**Oman Drilling Project – GT1 – Lead Scientist On-Site Log (LSOS).**

**January 22nd 2017 to February 11th 2017**

This is an electronic version of the blue on-site logbook.

**GT1 22.89226N, 58.51516E, Altitude 698 m (±8 m).**

Hole GT1A. Vertical.

***Overview***

**DAILY UPDATES**

**22nd January 2017, Sunday**

**On-site: BI, JC, AJ, SM**

**LSOS: Benoit Ildefonse, Jude Coggon**

Started drilling Hole GT1A

Arrived on site:

Rig started:

Rotation started: ~07.50

After core 2Z (09:05) rotation stopped – filling water tanks from green truck.

~12.45 Two men from “BEC” (according to sticker on their truck)

13:13 Rig stopped – two men from “BEC” inspecting/servicing engine of rig? (Yes)

Also, blue truck here to fill our tank – engine for pump of blue truck is broken so using Wali’s pump… muddy hose dipped straight into blue truck’s water tank!

14:15 Maintenance of engine over – engine started – drilling crew lunch.

14:42 Rotation started.

Core 7Z = first “proper core” – “finally in what looks like massive bedrock, and it is olivine gabbro” – BI. Dip of foliation is as expected here too.

Confirmed with Wali that he will case the hole to 12m depth (past fault zone at ~10-10.4 m and well into massive bedrock).

After Core 8Z (nice layered gabbro with some spectacular veins) Wali is tripping up HQ pipe to prepare for casing tomorrow morning.

2.5 m of casing drilled at the end of the day. Ready to go down to 12m tomorrow morning – HW (115 mm diameter).

**23rd January 2017, Monday**

**On-site: BI, JC, AJ, SM**

**LSOS: Benoit Ildefonse**

Arrived on site:

Rig started:

Rotation started:

10:00 10 m already cased, some high P – Wali decided to POOH to check the bit.

~10:30 Gopi says that truck is on it’s way to collect GT2 core boxes and will arrive in 30 mins but that JC should wait – Gopi will go to meet the truck driver and help them set up as this will take about an hour… JC clarified that the boxes will be loaded manually, not by crane. Gopi left GT1, saying he would return in 1h30m to tell JC to come to supervise loading.

13:20 BI and JC back from GT2 where the truck for transporting core boxes has not arrived yet (and no sign of Gopi…). JC made a few phone calls and sent some emails while we had phone reception – spoke to Sultan to request various items for site and confirm a) that he will be on site tomorrow and b) that the materials for installing the well-head at GT2 will be delivered tomorrow.

Casing still underway – the 10.4 m interval with the two very altered/faulted zones is a bit problematic – Wali goes in very slowly to case down to 12 m.

13:50 12 m of HW casing installed.

14:30 Re-entering hole with HQ rods.

After reaming and casing (HW) to 12 m, Wali had to start coring from ~10.4 m. Cores recovered from that depth to 17.7 m (Cores 9M to 11M; M for Miscellaneous, because overlapping with previous cores (end of 6Z to 8Z)) are similar to cores 6Z to 8Z. Pieces in core 9M and top of 10M show the outer drill marks/scar from previous core – view in cross section:

