



# Working on a drill

Claudio Bortolin



# Tools



- Drilling:
  - tungsten carbide tip welded on twisted ss cable
  - drill to operate the rotation
  - counter-flow at 200 mbar w/manometer to detect the presence of the hole



- Cleaning:
  - rilsan pipe connected to a rotary vane vacuum pump
  - magnet tip on twisted ss cable
  - cleaning machine to force counter-flow wise a cleaning fluid



# Procedure



## ➤ Drilling:

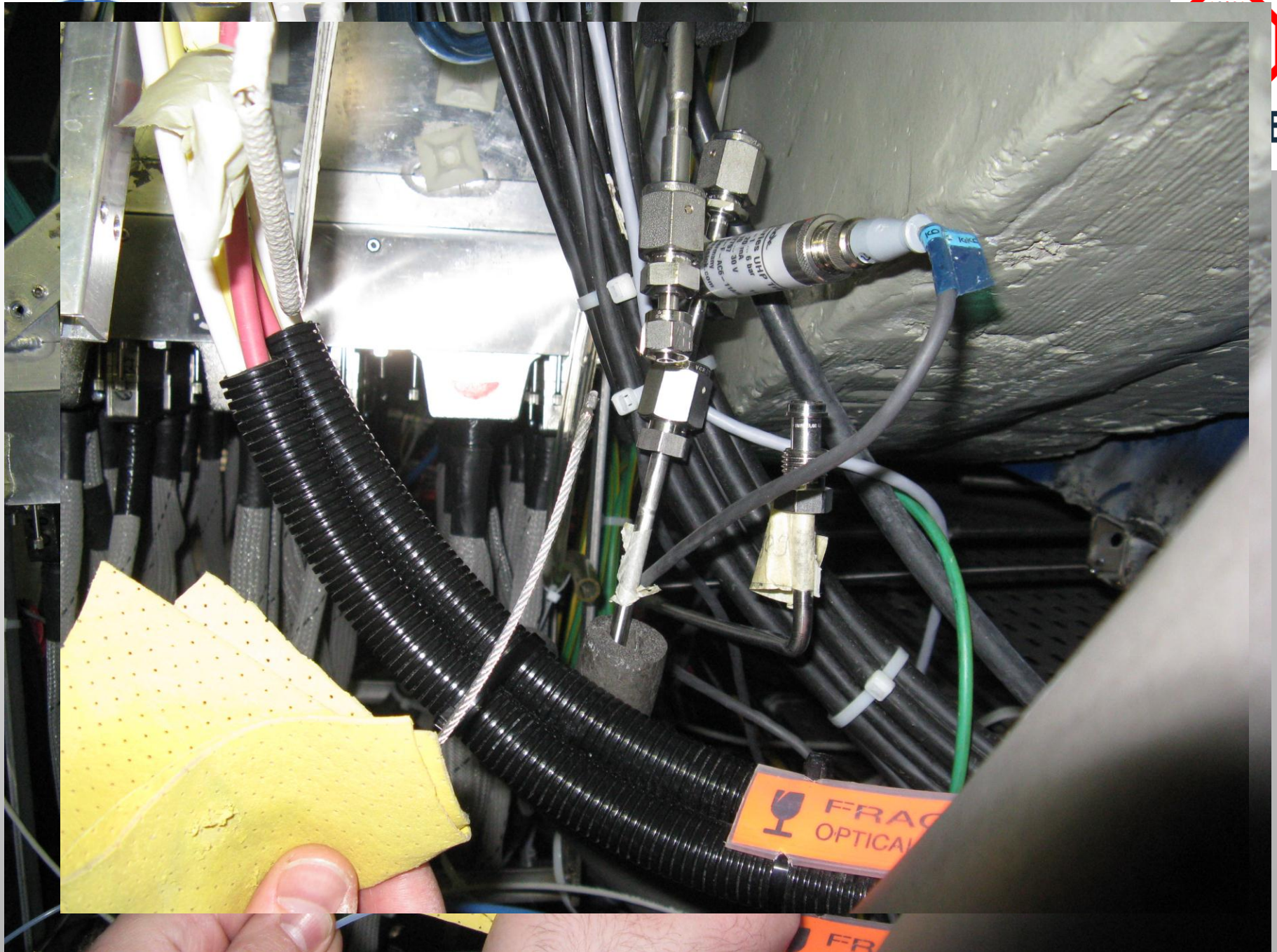
- the drill rotates the tool inside the pipe
- pressure drop (~20-30 mbar) on a manometer with specific trend when hole is done

