole cover switch, installed and tested
- 🍏 Installed ventilation hoods on roof of MECC
- 🍏 Resealed and taped screen cleaning system drip pan junctions
- 🍏 General Arch cleaning in preparation for the anticipated start of drilling this week and the NSF visit on Monday
- 🍏 Used jig transit to align core transfer truss, core barrel, FED, core receiving table and core tray
- 🍏 Jay Kyne and Chris Gibson are expected to arrive at WSD this coming week and Mike Jayred and Jim Koehler will depart WSD

#### SAFETY

- 🍏 Elizabeth is working on startup checklist items in preparation for the start of drilling
- 🍏 Steve Mikel, the refrigeration technician, has installed the batteries in the Arch fire alarm system and performed a system test. The alarm could not be heard on the core processing side of the Arch. A fire technician from McMurdo is arriving on Monday to inspect this system as well as the large DISC Drill Halotron fire extinguisher.

COMMENTS

(Problems, Concerns, Recommendations, Etc.)

● Cindy, the WAIS Divide Cargo Coordinator in McMurdo resigned this week.

Fleet Ops will now handle both pax manifests and cargo, and the South Pole

Cargo Coordinator will handle camp resupply.

Project: T-350-M  
Project Principal Investigator: Dr. Charles Bentley  
Report No: 5 for period 12-12-10 through 12-18-10  
Prepared by: Kristina Dahnert Date: 12-19-10

IDDO Personnel on Site:

Patrick Cassidy (WSD as of 12/8/10)  
Kristina Dahnert (WSD as of 11/22/10)  
Dave Ferris (WSD as of 12/8/10)  
Chris Gibson (WSD as of 12/17/10)  
Josh Goetz (WSD as of 12/1/10)  
Mike Jayred (MCM as of 12/17/10)  
Jim Koehler (MCM as of 12/17/10)  
Jay Kyne (WSD as of 12/17/10)  
Nicolai Mortensen (WSD as of 12/1/10)  
Elizabeth Morton (WSD as of 12/8/10)  
Steve Polishinski (WSD as of 12/2/10)  
John Robinson (WSD as of 12/8/10)

ACTIVITIES DURING PERIOD

- Assembled drill on tower and performed down hole testing
- Debugged winch software
- Tested new motor handoff code and debugged
- Cleaned Arch and MECC thoroughly in preparation for operations
- John Rand, Julie Palais, Lynette Barna, Nathan Zeigler and Jim Karcher came for an overnight visit and inspection of the Arch on Monday, 12/13/10
- Core transfer table drip pan installed near FED
- Troubleshooting for DGH modules in winch cabinet and communication with Yaskawas
- Aligned NICL saw table
- Completed Seasonal and Monthly Preventive Maintenance checklists
- Chip hopper moved to Arch and connected
- New motor controllers in Instrument sections J and L do not function well when integrated into the system and put down hole; suspect issue with added noise of new motor control boards
- Removed lifting chains and reinstalled winch drum drip pan
- First core of 2010-2011 season drilled on Thursday, 12/16/10!
- All drillers worked 1st shift on Friday, 12/17/10 for training purposes and shift work then began on Saturday and Sunday
- Revisited screen cleaning heat tube, as thermostat readings appeared

faulty; the heat tube is performing well

- Motor section Y has blown a seal and will not hold hydraulic fluid; the

current drill configuration is now Anti-torque 'A', Instrument section 'K'

and Motor section 'Z'

- Cutter head J3 was installed with .7 x 5mm relieved-edge cutters

- Current clearance of stabilizer pads to the borehole wall is as follows:

.05" at the core dogs and upper screen barrel and .02" at the top of the

core barrel

- Mike Jayred and Jim Koehler returned to MCM on Friday, 12/17/10 and

Chris Gibson and Jay Kyne arrived at WSD

- Six cores were drilled last week; there was some discrepancy in our

bottom depth for a couple of runs, likely attributable to cable stretch

- Final driller's depth for the week: -2584.588 Total meters drilled this

week: 17.694m

- A beach-themed party was held on Saturday night, complete with excellent

decorations. A good time was had by all.

