

# SITREP 01- November 16, 2014

Murat Aydin (Science Field Leader)

Written at South Pole

The highlight of the week is the record breaking travel time for Murat, Mindy, and Kimberly, spending less than 36 hrs at CHC and about 18 hrs night at MCM. The whole team got their snow mobile and light vehicle training. Kimberly successfully turned on the one spectrometer that got here in the science lab. Other than that, it has been more of a lowlight week. No cargo movement to NPX worth mentioning, although most or all cargo should be in MCM. There is the outstanding NSF safety stamp issue. Hopefully, common sense will prevail soon.

## I. PAX MOVEMENTS

- A. Murat, Mindy, and Kimberly traveled from home to CHC on Nov 8-10 and from CHC to MCM on Nov 12
- B. Murat, Mindy, and Kimberly traveled from MCM to NPX on Nov13

## II. CARGO MOVEMENTS

- A. Kimberly has 1 of 3 pieces of science she shipped.
- B. We also have the core cards.
- C. We also have 2 drums of isopar so we're almost ready for fluid drilling.

## III. STATUS OF DRILLING

- A. Tanner and the surveyor were out to put a mark on the ground and flag the no drilling zone. You will probably see more details in Tanner's report.

## IV. CORE LOGGING

- A. Nothing to report

## V. CORE PACKING

- A. Nothing to report

## VI. CORE RETRO

- A. Nothing to report

## VII. TEMPERATURES

- A. Nothing to report

## VIII. WEATHER

- A. Pretty standard NPX weather. Temps -38 C to -43 C, winds 5 – 15 knots, wind chill -45 C to -70 C, or something along those lines. Almost always sunny outside so not as bad as it sounds really. Avoid the shadows and the wind, and it feels like California.

#### IX. HEALTH

- A. No issues, everybody doing well.

#### X. OTHER

- A. I'm impressed with the popularity of yoga at the station.

# SITREP 02- November 23, 2014

Murat Aydin (Science Field Leader)

Written at South Pole

This week was definitely more eventful than the previous one. The MECC and the Duke (a spacious relief facility) are at the site and set up. The generators have arrived and been prepared. They are scheduled to go out to the site on Monday the 24<sup>th</sup>. The snowmobiles are ready and the van is getting there. Some of the cargo has been dragged out to the site. Most importantly, we finally got the green light from NSF design and safety team to move forward, with the understanding that the safety of the drilling operation is the responsibility of IDDO. There is also progress on the design of the trench roof. There is going to be a meeting between ASC and NSF on Monday 24<sup>th</sup> (US time) about the 90% drawings. It was disappointing that another week went by without construction at the site but it seems imminent. ASC is aware that we want the operation to start already and all signs indicate we will break ground this week.

There was a visit from a group of Russians, including the head of Russian NSF, to the station. Apparently, they are looking into upgrades to Russian Antarctic stations using some private money. The SPICE group is receiving high praise from station management for their contributions to station operations. They are not sitting around idle because we don't have much to do for our project. IDDO should ask ASC to chip in for the drillers' wages. In their spare time, the group visited the ARO building, the South Pole telescope, and the Spud/Keck telescope, and took some group pictures at the ceremonial Pole. We're ready to go.

## I. PAX MOVEMENTS

- A. Nothing to report

## II. CARGO MOVEMENTS

- A. Most of the IDDO cargo arrived at the Pole. The IDDO SITREP should have the details.
- B. The science cargo from NICL is still in MCM. Should be delivered next week. We already had the science cargo shipped from UNH.
- C. The spectrometer Kimberly and Tom shipped is on site.

## III. STATUS OF DRILLING

- A. No ice core drilling yet. Construction at the drill site is scheduled to start this week, very possibly tomorrow (Monday, November 24<sup>th</sup>).
- B. Six cores were drilled for the ASC using a hand auger they provided (Wed the 19<sup>th</sup>). The purpose was to measure the snow density at the drill site and make sure it was good enough for the drill structure.

## IV. CORE LOGGING

- A. Nothing to report

## V. CORE PACKING

- A. Nothing to report

## VI. CORE RETRO

- A. Nothing to report

## VII. TEMPERATURES

- A. Nothing to report

## VIII. WEATHER

- A. May be a slight warming this week. The temperatures were consistently over  $-40^{\circ}\text{C}$ . The highest I saw on the station monitors was  $-35.5^{\circ}\text{C}$ . Most commonly, they stayed in  $-37^{\circ}\text{C}$  to  $-39^{\circ}\text{C}$  range. Don't ask about the wind chill. When the wind is up, those numbers are depressing. Winds were also calmer this week though: usually in 3-10 knot range.

## IX. HEALTH

- A. No issues, everybody doing well.

## X. OTHER

- A. We got news from Michael Davis that the ice core boxes turned up a little too small and they can only fit 5 ice core tubes instead of 6 (note: the ice core boxes are the tall narrow ones, rather than the short wide ones requested). He has made extra boxes to make up for the lost meters but there are other potential implications, specifically with respect to the ice retro. Not an immediate concern at the moment.