## ➤ Cleaning:

1. suction of drilling remains with small pipe inside the stainless steel pipe (down to the filter) and vacuum pump
2. "walk" with magnet inside the pipe
  - the steel of the filter is slightly magnetic
3. counter-flow with  $C_6F_{14}$  for 30' @ 1.5 bar
4. pipe drying with Ar flow @ 1.5 bar
5. repeat 1-4 4 more times (5 cycles total)
6. last counter-flow with fluid lasts 12 h







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OPTICAL

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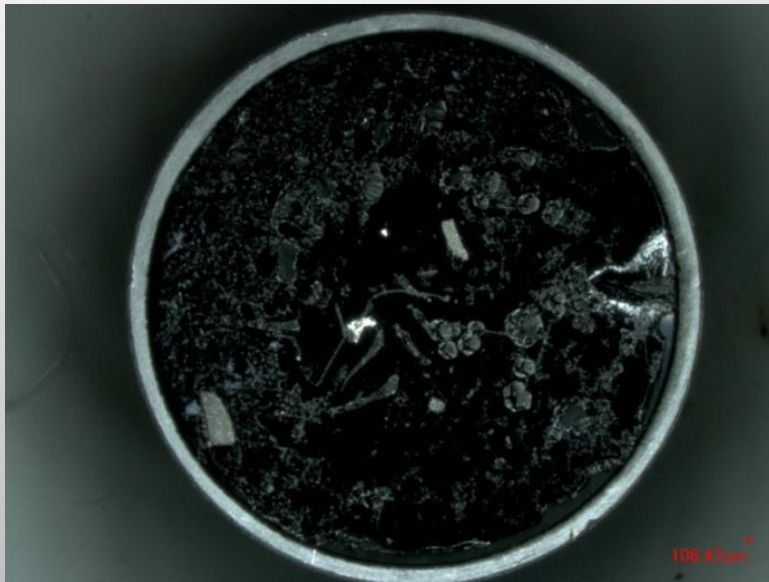
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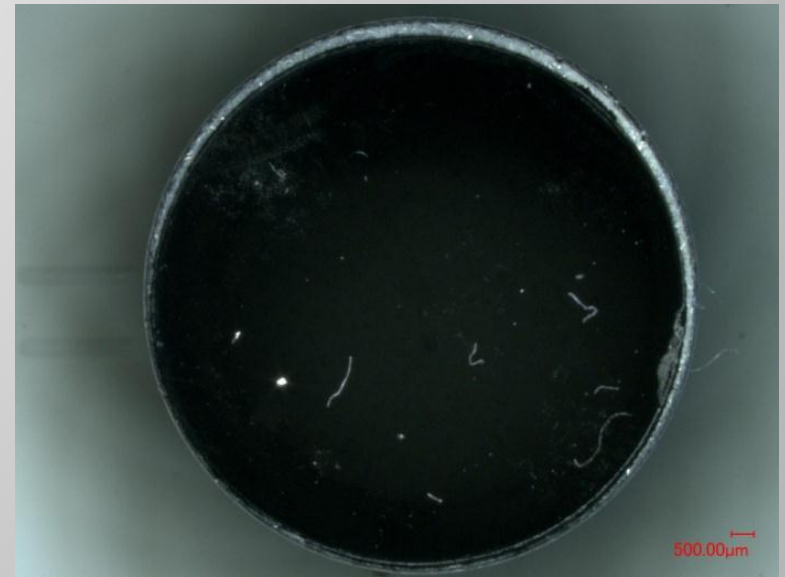
# SEM analyses: before and after the cleaning



Particles collected  
before...