#### SAFETY

- Elizabeth and I met with the camp managers, camp medics and the SCO

Representative, Gifford Wong, to discuss Arch emergency protocol

- Completed Arch safety walkthrough with all Arch staff, camp managers and

camp medics

- Viewed and demonstrated the use of additional slot extraction medical

equipment with all drillers

- NACL air monitor calibrated

- DISC air monitor having 'Trouble' issues; Dave Ferris and Elizabeth

Morton are looking into this and suspect a problem with the hose running

over near the centrifuge; a new hose will be run if necessary

#### COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- I will now use a Sunday through Saturday format for the weekly reports.

This will aid in including up-to-date drill progress data from a full

workweek and allowing the reports to be sent in a timely manner.

- We are currently down two instrument sections and one motor section.

Nicolai Mortensen remains onsite and is working to determine a noise

reduction fix for instrument sections 'J' and 'L'. Motor section 'Z' is

running well and we have section 'X' as a spare.



Project: T-350-M  
Project Principal Investigator: Dr. Charles Bentley  
Report No: 6 for period 12-19-10 through 12-25-10  
Prepared by: Kristina Dahnert Date: 12-26-10

IDDO Personnel on Site:

Patrick Cassidy  
Kristina Dahnert  
Dave Ferris  
Chris Gibson  
Josh Goetz  
Jay Kyne  
Nicolai Mortensen  
Elizabeth Morton  
Steve Polishinski  
John Robinson

- Happy Holidays to everyone!
- This has been a week of challenges and the drill is keeping us on our toes!
- Shift work started this week and shifts are as follows: 1st shift from 7:00am-3:30pm is Elizabeth, Jay and Steve, 2nd shift from 3:00pm-11:30pm is Patrick, Dave and John and 3rd shift from 11:00pm-7:30am is Josh and Chris. When Jay Johnson arrives at WSD next week, I will move to 3rd shift to drill with Josh and Chris.
- Minor software issues encountered this week, including issues with the shared variable engine and booting of the computers; the sonde computer should always be booted first, the sonde program running and the data streams enabled before the winch computer is booted
- A score mark was seen on the core earlier in the week, so the jig transit was once again used to re-level the core transfer truss, the FED and the core receiving tray; with Arch floor movement this season, it is becoming increasingly difficult to align components; core transfer is now smooth again
- Between 10-20 cm of minor barber poling is still seen at the tops of the

cores, but is decreasing; chip packing and refreezing in these grooves

made one core difficult to remove from the barrel and push through the FED

- Several issues transpired with our three instrument sections J, K and L this week. As last week's report noted, the new motor driver boards in sections J and L did not function properly when integrated into the system, thus we continued to run the old configuration in section K with sub par DDC modules. Instrument section pressure was continuously monitored and fluid was drained several times from instrument section K in an attempt to prolong the lives of the DDC modules. Between 500 mL and 3 L of drill fluid were removed during each draining. On Thursday morning, the DDC modules finally went on strike, necessitating the need to reassemble instrument section J and test the new fixes implemented by Nicolai throughout the week. Instrument section J now functions properly and Nicolai is working to implement the same fixes in section L, which will serve as our spare. Hooray!

- Our new J3 cutter head began showing signs of deformation similar to those witnessed last season. We immediately shimmed the core dog cages out to .024" (down from .05") clearance to the borehole wall to reduce the outward flexing seen at the head during core breaks. As with last year, we continue to take caliper measurements between opposing core dog cages after each run. Spare cutter heads are onsite if needed.

- Experimentation continues with winching speeds. We are now descending at a max speed of 1.2 m/s while keeping our weight-on-bit (WOB) below 3000 N. We are ascending at a max speed of 1.5 m/s while keeping our cable tension below 24000 N.