# SITREP 03- November 30, 2014

Murat Aydin (Science Field Leader)

Written at South Pole

We made some real progress this week. The generators at the site were started on Monday, allowing us to warm up the MECC, which was needed to do any serious work out there. The real turning point for the project was the meeting on Tuesday (Nov. 25<sup>th</sup>) between parties from the NSF, the ASC, and the IDDO. We got the final green light. The rest of the day was spent laying geoblock and making saw cuts for the trench excavation. Tanner and I decided November 25<sup>th</sup> is our official construction start date. On Wednesday, the excavation of the drill trench was completed and one end-wall (opposite to the storage trench side) was in and back-filled. Spent Thursday working on the skeleton of the drill trench structure. By Friday morning, the tent was ready to be moved over the trench. This pretty tricky job was completed successfully before lunch break on Friday. Both the IDDO and the ASC crews were right on. We went to work on Saturday (the station was taking the day off due to Thanksgiving) to start sorting out the inside of the drill trench.

There were other notable activities. Kimberly did some experiments on the runway (see details in the others section).

The South Pole traverse arrived at 8pm on Wednesday. We determined that the potential firm site for the 15/16 field season was not ideal. Given that the proximity of our drilling location to the old station, we asked the traverse folks to do a GPR survey of the new potential firm drilling area. This was completed on Saturday the 29<sup>th</sup>. They did a 10 m x 10 m grid of a 100 m x 100 m area and did not see anything. Kimberly has all the details and the data.

I gave a science lecture to the station on Sunday evening, providing a general overview of the SPICE project and some specifics on the scientific objectives from a trace gas perspective. I also promised TJ would give a talk about the isotopes and climate side of the project when he arrives in January.

## I. PAX MOVEMENTS

- A. Nothing to report

## II. CARGO MOVEMENTS

- A. NICL cargo needed for core logging is at the Pole. We also received four skids of ice core boxes and tubes. Based on the emails I received, we should have enough supplies to pack 192 m of ice. 120 data loggers and 50 hobos are also supposed to be in one of the skids that arrived. I will confirm that this is indeed the case on Monday. It appears we do not have any immediate cargo needs to be able to start drilling.

## III. STATUS OF DRILLING

- A. No ice core drilling yet. Drill trench prep and the construction of the storage trench will continue next week. The floor is really sugary ice and it is tough to walk on. We decided to cover most of the drill trench floor with geoblock. That job and the preparation frame and smaller inside trench for the drill tower should be completed over the next couple of days. I also expect to start working on the core logging area this week.

## IV. CORE LOGGING

- A. Nothing to report

## V. CORE PACKING

- A. Nothing to report

## VI. CORE RETRO

- A. Nothing to report

## VII. TEMPERATURES

- A. Nothing to report

## VIII. WEATHER

- A. I'm not sure if the warming trend continued this week. Temperatures are still consistently lower than  $-35^{\circ}\text{C}$ . There is word that we will be getting some weather from the Weddell Sea direction by midweek. The South Pole storm predictions do not always materialize. In any case, we should be in good shape because the drill tent is fully zipped up.

## IX. HEALTH

- A. No issues, everybody doing well.

## X. OTHER

- A. Kimberly started her field spectrometry measurements aimed at surface characterization of snow and ice conditions around South Pole. On 26 November, she gathered several measurements over heavily polluted ice on the skiway. She was very pleased that all instruments performed well, given the temperatures and wind conditions:  $\sim -39^{\circ}\text{C}$ , 8 knots.

# SITREP 04- December 07, 2014

Murat Aydin (Science Field Leader)

Written at South Pole

This past week was spent getting everything ready for drilling. Everything we need in the drill trench for fluid drilling is ready, including all the ventilation components that were added after the Greenland test. A lot of time went into preparing the drill control room. The storage trench is also just about ready. The wall and roof installation was completed. We settled on the stairs solution to access the storage trench. The original drawings had a ramp but the beginning of the ramp was going to be too close to the drill when the tower was down. Moving the ramp into the storage trench was causing head clearance issues at the entry. The sugar snow was an additional concern. It is very hard to pack it and get a nice solid surface. I think the stairs will work better in the end and save us some valuable space inside both the drill and storage trenches.

Probably, the biggest news of the week is the recovery of two 10m deep hand auger cores on Saturday. We have our first 4 boxes of ice cores. A few things to note on the core tubes and boxes: Core tubes can only accommodate up to 105 cm and the core boxes can only accommodate 5 tubes. The sixth tube pushes the top insulation up and the boxes don't want to close properly. However, having only 5 tubes leaves some empty space at the top. We put snow in this leftover space when we packed the hand cores. We intend to do the same for the actual cores from our main hole.

This week we also got our vehicle situation sorted out. We've been using two snow machines to go back and forth but we kept having problems starting one of the machines (this is a very common problem at South Pole) and ended up crowding on to one people mover. They finally got the parts to fix the wheeled van this week and now we are in really good in shape for the commute.

## I. PAX MOVEMENTS

- A. Nothing to report

## II. CARGO MOVEMENTS

- A. Received another AFP of core boxes.

## III. STATUS OF DRILLING

- A. Two hand auger cores down to 10 m (SPC HA1 and SPC HA2). The cores were drilled just outside the main drilling box. We used the 2 m barrel, which allowed us to bring up about 1 m cores almost every time. Core quality was pretty good except the top 2 m, which is really loose snow.

## IV. CORE LOGGING

- A. We logged the top depth, the bottom depth, and the temperature for the hand cores. They were packed as close to exact meters as possible. We'll follow the same strategy for the main core.

## V. CORE PACKING

- A. Hand cores are packed up in 4 boxes, sitting in the storage trench.

## VI. CORE RETRO

- A. Nothing to report

## VII. TEMPERATURES

- A. Temperatures were  $-30^{\circ}\text{C}$  to  $-31^{\circ}\text{C}$  while we were drilling the hand cores.