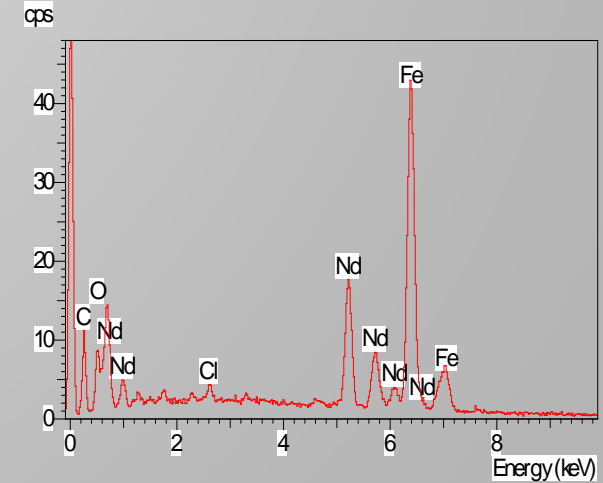
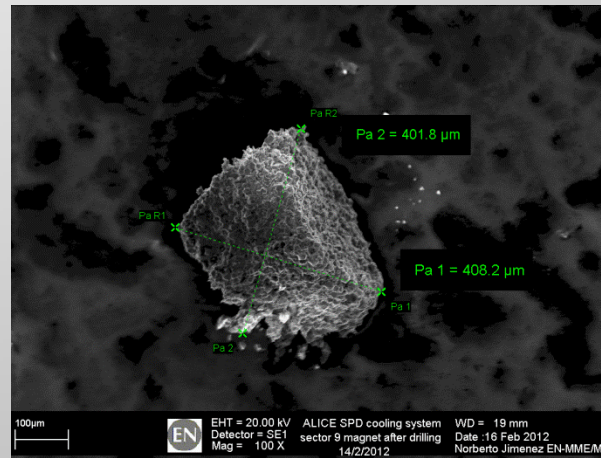
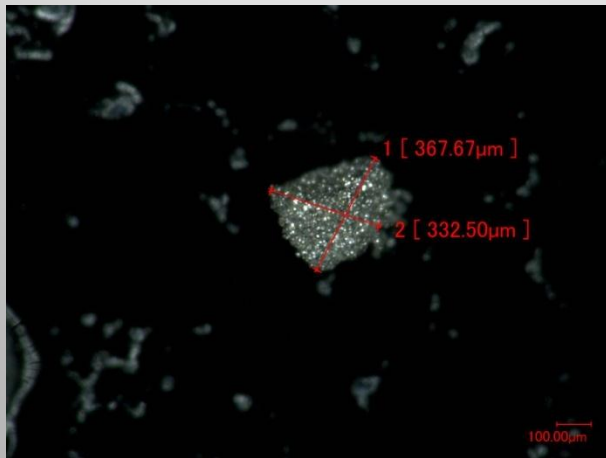
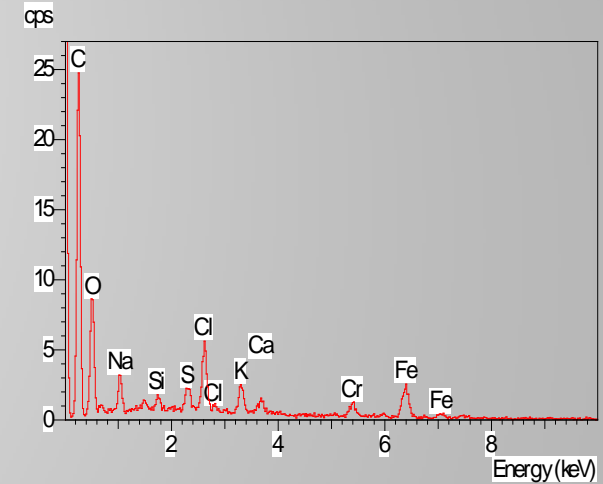
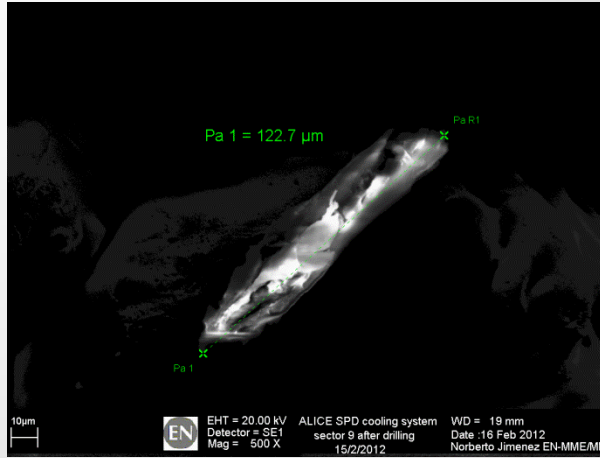
...and after cleaning!