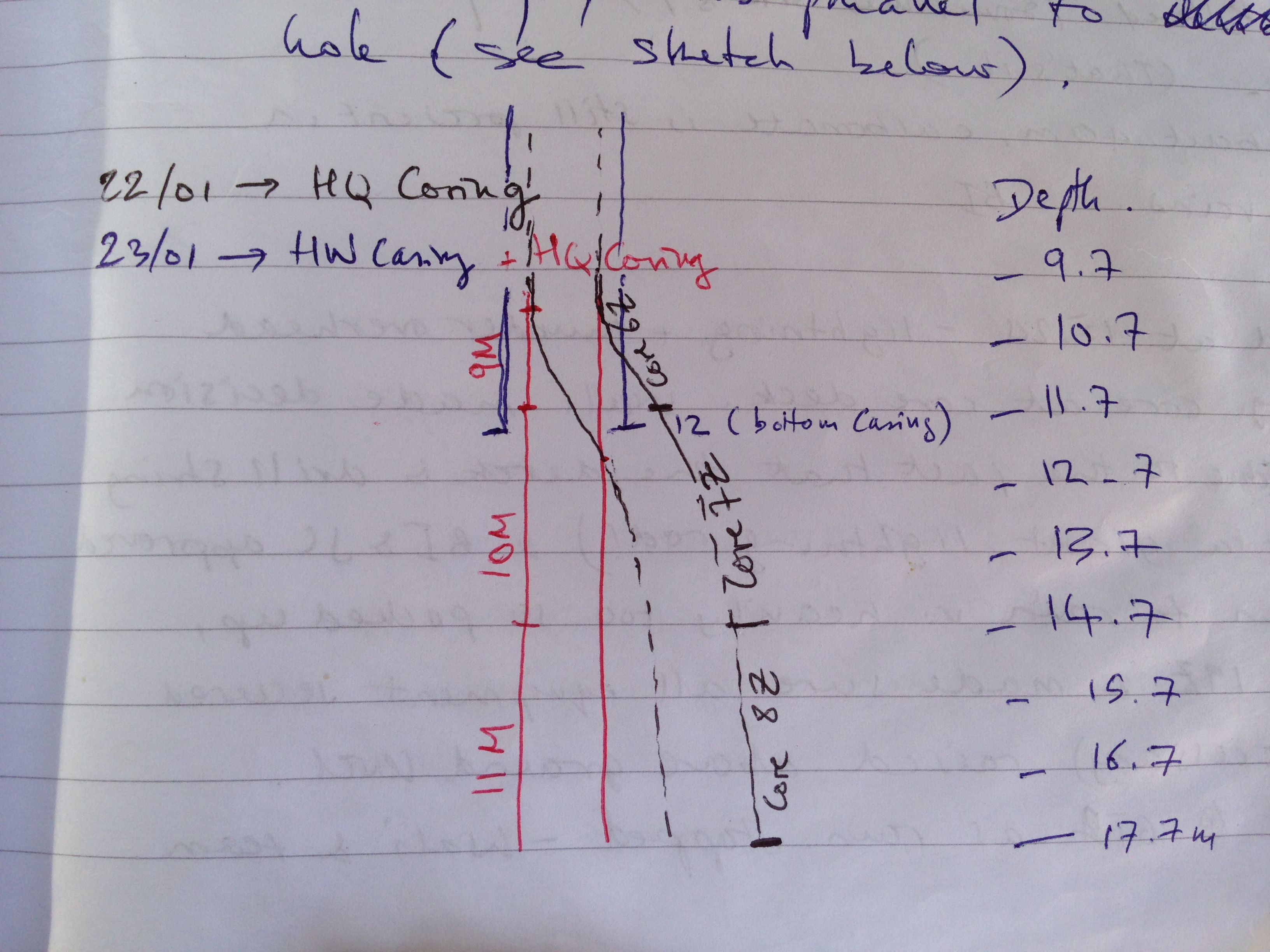
Macintosh HD:Users:jac3g15:Desktop:coreMsection.pdf

We drilled a new hole from ~ 10.4 m to 17.7 m, sub-parallel to that drilled yesterday.

Interpretation is that the hole drilled yesterday (22nd Jan) deviated from vertical at ~10 – 10.4 m depth, where we encountered highly altered olivine gabbro in which core was falling apart.

When reaming this morning, Wali experienced difficulties at ~10.4 m (see above) and POOHed the HW string – found some pieces of altered gabbro in the shoe bit – casing from that depth to 12 m was slower 🡪 Most satisfactory explanation for these observations is that the HW casing deviated from the original hole at ~10.4 m and continued sub-parallel to the original hole. Wali is confident that the new hole is true vertical and the original hole is off-vertical, based on the fact that the casing is much more rigid than the HQ drill string and therefore less likely to bend.