## VIII. WEATHER

- A. Most of this week was pretty windy. The expected weather moved in gradually through Tuesday and lingered on through Friday. Even though the temperatures go up when the wind is blowing (we saw  $-25^{\circ}\text{C}$ ), it actually feels worse outside with the wind chill and the lack of sunshine. Saturday was a nice day again.

## IX. HEALTH

- A. No issues, everybody doing well.

## X. OTHER

- A. Nothing else to report.

# SITREP 05- December 14, 2014

Murat Aydin (Science Field Leader)

Written at South Pole

The drilling of the main SPICE core borehole started this week. Most of the final preparations were completed on Monday before lunch. Following a little more fine tuning after lunch, the drilling started. We were somewhat apprehensive about core recovery in the shallow firm because of the sugar layers we saw while the trench was being dug. As it turned out, the core dogs performed pretty good even in the shallow firm. Some of the dog marks on the first cores were more than a few inches long but there did not appear to be any real danger of not bringing the core up. Finished Monday on a happy note with a small celebration in the MECC.

Tuesday started out fine as we quickly got down to 20+ meters before lunch. When we came back from lunch, however, we found the drill out of commission. The drillers reported nothing on the control console was working: could not control the winch and could not turn the cutters either. Looked like the board in the control console was fried. The drillers installed the spare, which fixed some of the issues. Cutters were spinning and we had tripping control on the winch, however, still no fine (drilling) control on the winch. We spent most of the week (Tue afternoon through Friday afternoon) trying to fix the problem. At one point, James Roth, an electronic savvy guy (relative to us) who is going to deploy at WISSARD later this season, put together a hybrid board using what was thought to be good parts from the two boards that malfunctioned. Unfortunately, the hybrid board also failed as soon as it was installed. On Thursday, IDDO sent us a work around plan. By Friday afternoon, the work around (bypassing the malfunctioning board and controlling the winch directly via the pots on the console) was implemented and perfected. Drilling started again Friday afternoon. We had a very productive day on Saturday, drilling about 42 m. We still do not know what was killing the boards (more specifically the problem seems to lie with the op-amps on the boards). There is likely a short (or something of that nature) somewhere but we haven't been able to locate it. We considered static as a potential cause and started to ground whoever is working with the console. The good news is the workaround solution works great. We are drilling very efficiently and the core quality has been excellent through the top 84 m of the firm. No problems so far with core getting stuck in the barrel as it did in Greenland while dry-drilling firm cores. We do have some spare boards and op-amps in the mail, however, we do not plan on trying to install them immediately.

## I. PAX MOVEMENTS

- A. Nothing to report

## II. CARGO MOVEMENTS

- A. We received a crate full of Tupperware from ASC that we don't have much use for at the moment.

## III. STATUS OF DRILLING

- A. As stated above, we are currently at 84 m. We hope to get to 130 m by Tuesday. We'll stop drilling to ream and case the hole once we reach that depth. Expect fluid drilling to start later during the upcoming week.

## IV. CORE LOGGING

- A. Logging plan is working fine. In addition to keeping track of top depth and bottom depth, an index mark is drawn close to the bottom of each run as soon as the core comes out of

the barrel and matched up against the overrun. We measure the distance between index marks and the distance to the next cut mark as discussed during season prep. After seeing the implementation, I find this to be the most useful measurement we're making in the field. When determining the ultimate top and bottom depths for the tubes at NICL, we should make sure the index mark depths from the field do not change. One problem has been making the core temperature measurement. We do not have the right instrument for this measurement.

#### V. CORE PACKING

- A. We currently have 20 boxes (5 m in each) packed in the storage trench. This includes the 4 boxes of ice from the two hand auger holes (SPC HA1 and SPC HA2). There is a data logger in each box and the space between the tubes and the top insulator (larger than usual because of only 5 tubes per box) is filled with snow from the bottom of the storage trench.

#### VI. CORE RETRO

- A. Nothing to report

#### VII. TEMPERATURES

- A. The outside temperature has been warm this week and ranged from -25°C to -29°C. Temperatures in the core processing area have been in -20°C to -22°C range during Friday and Saturday. We definitely get some radiative heating in the drill trench. Having to keep the doors open and use outside air to keep the inside temperature below -20°C. The storage trench is staying in -32°C to -35°C range.

#### VIII. WEATHER

- A. Not much wind this week. We had a dead calm day on Saturday with no windchill and outside temperature at -25°C.

#### IX. HEALTH

- A. No issues, everybody doing well.

#### X. OTHER

- A. Kimberly was out on the skiway again making spectrometric measurements during one of our down days.
- B. The station is expecting a visit from a congressional delegate on Wednesday next week.

# SITREP 06- December 21, 2014

Murat Aydin (Science Field Leader)

Written at South Pole

This has been another up and down week. Monday started out with some new electronic problems, this time relating to the cutter head control. It was possible to find a work around as before and we were able to get 20+ meters of core in one shift. We were getting ready to switch to two shifts if things went smoothly on Tuesday but we had another problem. This one was self-inflicted. After a series of unfortunate events, the drill cable snapped. Luckily, the drill was at the surface, and after an initial scare, we found out the damage was not nearly as bad as it could have been. We were up and running again by Wednesday, but this time some drilling problems emerged that impacted the drilling efficiency and core quality. There were two major problems. First, the drill was rattling a lot during the trips, which meant we had to decrease the trip speeds down to a crawl. Second, we started having serious issues with core breaking. The dogs were getting sintered in with chips and not wanting to engage, which often resulted in one-dog core breaks. This appeared to result in long spalls. After a couple of days of battles, it was figured out that the rattling was due to a problem with the anti-torques and it was resolved to the best of our ability. We also did the first ream to improve the quality of the hole walls. This is something that had to be done anyway before we could start the fluid drilling. These two measures fixed the rattling problem and we tried to continue dry-drilling on Saturday. Unfortunately, we could not overcome the chips mucking up the drill head problem and decided to call it on dry-drilling early afternoon on Saturday. We had just over 160 m of core at that point.