- Periodic 'knocking' has been heard at the level wind sheave immediately after core breaks. This is reminiscent of the crown sheave issues experienced last season. We continue to monitor the sheave, keeping our cable tension under a conservative limit on ascent and have our mechanical engineers assessing the situation.
- After one drill run on Wednesday, it was found that the drill was not rotating freely at the Farmor connection. Anti-torque section A was removed from service and inspected. Though the Farmor returned to free-spinning operations, loose screws up inside of the section were found during inspection. A Gisma connector was installed on section C and the section was installed on the drill.
- The 225kW Cat generator went down for a very short period early in the week showing a non-descript error code. The camp mechanic, Shawn, has since reviewed the generator switchgear and it is now functioning in automatic mode. UT, Ben Buchwald, arrived in camp to attend to generator temperature issues witnessed mainly during last season. He will implement louvers to help the generators function at their optimum temperature.
- Late in the week it was discovered that the pin in the hydraulic oil valve in Motor section Z was not plunging and resurfacing correctly. Motor section X was swapped in, but exhibited the same issue. The slant of the pin has been remedied and section X continues to function well on the drill. Section Z is still considered a working spare.
- With a new temperature sensor implanted in the instrument sections this season, borehole temperature is now more accurate and is being recorded both before and after coring each run. The borehole is approximately

-30°C during descent and ascent, approximately -23°C immediately before

coring and approximately -18°C at the end of coring.

- Our Christmas celebration was held on Friday night, Christmas Eve,

complete with an outstanding dinner of filet mignon, lobster tails,

potatoes duchess, vegetable tart, mustard greens and chocolate pie with

raspberry sauce. Yum! A white elephant gift exchange also added to the

excitement of the evening.

- On Christmas day, a barbeque was graciously prepared by one of the camp

equipment operators and one of the camp mechanics, complete with steak,

salmon, potatoes and peppers, baked beans and portabella mushrooms. The

barbeque was complimented by classic Christmas movies such as "It's a

Wonderful Life" and "A Christmas Story".

- Camp staff is enjoying a well deserved two days off this weekend. The

drillers and core processors (though also very deserving) took one

relaxing day off, but it's hard to keep us out of the Arch now that we're

up and running! Let the drilling continue!

- Final driller's depth for the week: -2683.188 Total meters drilled this

week: 98.600 meters

#### SAFETY

- The DISC air monitor has been exhibiting periodic 'Trouble' alerts on

various channels. Also, while the oxygen sensor calibrated correctly at

startup, it has since fallen out of calibration and will not recalibrate

correctly. After each calibration attempt, the oxygen reading slowly

drifts downward until it alarms on all channels. As we are confident we

have good quality air in the Arch, having had the large back doors open on

most days, we have disabled this oxygen sensor. We now have the auxiliary

pocket oxygen monitor powered up and stationed in the control room, except when utilized during slot entry.

- Paulene Roberts, our camp manager, prepared a WAIS Divide Arch Response document outlining emergency response protocols. I have reviewed this document and provided Paulene with very minor additions and edits.

#### COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- As with all previous drilling seasons, we continue to wade through whichever issues the drill sends our way. The drill sections have been troublesome this season, but we are confident in the reliability of the current configuration of sections C + J + X. Sections B, L and Z remain as spares. Once again, we have a very motivated crew of drillers and keep our eyes on the goal of finishing this hole!

Project: T-350-M  
Project Principal Investigator: Dr. Charles Bentley  
Report No: 7 for period 12-26-10 through 1-1-11  
Prepared by: Kristina Dahnert Date: 1-2-11

IDDO Personnel on Site:

Patrick Cassidy  
Kristina Dahnert  
Dave Ferris  
Chris Gibson  
Josh Goetz  
Jay Johnson (CHC as of 12/28/10)  
Jay Kyne  
Nicolai Mortensen  
Elizabeth Morton  
Steve Polishinski  
John Robinson

ACTIVITIES DURING PERIOD

- Happy New Year to everyone!
- The drill put up another good fight this week, you might say its best yet!
- Late Sunday, 12/26/10, the cutter and pumped simultaneously disabled and the Motor Power Supply (MPS) would not turn back on. Instrument section J was removed from service, as we suspected a thermal problem with the new motor drivers. Motor section X (with pump section Z attachment) was also removed from service, as it bled out its hydraulic oil on the tower and it was determined that the oil was flowing around the compensator piston.
- Instrument section L was installed on the drill, with increased switching speeds in the motor drivers as a means of reducing heat. Motor section Z (with pump section X attachment) was also installed on the drill.
- During the first run with the new drill configuration (Anti-torque C + Instrument section L + Motor pump Z (X)), the pump disabled itself periodically. The pump was exercised and additional core was drilled during the run.