See sketch below:



Geology: “Variably (sometimes strongly) altered gabbro… that’s it” – BI.

Down to about 40 m, carbonate is still present in the late veins.

**24th January 2017, Tuesday**

**On-site: BI, JC, AJ, SM**

**LSOS: Jude Coggon, Benoit Ildefonse**

Arrived on site:

Rig started:

Rotation started: 07:20

Resuming coring “fresh” hole now – Wali is confident that he is now drilling true vertical again after deviation from original hole. Subsequent cores numbered \_\_Z as no longer duplicating depth.

~10:00 JC to GT2 to supervise loading of core boxes onto truck.

11:08 Truck +core boxes left GT2 to head to Muscat.

15: 24 Last core pulled – lightning and thunder overhead while washing core at core deck. Wali made decision to stop drilling (due to the fact that the Derek and drill string are basically a giant lightning rod!) and BI and JC approved decision. Began to rain heavily so science team curated core 19Z, packed up and made sure all equipment secured and (where necessary) raised above ground level.

Heavy rain shower ended but after 4pm and all packed up now. Wali and crew have decided to use the time to install the well-head at GT2 so BI and JC went to watch. Well head installed and cemented. To be completed and padlock added tomorrow.

**25th January 2017, Wednesday**

**On-site: BI, JC, AJ, SM**

**LSOS: Jude Coggon, Benoit Ildefonse**

Arrived on site:

Rig started:

Rotation started: 07:10

Rain yesterday has not had an adverse effect on equipment etc. everything seems to have remained water-tight.

Moved core boxes to new storage area at top of site.

Lunchtime – Nico arrived, delivered to us by Gopi. He spent the afternoon with Sam, getting up to date with the current protocols for curation, scanning and archiving of images on-site, and packing white core boxes.

One of Sultan’s brothers brought yellow bands and clipping equipment for closing white core boxes.

~15:00 – after core 26Z, POOHed to change bit. New bit is different cutting structure – better suited to very hard rocks.

16:30 New bit reached bottom of hole – some fill – cut the last 50 cm from 16:35.

Geology: Core 21Z = predominantly made up of two long pieces of beautiful gabbro & nice veins (prehnite, amphibole) with alteration halos.

Core 22Z: passed 50 m. A 2 m long piece on top, continuous with bottom of core 21Z (broken when core was retrieved) – Total piece would have been 3.3m!

**26th January 2017, Thursday**

**On-site: BI, JC, AJ, NB**

**LSOS: Jude Coggon, Benoit Ildefonse**

Arrived on site: 07:15

Rig started:

Rotation started: already started when we arrived

Throughout day we sealed all core boxes (including those that had been packed and closed in previous days) using yellow bands.

~12:30 Rig System Pressure (kgcm-2): ~175, steady Pull Down (kgcm-2): ~40

Geology: Very coarse grained gabbro in core 31Z.

Core 32Z: A spectacular fault zone (semi-brittle) in section 2. Nice clinozoisite vein in section 4 with textbook example of pull-apart structure.

More ultra-mylonite/cataclasites at bottom of core 34Z and in core 35Z 🡪 continues in core 36Z (40 cm of which was not recovered).

**27th January 2017, Friday**

**On-site: BI, JC, AJ, NB**

**LSOS: Benoit Ildefonse**

Arrived on site: 07:05

Rig started: 07:09

Rotation started: 07:40

We were preparing ourselves for a day off last night, as everybody was (drillers, Nehal), when we got a message from Nehal telling that there would be drilling this morning. Decision came from Sultan apparently.

Rig stopped at 11:22

Geology: First ~6m were mostly plagioclase-wherlite and troctolite, strongly serpentinised (hence the core-catcher jammed twice). Last 3 m is layered gabbro and olivine gabbro.