After the decision was made to stop dry-drilling, the second reaming, with a 7" reamer if I'm not mistaken, started Saturday afternoon. We also decided to start the two shifts. The first night shift went out to continue reaming on Sunday night (21<sup>st</sup>) around 10pm. A 9" ream will follow the 7" one, and after that we'll need about a day to case the hole. It appears this year's Christmas present will be Estisol. We estimate that the production of fluid drilled cores will start on Christmas Eve. Let's see if we can keep that promise.

This is supposed to be the highlights section so here is a highlight of the week. The station welcomed a congressional delegate on Friday, after two days of flight delays. All in all, they spent a little more than 2 hrs. at the Pole, which did not include any time with the SPICE project.

## I. PAX MOVEMENTS

- A. Nothing to report

## II. CARGO MOVEMENTS

- A. We received the replacement electronics on Friday. We will probably try to replace the damaged boards sometime during the reaming process during this upcoming week.
- B. We received a box full of shop towels from WAIS Divide, courtesy of Don Voigt. They will be used for drying the fluid-drilled cores.

## III. STATUS OF DRILLING

- A. The dry drilling stopped just over 160 m early Saturday afternoon. We made the decision to start the second stage of reaming, which will be followed by the third ream and casing. The plan is to case the hole down to 130 m, which requires a fully reamed hole down to at least 140 m. We expect the fluid drilling to start sometime on Wednesday (24-Dec) if all goes well. The quality of the core so far is all in excellent and very good range, except for a couple of runs when we had serious problems getting the core out of the barrel.

## IV. CORE LOGGING

- A. No problems with core logging except a lost 8 cm just above 160 m depth because we had to hammer out a core that did not want to come out of the barrel. We are certain about the length of the ice lost because the piece was perfect and once we determined it was not coming out the easy way, we were able to measure its length before we forced it out the hard way.

## V. CORE PACKING

- A. We currently have 160 (main core) +20 (hand augers) meters of ice packed in boxes (5 m each in 36 boxes).

## VI. CORE RETRO

- A. Nothing to report yet. We are currently shooting for December 31<sup>st</sup> cold deck as the first shipment out. The flights, or the lack of them, are a huge problem this year. Our back-up date for the first cold deck is January 5<sup>th</sup>.

## VII. TEMPERATURES

- A. The outside temperatures are hanging in -25°C to -29°C range. Temperatures in the core processing area stayed between -21°C to -24°C. The storage trench is in -32°C to -35°C range.

## VIII. WEATHER

- A. Switches between sunny and a little cooler to gloomy, windy, and a little warmer. Doesn't really make much difference for the drill trench. If we keep the vents open and the fans running, we stay pretty close to outside temperatures.

## IX. HEALTH

- A. No health related problems to report.

## X. OTHER

- A. We now have Graceland (the Estisol soaked clothing dry-out facility) as the newest addition to our camp.

# SITREP 07- December 28, 2014

Murat Aydin (Science Field Leader)

Written at South Pole

The big news of the week is Estisol, of course, what else? The reaming and the casing went very smoothly and the switch over to fluid drilling have taken only 4 workdays. Once we started to drill again, we realized that some of the problems disappeared. The core breaks are now much better, with three dogs engaging most of the time. Getting the cores out of the barrel is very easy. That is one thing a lubricant like Estisol is great for. The FED is not perfect but it provides a good start in drying the core. A wipe with an Isopar soaked towel, followed by a wipe with a dry absorbent towel appears to get rid of most of the Estisol. The bad news is we are having to stop the runs way short of the ideal 2 m lengths because of either anti-torque (AT) slips or amp-outs on the cutting motor (more frequently AT slips). We are also having occasional seize problems with the bearing that attaches the cable to the drill.

So far, a perfect cure it all solution has eluded us. The leading theory is that poor chip transport might be the root cause of most problems. There are some potential solutions on the table that we will try. We can also use a little bit of luck at this point. The hope is that TJ is bringing some with him.

Now on to more light hearted news. Andy Clarke from NOAA gave a science lecture this Sunday that included a lot of climate change related material. The station population has been very receptive to our message in general. Wining people over one at a time.

## I. PAX MOVEMENTS

- A. TJ is on the move, expected to arrive on the 31<sup>st</sup>. We will see what actually happens.

## II. CARGO MOVEMENTS

- A. We received a box of 8" lay flat from WAIS Divide with Guard Mail.

## III. STATUS OF DRILLING

- A. The dry drilling was put on a hiatus by the end of the 20<sup>th</sup> to start casing the hole for fluid drilling. The 21<sup>st</sup> was a Sunday. Took us the 22<sup>nd</sup> through the 24<sup>th</sup> to ream the hole first to 7" and then to 9", working 18-20 hours a day in two shifts. The 25<sup>th</sup> was off (Merry Christmas) and casing started on the 26<sup>th</sup>. The entire casing down to 130 m was completed during the day shift. The night shift on the 26<sup>th</sup> did the final preps and fluid-drilling started in the early hours of the 27<sup>th</sup> at about 160 m depth. As I'm writing this in the morning of the 29<sup>th</sup> (Monday), we are close to 200 m. As explained above, the fluid drilling is not going as smoothly as anticipated and we are not coring nearly as much as we would like. The average core recovery per run is less than 1 m. Working on solutions to resolve various issues. The drill has not been very cooperative so far.