- Upon turning the pump on during surface operations, the pump bound up and the pump motor driver in the instrument section burned out at high torque and no rotation. The drill went down hard as of 12:00 noon on Monday, 12/27/10.

- The next 2.5 days were spent disassembling all three instrument sections, combining parts from multiple sections, implementing design changes and cleaning and reassembling the instrument tubes and end caps.

Current status of the instrument sections is as follows:

- o Section J has been refurbished with one motor driver board from section L. Current limits and other safeties have been implemented in the hardware to preserve this section. This section is currently installed on the drill and appears to be sealing well.

- o Section K has sustained damage that cannot be repaired in the field.

The seals on this section did not hold and up to 3 L of drilling fluid flooded the section causing all six DDC modules (of the old motor driver configuration) to swell and burst. A couple of PCB's also exhibit some bowing and other components succumbed to fluid damage as well.

- o Section L is currently under repair. Parts were received from McMurdo on Friday, 12/31/10, including additional DDC modules and ferrite cores. The current plan is to assemble a 'hybrid' instrument section, combining one of the old style motor driver boards with DDC modules as well as one of the new motor driver boards. This section will serve as the spare section, should section J encounter trouble.

- A portion of the Arch Jamesway was turned into a workstation for disassembling motor pump sections X and Z. Work was done to determine the

cause of the mechanical binding, now believed to be caused by over-pressuring of the grease port such that the needle roller bearing was being sandwiched to such a degree that it could not rotate freely. The grease port will now be filled to a maximum depth of 0.5" from the housing to the edge of the brass fitting. Motor X was reassembled with pump X and motor Z was reassembled with pump Z. Current status of the motor pump sections is as follows:

- o Section X contains a pump that has seized, a replaced seal and an improperly seating oil fitting (manageable); this section was filled with oil using the bell jar this is now a working spare if needed

- o Section Y has blown a seal and will not hold hydraulic oil
- o Section Z has an improperly seating oil fitting (manageable), but has a free spinning pump shaft even with a full grease port; currently the best section and is installed on the drill

- Software limits have also been implemented to prevent further damage to instrument and motor sections. There is now a 7amp cutout on the pump and a 6amp cutout on the cutter. If either limit is reached, both motors will automatically disable.

- New cutters installed prior to resuming operations
- The drill was back online as of Thursday, 12/30/10 at 3:45am. This represented approximately 64 hours of down time. The current drill configuration is now C + J + Z.

- A meeting of all drillers was held to review the fixes implemented as well as to discuss standard operations from this point forward. With only one instrument section currently available, very standard operations using the Run Operations Reference Guide combined with increased vigilance is required.

- Upon resuming standard operations, the pump began disabling itself,



owing to the very conservative software and hardware limits recently implemented. The limit with respect to noise tolerance on internal power was then raised a conservative 4% and the pump no longer self-disables under normal operations.

- Max descent speed remains at 1.2m/s while max ascent speed has risen to 1.7m/s or a 25000 N limit on cable tension. There is no longer a need to slow between 2055-1935m on ascent, as we have passed the questionable loose cable wrap. The level wind sheave appears to be holding up well to our slow speed increases and no more knocking has been heard immediately after core break.

- Minor software changes were made for ease of operations regarding motor default speeds. The trip motor will now default to the proper speed of 0.10m/s for travel on the tower and the drill motor will now default to 2.5mm/s during the coring phase.

- Height of the rear button shoes was changed early in the week from .197" to .176" in attempt to speed up the coring portion of the drill runs. The shoes have since been returned to .197" in an attempt to go easy on our one remaining instrument section.

- Bulk fluid tanks were filled

- Weekly Preventive Maintenance (PM) tasks and checklists are being completed

- A New Year's celebration was held on Friday, 12/31/10.