**28th January 2017, Saturday**

**On-site: BI, JC, AJ, NB**

**LSOS: Benoit Ildefonse**

Arrived on site: 07:05

Rig started: 07:10

Rotation started: 07:20

Water table at GT1: Wali says drilling parameters indicated something at 40-45 m, then – there has been significant backflow when he breaks the pipe after 70 m depth.

Geology: Today mostly layered gabbro and olivine gabbro, commonly fresh, but locally altered in the vicinity of the veins (amphibole, prehnite, chlorite, serpentine, …)

**29th January 2017, Sunday**

**On-site: BI, JC, AJ, NB, Nidhal and Maisa (GUTech students)**

**LSOS: Benoit Ildefonse**

Arrived on site: 06:55

Rig started: 07:05

Rotation started: 07:15

First day with Omani trainees – GUTech students Maisa and Nidhal – on-site. Ana gave them an intro and overview of coreflow, then Nidhal assigned to help Nico at the core scanner station while Maisa helped Ana with sub-piece label printing and core sketches.

Geology: Cores recovered today were dominantly gabbro, with no significant layering, and relatively abundant amphibole/chlorite/? in the groundmass – intense veining in general with the usual combination of amphibole/prehnite/chlorite/clinozoisite/serpentine veins.

NB: Addendum, 30th Jan: Layering is there, at least down to core 61Z, just not very contrasted – not much from core 63Z downwards.

**30th January 2017, Monday**

**On-site: JC, AJ, NB, Nidhal and Maisa (GUTech students)**

**LSOS: Benoit Ildefonse**

Arrived on site:

Rig started: 07:05

Rotation started: 07:15

NB. Tablet photos of core 75Z were taken with label for core 74Z by accident.

Geology: From core 76Z (~ last 2 sections), i.e. @ ~188 m, gabbros tended to be more altered (greenschists), veined and fractured, with more or less advanced brecciation.

In core 80Z @ ~198-199 m was recovered a spectacular fault gouge with x cm-sized rounded calsts of metagabbro. That’s all for me 🡪 going back home! Good luck, have fun! Benoit.

**31st January 2017, Tuesday**

**On-site: JC, AJ, NB, Nidhal and Maisa (GUTech students) (later MH and GFG)**

**LSOS: Jude Coggon**

Arrived on site:

Rig started: 07:14

Rotation started: 07:20

Benoit came to site to say goodbye. Michelle and Gretchen en route from Muscat this morning.

Core 84Z got very jammed in core barrel, various enlightening tactics used to release it…

12:15 Michelle and Gretchen arrived on site.

Geology: Relatively continuous cores of gabbro. Cores 89Z, 90Z and 91Z were veined and more fractured. Core 90Z with vuggy white crystals. Grain size dominantly fine to medium grained. Veins with talc and chlorite tend to break more than finer white veins. GFG

**1st February 2017, Wednesday**

**On-site: MH, GFG, JC, AJ, NB, Nidhal and Maisa (GUTech students)**

**LSOS: Jude Coggon**

Arrived on site: 07:10

Rig started:

Rotation started: already rotating when we arrived

08:45 Rig System Pressure (kgcm-2): ~125, steady Pull Down (kgcm-2): ~25

10:55 Rig System Pressure (kgcm-2): ~150, steady Pull Down (kgcm-2): ~50

Nehal has spoken to Wali to ask about change to NQ – when? Wali will continue until ~250 m with HQ, then POOH 🡪 case with NC to ~250 m, then continue with NQ. Nehal expects that drilling will resume around ~2pm tomorrow (probably at earliest). Crew will drill on Friday – 3 runs only. JC spoke to Wali – same plan discussed and approved.

14:15 Rig System Pressure (kgcm-2): ~175, steady

~16:00 After core 100Z, ~250 m, Wali decided to stop, as discussed earlier. Now POOHing. Will case with NC tomorrow, then start coring NQ – Wali estimates drilling will restart at 3pm.