## IV. CORE LOGGING

- A. Core logging with the fluid-drilled cores is a little different. The measurement and cut marks we put on the core tend to smear. We are using pencils only and trying to mark as little as possible to keep the core clean. On the first day of fluid coring we were merely trying to towel-dry the cores and then put them on drying racks we prepared. Unfortunately, it quickly became evident that the makeshift drying rack system was a little too risky with the cores being as slick as they are. We are now first wiping the cores with an Isopar soaked shop towel, then drying them vigorously with blue absorbent paper

towels. Seems to be working well. The cores look pretty dry when they are packed. Hard to tell if smell would be an issue at NICL.

- B. Shorter core recovery results in more core breaks per tube. One good thing about switching to fluid coring has been that cores slide out of the barrel very easily. Even the smaller pieces lock in nicely with the prior run. Spalling issues have also almost completely disappeared. Most pieces we have packed since the start are very good (not excellent) because of the extra breaks we're getting due to short core recovery.

#### V. CORE PACKING

- A. Packing is going well. No issues really. Still putting a little snow on top of all boxes to fill up the extra space.

#### VI. CORE RETRO

- A. Nothing to report yet. There is no possibility of a December 31<sup>st</sup> cold deck anymore. We are looking at January 4<sup>th</sup> or the 5<sup>th</sup> as the first cold deck out. The extra days helped us out a bit since we are having issues producing core right now.

#### VII. TEMPERATURES

- A. The outside temperatures are in -24°C to -28°C range. The height of summer here definitely. Temperatures in the core processing area stayed between -20°C to -23°C mostly. The screened-windows do not provide enough circulation and the temperature in the drill trench starts to creep up above -20°C if the doors are kept shut. It is fairly easy to regulate the temperature inside the trench, however, by opening and closing the upwind door. The tent gets down to within a degree or two of the outside temperature in a few minutes.

#### VIII. WEATHER

- A. We're enjoying the summer while we can.

#### IX. HEALTH

- A. No health related problems to report. The drill trench floor is extremely slick due to Estisol. We are trying to be very careful walking around. Everyone has gotten used to the penguin step.

#### X. OTHER

- A. I should mention Dave Pernic, a highly skilled machinist previously with IceCube now with one of many telescopes stationed here, has almost become a part of the team and has been helping us out a lot.

# SITREP 08- January 04, 2015

Murat Aydin (Science Field Leader)

Written at South Pole

We welcomed 2015 with TJ's arrival on Jan 1<sup>st</sup>. This gave us plenty of time for a proper change over. I skipped the afternoon shift today (Sunday the 4<sup>th</sup>) for the first time to write this report. TJ is out there overseeing the operation and helping with the core logging. So in a sense, the hand over has already happened. You should receive this report with a foreword from TJ. With 320 m of high quality ice under our belt ready to ship very soon (see details below) and about 20 more drilling days still on the calendar, all of a sudden, we feel fairly good about the season.

I should also mention the big highlight of the week for the station was the ceremony for moving the geographic pole marker to its new location. The ceremony is held on the first day of the new year. The new pole marker, traditionally designed and manufactured by the last winter overs, will stay there until Jan 1<sup>st</sup> 2016.

Happy 2015!

## I. PAX MOVEMENTS

- A. TJ arrived at the South Pole on Jan 1<sup>st</sup>, only one day late. I am scheduled to depart on a flight to MCM late in the evening on Jan 5<sup>th</sup> (tomorrow).

## II. CARGO MOVEMENTS

- A. We requested 16 additional drums of Estisol. They should be arriving on the next flight in.

## III. STATUS OF DRILLING

- A. We have made marked progress in drilling since Dec 29<sup>th</sup>. I cannot say that we found permanent solutions for some of the problems we have been having. For example, the cable bearing can still get sticky unexpectedly and the anti-torques appear to want to slip too easily. However, the drillers have figured out some happy settings that allow us to bring up high quality cores at a reasonable rate. We have to sharpen and replace the cutters often, and bail the hole quite frequently, which comes with some serious overhead, but we have been able to consistently produce 20+ and 25+ meter days. The hole was at just over 300 m deep by the end of morning shift today (Sunday the 4<sup>th</sup>). This is a work Sunday for everyone here because of the special scheduling for Holidays.

## IV. CORE LOGGING

- A. No problems with core logging. As reported before, most of our effort is on getting the cores as dry as possible before they are packed.

## V. CORE PACKING

- A. We had 64 boxes (4 being hand auger cores) packed and strapped as of lunch time on Sunday the 4<sup>th</sup>. We have come across one data logger (temperature loggers placed in each ice core box as per new NSF requirements) that refuses to turn on. 64 out of 65 is not a bad stat.

- B. We also found that the HOBO loggers have dead batteries. We had 55 of the blue data loggers remaining, so we started packing those loggers in every other (even numbered) boxes so that we could use one blue logger on the outside and one under the blanket for each skid of ice. We have contacted Michael Davis about whether more HOBO loggers are available.