Appetizers were

served at 10:00pm followed by a countdown at midnight. Both the drill and

science tech crews took a day off for holiday, needing a bit of recuperation from the stressful drill repairs throughout the week. A fun, relaxing night was had by all.

- Camp staff is again enjoying a well deserved two days off this weekend.

- Final driller's depth for the week: -2760.706 Total meters drilled this week: 77.518m

#### SAFETY

- The four channels on the DISC air monitor are now functioning properly after Dave and Elizabeth ran new tubing lines to both the slot and centrifuge. The oxygen sensor remains disabled at this time, but another attempt at calibration of this sensor might be made this next week.

#### COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- With only one working instrument section at this time, we are 'babying' the drill to some extent, however have been able to make up a bit of time experimenting with faster winching speeds. The new permanent level wind tracking device is working well this season.

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

IDDO Personnel on Site:

Patrick Cassidy  
Kristina Dahnert  
Dave Ferris  
Chris Gibson  
Josh Goetz  
Jay Johnson (WSD as of 1/5/11)  
Jay Kyne  
Nicolai Mortensen  
Elizabeth Morton  
Steve Polishinski  
John Robinson

ACTIVITIES DURING PERIOD

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

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

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

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

#### SAFETY

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

#### COMMENTS

(Problems, Concerns, Recommendations, Etc.)

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

Project: T-350-M

Project Principal Investigator: Dr. Charles Bentley

Report No: 9 for period 1-9-11 through 1-15-11

Prepared by: Jay Johnson Date: 1-16-11

IDDO Personnel on Site: Patrick Cassidy

Kristina Dahnert

Dave Ferris

Chris Gibson

Josh Goetz

Jay Johnson

Jay Kyne

Nicolai Mortensen

Elizabeth Morton

Steve Polishinski

John Robinson

#### ACTIVITIES DURING PERIOD

- Drilling went much smoother this week and everyone is starting to settle into a routine.
- We worked on Sunday since most people had off for a few days while the drill was down last week.
- I took over as lead driller on Tuesday and Krissy switched to third shift to work with Josh and Chris.
- Krissy and I met with Paulene R. (camp manager), Ken T., Mark T., Gifford W, and Brian B. to discuss the schedule and time-table for the end of the season. A request for an extension of 3-5 drilling days is on the table; however we are waiting for final approval.
- We experienced comms issues with the sonde a few times this week. When this occurs the cutter and pump torque graphs flat line even though the motors are still running. Rebooting LabView on the sonde computer solves the problem. Drill runs can be resumed when this happens.
- While ascending, a screw came loose on the level wind control arm that connects the LVDT to the control arm slide. This caused the level wind to stop and resulted in several wraps of cable lapping over themselves before the winch was stopped. No damage was done to the cable and the problem was resolved in less than one hour.
- The weight-on-bit sensor is not working reliably. The pressure housing has leaked causing the sensor to drift while tripping and sometimes not work at all. Operations can be conducted safely without it so I have decided not to change anti-torque sections at this time. This has been an ongoing problem so the chances of putting on a new section and having the same problem occur are high.

- Nicolai finished repairing, assembling, and testing a second instrument section (section L). We now have one spare. The third unit cannot be repaired on site.
- Oil leaks were repaired in motor section Y. It is now ready as a backup.
- Anti-torque section A has been inspected and is ready as a backup.
- Borehole inclination has decreased from 4.1° to 3.7° since the start of the season.
- The borehole fluid density was checked and found to still be at .92 at -31°C.
- New cutters were installed after ~160m of drilling.
- Winching speeds have been increased to 2m/s during ascent.
- We started drilling an extra 10cm on each drill run. Our theoretical core lengths are now 3.2m.
- The spare drill cable, cable tensioner, and P05 controller arrived this week. At this point we will not be installing the new cable at the end of the season. The cable and equipment will winter over at WSD.
- The winch and slot drip pans were cleaned on Saturday after we were done drilling.
- The NSF media crew filmed operations throughout the week.
- Weekly PM maintenance was completed.
- Monthly PM maintenance has been started.
- On Friday at 9:45pm we reached 3000m!
- Drilling rate this week averaged 23.7m per day.
- Final Driller's depth for the week: -3019.769m
- Total meters drilled this week: 163.757

#### SAFETY

- Nothing to report

#### COMMENTS

(Problems, Concerns, Recommendations, Etc.)