Discussed with AJ and decided to release Maisa and Nidhal from their commitment a day early as there will not really be anything for them to do on site tomorrow. We plan to come to site in morning to try to clear the HQ cores from the tables – all have been whole-round scanned now and only two left to sketch (8 boxes in total left on the tables).

**2nd February 2017, Thursday**

**On-site: MH, GFG, JC, (AJ and NB in afternoon)**

**LSOS: Michelle Harris, Jude Coggon**

07:15 Nehal called to say that drillers are not on site yet as their car broke down, but will be there asap.

Arrived on site: ~10:20

Rig started: Already started

Rotation started: Wali and team still pulling out HQ, started tripping down with NW casing soon after our arrival.

MH and GFG finishing description of HQ cores. JC helping finish labeling and then scanning and packing of completed boxes.

~12:00 Wali and team started inserting NQ rods.

13:35 JC spoke to Wali, he has 8 more rods to trip down, then will be ready to start drilling again (NQ). JC climbed hill to get reception to phone Nico and Ana to tell them to come to site now.

14:00 Nehal and Gopi arrived, with new table (after three weeks!)

14:30 NB and AJ arrived

14:50 first NQ core on deck.

Geology: Today we caught up on all the outstanding HQ core flow. The last of the GT1 HQ cores were variable, with metre-scale intervals that were highly altered with some localized cataclasis and then metres of ‘relatively’ fresh massive gabbro. Quartz and clinozoisite veins were more abundant and often associated with halos. Possibly some gabbronorite too. Pyrite in veins up to 1mm thick at bottom of core 101Z-1.

**Length disparity issue between HQ and NQ**

Drillstring dimensions:

Bit + barrel = 4.01 m

(Wali had noted this as 4.10 m so his depth calculations are out by 9 cm)

Length of rod exposed above ground level to allow Wali and team to manipulate rods etc.

= -1.40 m

Σ = 2.61 m = C (constant value to be added to length of total rods in hole at any time in order to give depth)

Wali drilled to 251.7 m (=251.69 m) with HQ (last core was 100Z).

= 83 x 3.00 m HQ rods + C

= 249 + 2.61

= 251.69 m

Wali re-entered, cased with NC casing to 251.69 m, then re-entered with bottom hole assembly plus 83 NQ rods. Experienced an increase in torque over last ~m but thought no advance as same number of rods as used for HQ. However, 1.2 m of NQ core was recovered (101Z), which is perfectly continuous with 100Z. We measured the NQ and HQ rods and found that the HQ rods are 3.00 m long but the NQ rods (USA-made) are 10 foot long (3.05 m).

= 83 x 3.05 m NQ rods + C

= 253.15 + 2.61

= 255.76 m

255.76 – 251.61 = 4.15 m = difference in depth between bottom of core 100Z and calculated bottom of core 101Z.

Still not resolved as only 1.2 m of core recovered in 101Z. No evidence of unrecovered material. Nehal and JC suggest that perhaps there were actually only 82 NQ rods in the hole at this point, making the bottom depth for 101Z = 252.8 m (i.e. only 1.1 m advance from 100Z to 101Z).

Wali is certain that he has counted the rods correctly (specifically because they are added in pairs, so it is difficult to see how he could be out by a single rod). This difference is disturbing but for now we will assume that the advance for core 101Z was 1.1 m.

Jude has travelled up to Muscat in evening ready to collect Julie tomorrow am.

**3rd February 2017, Friday**

**On-site: MH, GFG, AJ, NB**

**LSOS: Michelle Harris**

Arrived on site: 07:05

Rig started:

Rotation started: 07:17

09:05 Rig System Pressure (kgcm-2): 210, steady Pull Down (kgcm-2): 50

Friday so three cores only.

09:25 Drilling end for day

Rain is forecast, core boxes (completed) have been covered with plastic from mattresses. Science team to leave site asap.