## VI. CORE RETRO

- A. Our first cold deck is scheduled for tomorrow (Jan 5<sup>th</sup>). In all likelihood, we will be shipping out 320 m of ice, which is two full AFP loads (64 boxes on 8 skids). It will be a late flight. The scheduled departure from MCM is 5pm. This probably means the ice will be arriving back in MCM after midnight. I am flying out with the core. Michael Davis will be waiting for us (well mostly for the ice) at Willy. The ice cores are spending their last night at the Pole in the trench. We will be loading the pallets during the day shift tomorrow. The load will be transported from the drill site to the station cargo area around 4pm. The road will be groomed in the morning for smoothest transport possible. We have a good plan. As long as the flight happens, we do not anticipate any problems.

## VII. TEMPERATURES

- A. Not much change in temperatures since last week. The outside temperatures are in -24°C to -28°C range. Temperatures in the core processing area stayed in -20°C to -24°C. The trench is always below -30°C.

## VIII. WEATHER

- A. Summer continues. Mild winds and mostly sunshine.

## IX. HEALTH

- A. No health related problems to report.

## X. OTHER

- A. We also celebrated Mindy's birthday this week.
- B. Dave Ferris is scheduled to deliver his second Antarctic history talk tomorrow at 5pm. His first lecture three weeks ago was about the heroic era in Antarctica and it was a smash hit at the station.

# SITREP 09- January 11, 2015

T.J. Fudge (Science Field Leader)

Written at South Pole

The past week has been very productive. In the 8 days since the last day off, we drilled 200 m of core, reaching a depth of 460 m. We also sent two full pallets, 320 m of ice, on a cold deck to McMurdo. Murat accompanied the ice on his way home after a productive overlap period with T.J.

The drilling has become more routine as challenges with the bearing and anti-torque slips have been mitigated. The fabrication of step cutters improved the coring quality and speed. A second set of step cutter with a small design change reduced the ribbing on the core surface.

The ice remains high quality. It is becoming more brittle, but with only a few exceptions, remains excellent-to-very-good. The next cold deck is scheduled for the 15<sup>th</sup>, in time for the ice to be loaded on the ship in the Safecore container. We currently have about 160 m of ice packed for the next cold deck. Whether we reach the full capacity will depend on whether the ice becomes brittle and when the cold deck happens. We have also decided to build the brittle ice storage racks before the storage trench becomes too full of ice.

All in all, a long but productive week. We have two weeks of production drilling remaining before winterizing camp for next year.

## I. PAX MOVEMENTS

- A. Murat departed on a cold deck flight to MCM on the night of Jan 5<sup>th</sup>.

## II. CARGO MOVEMENTS

- A. 16 drums of Estisol arrived.

## III. STATUS OF DRILLING

- A. It was a productive week of drilling. With the original cutters, we averaged about 22 m per day. The switch to step cutters improved the coring and increased the cutting rate. The days since the step cutters were introduced have all produced 30 or more meters of core. There has been no change in core quality, except for a larger ribbing on the surface from the step cutters. A second set of step cutters were fabricated at the South Pole machine shop which minimized the surface roughness. Fewer anti-torque slips are occurring due to the new cutters. The issue with the bearing sticking has been mitigated with improvements in the cleaning process between runs but remains an outstanding challenge. The step cutters are being bruised by the hard ice just like the original cutters. We hope to have a third set fabricated.

## IV. CORE LOGGING

- A. Extensive effort is being made to clean and dry the core of Estisol-140 before packing. We are also coordinating with the drillers to have natural breaks on the meter to reduce the number of saw cuts needed. There have been occasional issues with blow outs using the chop saw. A saw blade was changed at the beginning of the week and very slow cutting seems to minimize any disturbance to the ice.

- B. The difference between the running depth (dumbbell mark) and the meter marks continue to increase reaching a total offset of 15 cm. We believe this is mostly due to the measurement of the dumbbell to meter mark and not in the actual depths of either the meter marks or the running depth. This occurs because many of the “meter marks” are actually natural breaks and difficult to measure. We believe we tend to measure closer to “bottom short”. This will continue to be watched, although given of measurement accuracy of 0.5 cm, this discrepancy is not unexpected.

#### V. CORE PACKING

- A. 8 skids of 8 boxes were loaded onto two air force pallets. Loggers were inserted in each box and additional loggers were put both inside and outside of the blanket on each skid. The top two boxes on each skid were flipped sideways to reduce the height. The skids were banded, but not stretch wrapped, and the wider top layer led to looser banding than desired. The pallets were blanketed and netted.
- B. Since the HOB0 loggers were dead, we started putting a blue temperature logger in every even box. This will leave a total of 8 loggers (instead of 16) for the next two air force pallets. We contacted Michael Davis about whether more HOB0 loggers are available but have not heard. We have not pressed since there are more pressing issues, see below.

#### VI. CORE RETRO

- A. Two air force pallets with 320 m of ice have been safely transported to McMurdo and placed in the Safecore container. There were a number of issues with the transport of the cores but it is worth emphasizing that all cores have been transported safely.
- B. The first issue with the transport of the core was that the banding was loose allowing the boxes to shift more than desired, mostly during transport at McMurdo. The second related issue, is that skids sit higher than desired in the safecore container, possibly limiting the flow of cold air above the skids. For the next cold deck, we will place all boxes on their sides, not just the top layer. This will both reduce the height and allow tighter banding. We will also try to use stronger corners (than the cardboard corners) to reduce the amount the banding cuts into the edges of the core boxes. Michael Davis has repacked the skids in the Safecore for better airflow (all tiers of ISC boxes are now on their side). We started packing the core boxes at South Pole with snow between all core tubes in the boxes. All core boxes in the storage trench now have full snow packing.
- C. Michael Davis pulled the 16 temperature loggers placed inside and outside of the blanket on each skid and sent pdfs of the temperature data to us. The logger data is confusing to interpret, but the loggers on three skids showed warmer than expected temperatures while the pallets were sitting on the surface with an air temperature of approximately -25C. The day had little wind and no clouds. The highest temperatures, above freezing, were from the loggers on the inside of the blanket. We hypothesize that the loggers heated up in direct sun and then were insulated from the cold air once the blankets were applied. We did not record the orientation of the skids on the surface with respect to the sun, so we cannot determine which skids received the most direct sun. At our request, Michael Davis pulled the data loggers from the top four boxes of the two most affected skids. All four loggers show that the ice did not warm above -25C. Since the ice remained cold, we will likely not alter the procedure for packing the cores at South Pole. The days are getting colder, which should work in our favor keeping the ice cold.