# SEM analyses: Most particles are carbon and iron





# Sector 9 drilling procedure and results



- It never worked properly (max result: 6 HSs ON beginning of 2008)
  - vacuum cleaning + 3 magnet sweeps + vacuum cleaning + counterflow
  - last counterflow left running overnight
  - flow: from 0.27 to 0.46 g/s
  
- Drilling: Wed 15 Feb morning
- Cleaning: 5 cycles (overnight counter-flow between cycle 3 and 4)
- Results:

Flow=2.0 g/s at 4,5 bar (was: 0,27 g/s at 6,3 bar)

Modules on= 100% (was: 0%)



| Ch 054            | Ch 055            | Ch 056            | Ch 057            | Ch 058            | Ch 059            |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| READY             | READY             | READY             | READY             | READY             | READY             |
| SpdHStave_9_A_0   | SpdHStave_9_A_1   | SpdHStave_9_A_2   | SpdHStave_9_A_3   | SpdHStave_9_A_4   | SpdHStave_9_A_5   |
| MCM 2.59 v 0.40 A | MCM 2.59 v 0.40 A | MCM 2.60 v 0.38 A | MCM 2.61 v 0.38 A | MCM 2.60 v 0.40 A | MCM 2.58 v 0.38 A |
| Bus 1.85 v 4.61 A | Bus 1.86 v 4.32 A | Bus 1.85 v 4.75 A | Bus 1.85 v 4.71 A | Bus 1.85 v 4.65 A | Bus 1.84 v 4.28 A |
| HV 49.7 v 6.92uA  | HV 20 v 3.59uA    | HV 39.9 v 1.79uA  | HV 19.7 v 1.32uA  | HV 19.8 v 1.20uA  | HV 29.9 v 1.09uA  |
| TempDSS 30.05     | TempDSS 31.52     | TempDSS 32.14     | TempDSS 33.65     | TempDSS 33.21     | TempDSS 34.19     |
| TempFEE 32.14     | TempFEE 32.14     | TempFEE 34.50     | TempFEE 35.10     | TempFEE 30.95     | TempFEE 33.02     |
| TempMCM 17.97     | TempMCM 18.49     | TempMCM 19.18     | TempMCM 19.97     | TempMCM 20.58     | TempMCM 20.51     |

Router Settings

Exclude trigger from TTC

Refresh Status **Excluded!**



Flow Heaters Loop ON/OFF

1.89 2.00 87.37

17.12 3.69

| Ch 114            | Ch 115            | Ch 117            | Ch 118            | Ch 119            |
|-------------------|-------------------|-------------------|-------------------|-------------------|
| READY             | READY             | READY             | READY             | READY             |
| SpdHStave_9_C_0   | SpdHStave_9_C_1   | SpdHStave_9_C_2   | SpdHStave_9_C_3   | SpdHStave_9_C_4   |
| MCM 2.59 v 0.40 A | MCM 2.59 v 0.40 A | MCM 2.60 v 0.40 A | MCM 2.58 v 0.40 A | MCM 2.60 v 0.38 A |
| Bus 1.84 v 4.46 A | Bus 1.84 v 4.46 A | Bus 1.84 v 4.71 A | Bus 1.85 v 4.42 A | Bus 1.84 v 4.28 A |
| HV 49.9 v 2.39uA  | HV 49.9 v 2.39uA  | HV 9.89 v 1.39uA  | HV 49.8 v 1.36uA  | HV 30 v 1.25uA    |
| TempDSS 30.15     | TempDSS 30.50     | TempDSS 32.50     | TempDSS 34.54     | TempDSS 35.61     |
| TempFEE 30.15     | TempFEE 30.66     | TempFEE 33.62     | TempFEE 33.91     | TempFEE 31.25     |
| TempMCM 19.04     | TempMCM 19.04     | TempMCM 19.60     | TempMCM 19.39     | TempMCM 20.51     |