10:15 Leave site.

JC and JN arrived back at apartments ~same time as rest of science team.

Ronald Conze made some changes to the DIS via TeamViewer in pm.

**4th February 2017, Saturday**

**On-site: MH, GFG, JC, AJ, NB, JN (Jürg Matter in pm)**

**LSOS: Michelle Harris, Jude Coggon, Gretchen Früh-Green**

Arrived on site: 07:05

Rig started:

Rotation started:

Julie Noel’s first day on site. Has been very windy yesterday afternoon and overnight – had to rescue lids and foam from site/wadi. Tent needed some attention to reposition poles, tighten guys and generally shore-up.

JC shoed JN site and explained core flow briefly. Now AJ showing JN labeling and sketching ready for handover and departure of AJ tomorrow.

~13:20 Jürg arrived.

DIS issues: Box labels 🡪 Toughbook (Server) DIS Box labels are working with new structure as updated by Ronald last night, however, DIS client labels not correct – specifically, site number text. Problem because new field added by Ronald for “Hole Name” in Hole form does not exist in DIS client structure. MH and JC have changed text in “comment” field – deleted “in operation”, added “GT1A “ = temporary fix for the problem. Sample label still not showing hole name 🡪 went to DB Pane 🡪 form = DIS\_SAMPLE\_LABEL 🡪 opened in design view on properties sheet, scrolled through to find name of “Remarks” field = “TEXP” 🡪 format tab 🡪 Text align, changed from centre to left. Another temporary fix.

🡪 Had to repeat with DIS client to realign label text – view on screen fine, prints fine.

Geology: Core 108Z has several cataclastic intervals – way-up line changed at start of cataclastic bands (steeply inclined).

Cores were gabbro with variable grain sizes, some contained opx, few zones of ol-rich gabbro. Few repeated zones with high alteration. Core108Z contained thick zones with white alteration – mineralogy unclear. Doesn’t seem to be quartz or calcite and is clearly different from laumontite veins up-section.

JC to Muscat to renew visa first thing in morning, followed by meetings with JMM?

**5th February 2017, Sunday**

**On-site: MH, GFG, AJ, NB, JN, Zahra and Maria (GUTech students) (JC in pm)**

**LSOS: Michelle Harris**

Arrived on site: 07:10

Rig started: 07:15

Rotation started: 07:21

Maria and Zahra’s first day on site – AJ introducing site and protocols.

13:30 Tripping pipe to replace bit.

14:30 JC arrived in time for update and to see bit changed.

14:55 Bit on deck (~1h25m trip out of hole). New bit attached.

15:20 Tripping in.

16:30 Finished tripping in.

AJ left to Muscat

Geology: Cores 120Z to 122Z mostly intact with few pieces! ☺ Opx very clear when core-washing – increasing abundance?

Core 123Z had 2.1 m single intact piece, 5 cm short of GT1 record!

Core 125Z only advanced 0.60 m, after new core barrel deployed drilling only lasted <15 min before barrel was pulled. Possible advance of 10 cm. Nehal has spoken to Wali and the NQ bit may have to be changed. Confirmed at 13:00 that a bit change was necessary. Also confirmed that the NQ bit used so far in GT1 is the same bit that was used for GT2. This bit has therefore cored GT2 = 250.3 m + GT1 = 62.8 m = total of 313.1 m.

Cores 124Z to 126Z are also relatively intact with few sub-pieces. Steep to vertical white veins dominate.

**6th February 2017, Monday**

**On-site: MH, GFG, JC, NB, JN, Zahra and Maria (GUTech students)**

**LSOS: Michelle Harris**

Arrived on site: 07:11

Rig started:

Rotation started: Already rotating when we arrived on site.

Core 128Z had two retrievals: 1st attempt = ~2.8 m at 09:04 2nd attempt = ~0.24 m at 09:22 – sum = full core advance.

In pm drilling team pumped out mud pits and after last core pulled they cleaned the rig (using a high pressure hose).