#### VII. TEMPERATURES

- A. The outside temperatures are getting colder, rarely getting above -25°C and generally being closer to -28°C. Temperatures in the core processing area stayed in the -20°C to -25°C range. The trench is always below -30°C.

#### VIII. WEATHER

- A. Summer continues but we can tell that our window is beginning to close. Mild winds and mostly sunshine. There was one day of “making ice core” with a couple centimeters of accumulation.

#### IX. HEALTH

- A. No health related problems to report. Mindy got “meet the Faulkered” during her volleyball game when a volleyball struck her face. She suffered no lasting health effects.

#### X. OTHER

- A. Dave Ferris delivered a second Antarctic history talk on the guys behind the heroes. It was standing room only and a third talk was requested.
- B. Murat is missed and we regularly do “Murat squats” to stay warm

# SITREP 10 - January 18, 2015

T.J. Fudge (Science Field Leader)

Written at South Pole

We have had another productive week. We drilled 160 m, reaching a depth of 624 m. We packed to 585 m depth for the second cold deck of the season and will send back the maximum amount of ice possible in the Safecore container. Unfortunately, the cold deck flight was canceled and has been rescheduled for Monday afternoon. The pallets of ice are resting under an unused steel arch. The arch provides good shade and acts as a wind tunnel. The outside temperatures have been about -28C.

We declared the start of brittle ice at 619 m after a core fractured all the way through for the first time. We are packing all ice in netting and letting it rest in 2m sections on the storage racks in the trench. We have one more week of drilling before winterizing the drill camp and heading North.

## I. PAX MOVEMENTS

- A. Mindy was scheduled to fly as an observer on the cold deck but did not go to McMurdo. Paul Cutler arrived and toured the drill camp. He was scheduled to return to McMurdo on Monday and he agreed to act as our observer for the cold deck, letting Mindy remain at South Pole.

## II. CARGO MOVEMENTS

- A. We received the backup FED motor from WAIS Divide. The stretch wrap and blankets from Michael Davis did not arrive until Friday evening after we had packed the ice on the pallets.

## III. STATUS OF DRILLING

- A. It was a routine week of production drilling. We averaged 27 m per day. The longer trip times up and down the borehole are starting to lengthen the time between drill runs. A third set of step cutters was made, and a fourth set is being made, and we are optimistic that the cutters will last through the final week of drilling. Large amounts of chips are remaining in the hole, requiring nightly bailing.

## IV. CORE LOGGING

- A. We have now shifted to brittle ice handling procedures. The ice is pushed through the FED into the green netting. The length is measured, the ends tagged, and the ice is pushed into a cardboard tube and set to rest on the racks in the core storage trench. The green netting is going on well and the switch to brittle ice logging was less painful than anticipated.

## V. CORE PACKING

- A. 7 skids of 8 boxes were loaded onto two air force pallets. Loggers were inserted into every other box. Additional loggers were put both inside and outside of the blanket on each pallet. All boxes were flipped sideways, allowing much better banding of the skids. An additional "belly band" with a cargo strap was put around the skids on each pallet.

## VI. CORE RETRO

- A. The cold deck flight was finally canceled at 1AM on Saturday morning (originally scheduled for Friday afternoon). The pallets sat by the runway until about 9AM on Saturday when they were drug underneath the station. The weather was about -25C and cloudy so the ice should not have warmed up significantly. Underneath the station was determined not to be an ideal place to store the pallets because of sun exposure at midday, minor heat coming off the station, and construction and people activity nearby. Cargo and operation folks removed snow from an unused steel arch out at the end of the berms ("the end of the world"). The pallets were moved there Saturday evening. There is little sun exposure, the arch funnels the wind, and they are out of the way of normal activity. This will make a good backup storage location for any future failed cold deck flights.
- B. There is plenty of time for the ice to make it to McMurdo and be loaded on the vessel for transport to NICL.
- C. The scheduling of the cold deck flight on Friday evening was a poor decision. There were no flights to South Pole Saturday because the Hercs are tasked with transporting PAX to Christchurch. Therefore, the ice has to sit on the surface for the full weekend (Friday to Monday). Future cold decks should be scheduled with at least a one day buffer to minimize the time the ice has to be on the surface.

## VII. TEMPERATURES

- A. The outside temperatures are getting colder, rarely getting above -25°C and generally being closer to -28°C. Temperatures in the core processing area stayed in the -20°C to -25°C range . The trench is always below -30°C.

## VIII. WEATHER

- A. Summer continues but we can tell that our window is beginning to close. There have been more cloudy days than in weeks past.

## IX. HEALTH

- A. No health related problems to report.

## X. OTHER

- A. Dave Ferris delivered a third Antarctic history talk on the guys behind the names. It was standing room only again.