-

Project: T-350-M  
Project Principal Investigator: Dr. Charles Bentley  
Report No: 10 for period 1-16-11 through 1-22-11  
Prepared by: Jay Johnson Date: 1-22-11

IDDO Personnel on Site: Patrick Cassidy  
Kristina Dahnert  
Dave Ferris  
Chris Gibson  
Josh Goetz  
Jay Johnson  
Jay Kyne  
Nicolai Mortensen (departed WSD on 1/18/11)  
Elizabeth Morton  
Steve Polishinski  
John Robinson

#### ACTIVITIES DURING PERIOD

- Once again a smooth week of drilling. It is evident that the ice is changing through the way it is cutting and the uneven core breaks we have seen.
- Nicolai departed WSD on Tuesday, 1/18/11.
- On Tuesday at 12:02AM we reached 3056m. This now makes the WAIS Divide ice core, known as WDC06A, the deepest US ice core ever drilled! The previous record was set in 1993 at GISP2 with a depth of 3053.44m.
- The shoe height was reduced .25mm (.01") resulting in an actual cutting pitch of 3.2mm. This change was prompted by two factors. First, the cutter torque graph was becoming increasingly erratic and our operational methods of calming it were not working. Secondly, the check valve and cutter head were packing with chips more frequently without increasing the depth drilled. The shoe change resolved both of these problems. However, towards the end of the week the frequency of the check valve packing with chips at the end of a run has again increased. Cutter torque generally remains stable throughout the run.
- Daily progress has increased from 24.61m to 27.72m as a result of the shoe change.
- We are continuing to recover 3-3.1m cores per run.
- At the start of coring we are now reading a borehole temp of -15°C.
- The winch has enough cable on it to drill to 3365m leaving 12 wraps on the drum. As of Wednesday we are down to the last layer of cable.
- We have observed that the motor end of the level wind lifts slightly during core breaks when they exceed 31,000 newtons.



- Core breaks are not as clean as they were a week ago. New core dogs were tried but they perform the same. They are engaging cleanly and without sliding, so the rough breaks may be due to the changing ice.
- We have drilled a total of 627m so far this season.
- Final Driller's depth for the week: -3191.481m. Total meters drilled this week: 171.712.

#### SAFETY

Nothing to report

#### COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- The generator shut down due to an over frequency condition. The backup generator automatically came on line within 3 seconds. The winch and drill shut down and had to be restarted, but that was the extent of the inconvenience.



## PROJECT SITUATION REPORT DISC Drill 2010-11 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	11	<b>for period</b>	1-23-11	<b>through</b>	1-29-11
<b>Prepared by:</b>	Jay Johnson	<b>Date:</b>	1-30-11		

<b>ICDS Personnel on Site:</b>	Patrick Cassidy Kristina Dahnert Dave Ferris Chris Gibson (Departed WSD on 1/24/11) Josh Goetz Jay Johnson Jay Kyne Elizabeth Morton Steve Polishinski (Departed WSD on 1/26/11) John Robinson
--------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### ACTIVITIES DURING PERIOD

- Final week of drilling!
- We reached our depth goal of 3330m on Friday at 10:24am! One day ahead of the scheduled stop date.
- All shifts worked on Sunday.
- Shoe height was reduced from .184" to .181".
- Borehole inclination started at 4.1° and dropped to 3° this season. Inclination stopped decreasing when we switched to the more aggressive .184" height shoes a week ago.
- On two separate drill runs the pump stopped running for no apparent reason. The first time was while tripping down. The second time was while coring. Both times we were able to simply turn the pump back on and continue operations.
- The grease seal on the Z pump began to leak and it also caused the motor to draw more current. The X pump was swapped in. This pump ran well until the last night of drilling. After entering the fluid the pump was turned on. Immediately the torque maxed out causing it to trip out. This pump was replaced with Y. Initial inspection of the X pump showed that over greasing the piston may have caused the pump shaft to bind up.
- Rebuilt the reeds in both screen check valves. Many of the reeds were not closing completely due to use and cable void filler getting stuck under them.
- This week we began to see cuttings refrozen on the cutters at the end of a run. It looks like the cuttings are left on the cutter faces at the end of a run and then refreeze when the drill is brought up. The rest of the cutter head and shoes are always clean.
- After drilling the last core, a temperature logging run was done. The winch was set at .25m/s for both descending and ascending. The entire run took 8 hours. When we touched off the bottom the core dogs engaged on a carrot left from the