Geology: Cores 127Z to 129Z, large intact pieces, fine grained.

Core 131Z – fault zone, appearance of red veins, cores are very fragile. Main zone of cataclasis is ~2.8 m (131-3 to 132-1).

Core 132Z – faulted zone and oxidation at top, friable at ~40 cm

Core 133 – large zone of leucocratic alteration or poss. magmatic vein.

**7th February 2017, Tuesday**

**On-site: MH, GFG, JC, NB, JN, Zahra and Maria (GUTech students)**

**LSOS: Michelle Harris**

Arrived on site: 07:11

Rig started:

Rotation started: Already rotating when we arrived on site.

Today we were visited on site by an elderly gentleman who told us the names of the mountains surrounding GT1 and the name of this area – “Daira”. He also informed us that a djini (genie) lives here, in the wadi – she was sleeping there but has flown away now because of all the noise and people…

Maria, Zahra and Nehal explained that djins and djinis are spirits that come from fire and can be good or naughty, like humans.

Geology:

137Z is a continuation of cataclastic zone from base of 136-4. Sharp contact with ol-gabbro at base of interval (~1.9 – 2.0m) (same approx. thickness as similar cataclastic zone in core 131-132Z. Need to check the depth of separation… ~approx. 15m.

138Z Grain size increasing, opx-bearing gabbro. Ol-rich intervals.

139Z Foliated gabbro/Ol-gabbro. Cont. from 138-4 but way up line rotated.

140Z epidote-rich hydrothermal ateration zone with brecciation in weakly foliated gabbro.

141Z 30cm epidote-rich alteration zone, rest of core = foliated gabbro.

142Z Two large pieces of relatively homogenous medium grained gabbro, possible layering.

Note: original advance was given as 2.5 m but later corrected to 2.8m🡪 incorrect label in tablet photos.

143Z lower penetration length again (1.46 m) Layered gabbro – layering 55-65 cm gb/ol-gb. 1.46m continuous piece.

144Z layered gb. Originally didn’t get entire core – went back in and recovered 2.46 m total, which includes missing recovery from previous core.

145Z Full penetration. Beautiful layered gbs, some with foliation and epidote-prehnite veins.

146Z Full penetration. Layered gbs and veins as in prev section.

**8th February 2017, Wednesday**

**On-site: MH, GFG, JC, NB, JN, Zahra and Maria (GUTech students)**

**LSOS: Michelle Harris**

Arrived on site: 07:15

Rig started: 07:19

Rotation started: 07:23

07:40 Rig System Pressure (kgcm-2): 200, steady Pull Down (kgcm-2): 30

15:45 Final COD for GT1 – 400m! (N.B. actually 403.15 m)

Geology:

147Z Discont from 146-4. Decimetre scale alternations of gabbro and ol-gabbro. No epidote veins as seen in 145&146Z.

148Z Decimetre scale layering/alternation of foliated gabbro + ol-gabbro. 10 cm white halo 148-2.

149Z Initial core retrieval caught ~1.7 m of core, going back down to catch the rest. Second attempt on deck 10:14, all core caught.

150Z Continuation of gabbro/ol-gabbro

151Z Continuation of gabbro/ol-gabbro alternations, return of epidote veins and generally more halos

152Z Continuation of gb/ol-gb alternations with one ~10cm thick dunitic/troctolitic layer. No epidote veins. Top piece ~1.3 m long.

153Z Gb/ol-gb alternations. Gb in partly foliated. More veining + fracturing than previous sections.

154Z Continuing gb/oliv gb alternations. Gb altered green.

155Z Gb/ol-gb alternations.

156Z Last core! Layered gabbros ending in olivine gabbro.

Total drilled depth = 400m (NB. Due to subsequent discovery of drill rod issue the depth is actually 403.15 m)

Total core recovery = 405.33 m = 101% recovery

16:10 JC dropped students to their hotel and visited GT3 w/ Nehal, Wali and crew 🡪 Bulldozed and ready, looks big!