# SITREP 11- January 24, 2015

T.J. Fudge (Science Field Leader)

Written at South Pole

We had another successful week, and a successful season, of drilling. We reached our season goal of 700 m on Thursday morning and then concluded drilling at 736 m on Saturday morning. We spent the final shift on Saturday bailing the hole of chips.

The second cold deck occurred on Friday with the ice arriving before the vessel docked in McMurdo. The folks at Pole and beyond did a fantastic job prioritizing the cold deck despite pressure from many directions due to the many canceled flights this week.

We have 150 m of ice resting in the storage trench. Most has been netted but it would be unfair to call it "brittle" as there are few fractures.

We have begun drying the drilling sonde and packing up. Next week we will prepare retro cargo and winterize the camp. We hope to depart the Pole on Friday, January 30<sup>th</sup> and the continent on February 3<sup>rd</sup> after a long and successful season.

## I. PAX MOVEMENTS

- A. No PAX movements

## II. CARGO MOVEMENTS

- A. The only cargo movement was the cold deck flight.

## III. STATUS OF DRILLING

- A. It was another good week of drilling, but it was good it was the last week. The last set of step cutters is quite dull; we are using the last set of undamaged core dogs; and there is limited drilling fluid remaining. We have learned a lot from drilling this season and look forward to making improvements for next season.

## IV. CORE LOGGING

- A. We have added hand vacuuming to the logging process. This seems to be the simplest and most effective way to remove Estisol from the cores. We tested squirting and spraying isopar-k on the netted ice and it did not cause any fractures. However, the cores remained quite wet even after hand vacuuming.
- B. We are hearing little popping from the cores. We encountered our first through-core break since starting netting at 724 m. We spot checked a few cores in storage and did not find any new breaks.

## V. CORE PACKING

- A. The cardboard tubes hold the 2m core sections well with plenty of space on the ends for holding the tubes. The tubes rest well in the storage racks.

## VI. CORE RETRO

- A. The cold deck flight occurred on Friday, after about 10 cancelations almost entirely for mechanical or aircraft unavailability reasons. Two flights arrived in the week since the cold deck was scheduled (last Friday). These flights were PAX IN/OUT flights which had been bumped up in priority. The ANG has a no PAX on cold deck flights policy (an observer is ok) which is why the PAX and cold deck flights had to be separate. This policy makes cold deck flights difficult during limited flight availability.
- B. The steel arch used for temporarily storing the ice core pallets worked well. A little additional clearing next season will allow the cores to sit even more protected. A night of 20kt winds resulted in little drifting.
- C. While the steel arch worked well, we benefited from temperatures consistently colder than -23C. Next season, if cold decks are delayed and ice is sitting during the peak of summer, there is the potential for the cores to warm up above -20C when ambient temperatures are at the peak.
- D. We began discussions of how to store the ice if we were unable to transport the ice to McMurdo. Fortunately, we did not need to develop a plan since a cold deck flight arrived.

## VII. TEMPERATURES

- A. The ambient temperatures are getting below -30C.

## VIII. WEATHER

- A. Windier this week.

## IX. HEALTH

- A. No health related problems to report.

## X. OTHER

- A. T.J. had two phone calls with Lisa Clough, the NSF representative in McMurdo, in regards to ice transport. Leah Street and Don Voigt were also on the calls.
- B. I just noticed that I have not been updating the date at the top of the SITREPs. This has been corrected.
- C. A reporter and videographer from the Antarctic Sun visited the site on Friday. The video article is expected in late February.

# SITREP 12 - February 1, 2015

T.J. Fudge (Science Field Leader)

Written in McMurdo

We concluded our successful season with winterizing the camp. Everything went smoothly. The brittle ice is relaxing in the storage trench. The drill tent is braced inside with cargo straps. The buildings were pulled to the resting spots. The cargo is up on 6-foot high spools to minimize drifting. And everything out at the site got inventoried.

We arrived in McMurdo on Friday night and spent the weekend enjoying the abundant oxygen and warm temperatures at sea level. We are scheduled to depart for Christchurch on Monday, February 2. This is the last SITREP of the season.

## I. PAX MOVEMENTS

- A. All 10 team members arrived in McMurdo on Friday, January 30.

## II. CARGO MOVEMENTS

- A. A pallet of ice core boxes arrived at Pole on January 30. They will be stored at South Pole station, but not out at the drill camp.

## III. STATUS OF DRILLING

- A. No drilling was performed. The fluid level dropped through the week and we expect it to be at the firn-ice transition (~120 m) when we return next year.

## IV. CORE LOGGING

- A. No core was logged.

## V. CORE PACKING

- A. The cores were repositioned in the storage racks to equalize the load.

## VI. CORE RETRO

- A. The SAFECORE container in McMurdo had not been loaded onto the vessel as of Saturday afternoon. The vessel is scheduled to depart on Tuesday and the SAFECORE should be one of the last containers loaded.

## VII. TEMPERATURES

- A. Consistently below -30C at Pole. Downright balmy in McMurdo.

## VIII. WEATHER

- A. Nothing to report.

#### IX. HEALTH

- A. No health related problems to report.

#### X. OTHER

- A. Mindy and T.J. briefly discussed the ice core project with the Secretary of the Air Force and other higher ups in the Air Force.
- B. We had a core handlers debrief. A brief report on suggestions for next season will be compiled.
- C. T.J. had an informal outbrief with Lisa Clough, NSF science representative in McMurdo. An electronic survey should be sent to Murat within a couple of weeks for more project feedback.