Router Settings

Exclude trigger from TTC

Refresh Status **Excluded!**



Clear CAEN Alarms

Manual Config

Automatic Config

Display Interlock Threshold

Load Configuration

**This isn't a fake panel, the values are real!!**



# Next steps



## Sector 7

- The filter was drilled last Monday morning.
- Cleaning is ongoing
- We expect to restart loop/sector this afternoon: waiting for SEM results
- Other sectors will be drilled according to the results of sector 7
- Drilling schedule to be decided soon (Technical stops time table)



# SDD/SSD cooling maintenance



- pump: replaced
- outlet filter: **replaced**
- demineralized cartridge: replaced
- mechanic filter on air control: replaced
- SSD chilled water valve: replaced (it was leaking)
- safety valve on the tank: replaced
- alarm security test: done
- upload new program PLC (ramp of p regulator SSD): **done**
- temperature sensors loop 17 & 18: replaced

**Finished**



# SPD cooling maintenance



- pump replaced
- dehydrator cartridge replaced
- inlet mechanic 1um filter replaced
- chilled water valve replaced (leak on the top)
- one of compressor was replaced
- some safety valves were recalibrated and installed (10 bar pump valve and 8,5 bar in the inlet manifold, 3,5 bar tank valves): done
- 10 safety valves on the loops (return side) replaced
- test security alarm: **to be done**
- BPRs installation: **Postponed to 2013**





# UX25 access restrictions



|    | Dec            |                |             |        | Jan |   |     |    |    | Feb |                  |                |     | Mar |    |  |  |
|----|----------------|----------------|-------------|--------|-----|---|-----|----|----|-----|------------------|----------------|-----|-----|----|--|--|
| Wk | 49             | 50             | 51          | 52     | 1   | 2 | 3   | 4  | 5  | 6   | 7                | 8              | 9   | 10  | 11 |  |  |
| Mo | 5              | After<br>17:00 | 19          | 26     | 2   | 9 | 16  | 23 | 30 | 6   | After<br>17:00   | 20             | 27  | 5   | 12 |  |  |
| Tu |                |                |             |        |     |   |     |    |    |     |                  |                |     |     |    |  |  |
| We |                |                |             |        |     |   |     |    |    |     |                  |                |     |     |    |  |  |
| Th | After<br>17:00 |                | Open L3     |        |     |   |     |    |    |     |                  |                |     |     |    |  |  |
| Fr |                |                |             |        |     |   | AUG |    |    |     | Close L348V (EL) | Lift           | DSO |     |    |  |  |
| Sa |                |                |             |        |     |   |     |    |    |     |                  | After<br>17:00 |     |     |    |  |  |
| Su |                |                | Xmas<br>Day | NY Day |     |   |     |    |    |     |                  |                |     |     |    |  |  |

## Access restrictions:

Removal/installation of shielding (restriction includes RB24 triplets)

- PX24 blocks: no access CR5 and UX25
- PX24 beams (35t): no access CR1-5, Expo, and UX-25
- All other blocks: no access to UX-25 (or 1-2 teams max, not on A-side)

TRD insertion: no access to MNF and L3

AUG test (*Arrêt Urgence General* – General Emergency Stop) – no access UX25

DSO test (Department Safety Officer) – no access UX25

No access SX2 during manipulation of blocks in SX2 (except ACR and WRs)

### Legend

No access (except transport)

Access possible

No access