Have arranged with Gopi that a truck will come after lunch tomorrow to collect our big tables, core liners + water tank (as these are the first things that we will need (priority over oilet, office, generator) at next site – can receive core w/o power but not w/o liners + tables. Not having these at GT1 delayed start of drilling, as Wali was ready to drill on Sat pm but we could not receive cores.

Plan is to finish logging tomorrow am while drillers POOH. Truck in pm to move tables, water tank, liners (+ saw?).

pm – we will pack up all of our equipment. Wali will prob. move rig down to GT2 or nearby.

Friday, truck will come to move office, toilet, generator. Tent down. Gopi will move scanner + tent poles to GT3 by pick-up truck. We will move our equipment, pitch tent at GT3 and set up again. Drillers will move rig by truck, plus move accessories.

Key is for Wali to site rig before rest of camp is set up. Probably same rough layout as GT1.

**9th February 2017, Thursday**

**On-site: MH, GFG, JC, NB, JN**

Wali will POOH (NQ x 400m + HC casing x 250m) this moring.

Arrived on site: ~08:10

JC (+MH+NW) got a flat tyre on the the track (near to PK’s flash flood wadi crossing) 🡪 MH walked to site w/Toughbook to ask for one of Wali’s crew to come and help JC + NW to change the wheel, and to start logging the final cores w/ GFG, JN & NB.

JC + NW arrived on site ~09:05.

Gopi told Nehal that he will come at ~ 09:30. Truck to come for tables and water tank after lunch.

Rest of team in full swing getting final boxes of core labeled, sketched, described, box-scanned + packed. JC joined this effort + also began packing up equipment from tent.

11:30 Truck arrived – driver plus one helper (crane operator) – he thinks he’s here to take office and toilet… hasn’t spoken to Gopi today and Gopi is nowhere to be seen. Nehal’s concern is that although we can help to load the tables at this end we won’t be at GT3 to help unload – let them stew it over for a bit and after a while the driver agreed that they can use the crane to load the tables.

12:10 Started loading tables onto truck.

12:55 MH + GFG finished logging final core.

Took down tarp and packed up everything except scanner and tent.

**10th February 2017, Friday**

**On-site: JC, MH, NB, DT (later JM)**

Tent down, rest of stuff packed = scanner to Gopi’s picu-up truck, tent poles onto lorry w/ office, generator, toilet etc., tent into DT’s truck. Moved to GT3. Met JM. Lunch. Tent up at GT3, rig here. Rest of ‘site’ arrived on Lalbuksh’s truck too – DT chose spot for toilet… v. important…

***Depth Mystery Resolution***

At GT2, all rods were 3.05 (10 foot).

Now, two lengths of HQ rods exist in Wali’s stock 🡪 3.00m (x 51) and 3.05m (10 foot) (x 50). Wali is using the 10 foot rods first.

So at GT1:

HQ (50 x 3.05) + (33 x 3.00) = 251.5 m

+ 2.61 m

= 254.11 m

NQ 83 x 3.05 = 253.15m

+ 2.61 m

= 255.76 m

254.11 – 255.76 m = 1.65 m

So updates to DIS: GT2 – all 3.00 m advances are actually 3.05 m

At GT1, first 50 x 3.00 m 🡪 3.05 m

***Notes on drilling additives*** *(Notes and photos taken Dec 2016 by DT)*

500 g added to 1000L of water

2 Types of additive:

1. Crystalline/solid mix – for Hard but fractured formation
2. Liquid polymer – for when fewer fractures

DT took photos of cans

Type 1 EZ-Mud DP Halliburton Clay/shale stabilizer, PHPA Co Polymer

Type 2 EZ-Mud Polymer Emulsion (hard but not fractured formation) PHPA – partially hydrolyzed polyacrylamide/polyacrylate co polymer.