previous run. An 11cm long core was recovered with a clean bottom break.

- Josh debugged some issues with the winch control software after coring was complete. When trying to force the computer between states the software used to often crash. This has now been resolved.
- After drilling was complete, one of the vent ports on the instrument section was opened to see if it had leaked. ~100ml of fluid was drained out.
- The temperature at -3331.5m is -10.67°C.
- Packing began on Friday night.
- The winch cabinet crate is packed and will fly to MCM on Monday along with a few other smaller pieces of our cargo. The winch cabinet crate and fire extinguishers will winter in MCM this season. All other cargo will leave WSD on Wednesday.
- 767.168m of core were drilled this season over a period of 43 days. This includes days off and down time for repairs.
- Final Driller's depth for the week: -3331.538m. Total meters drilled this week: 140.057.

### **SAFETY**

- Nothing to report

### **COMMENTS**

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

- Nothing to report



## PROJECT SITUATION REPORT DISC Drill 2010-11 Season

<b>Project:</b>	T-350-M				
<b>Project Principal Investigator:</b>	Dr. Charles Bentley				
<b>Report No:</b>	11	<b>for period</b>	1-30-11	<b>through</b>	2-05-11
<b>Prepared by:</b>	Jay Johnson	<b>Date:</b>	2-06-11		

<b>ICDS Personnel on Site:</b>	Patrick Cassidy (Departed WSD on 1/31/11) Kristina Dahnert (Departed WSD on 1/31/11) Dave Ferris (Departed WSD on 1/31/11) Josh Goetz (Departed WSD on 2/2/11) Jay Johnson (Departed WSD on 2/2/11) Jay Kyne (Departed WSD on 1/31/11) Elizabeth Morton (Departed WSD on 1/31/11) John Robinson (Departed WSD on 1/31/11)
--------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### ACTIVITIES DURING PERIOD

- Final weekly report for the season.
- Patrick, Krissy, Dave, Jay K., Elizabeth, and John flew from WSD to MCM on Monday.
- Josh and I flew from WSD to MCM on Tuesday.
- Repaired both gantry crane pendants. The electrical cable had pulled out of the connector grommet exposing the wires. The cable was reinserted and the strain relief cables were adjusted so they will carry the weight of the pendent.
- Removed the VFD controllers from both cranes.
- Packed the early season put in DNF Hardigg.
- Added ball valves to the outlet of the centrifuge and sonde nitrogen purge regulators. The cylinders can now be left on between use and the supply can be shut off with the new valves.
- Packed the MECC and had it moved to the winter berm.
- Removed and inspected the crown sheave. The bearings on one side of the hub had a couple of rough spots when rotated (felt like a piece of grit in the bearing). I was going to replace the bearings, however once the sheave had warmed up in the MECC the bearings ran completely smooth. The level wind sheave had the same condition. The hub on the crown sheave was disassembled and inspected. No damage or wear was seen. It was reassembled with a film of Aeroshell 22 grease between all matting surfaces.
- Did maintenance on the sheave cable groove wipers.
- Put returning gear into the USAP cargo system for either COMAIR back to MSN or hold in MCM for DNF winter storage.
- The winch control cabinet crate was too tall to fit through the garage door at the MEC, our winter over DNF space. It will be sent to CHC for the winter.
- Attended our outbrief with RPSC and NSF representatives.

**SAFETY**

- Nothing to report

**COMMENTS**

(Problems, Concerns, Recommendations, Etc.)

-