

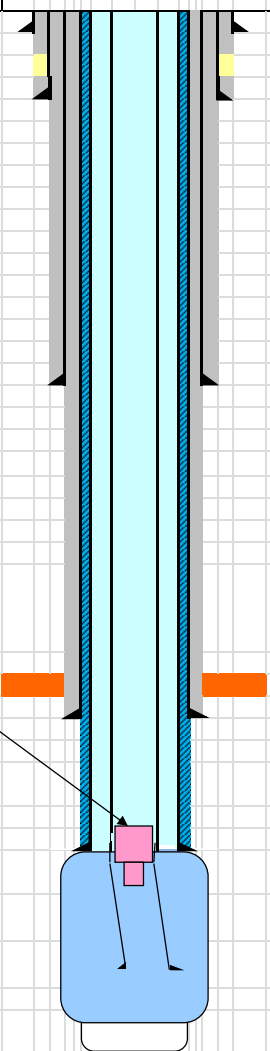
Overview mining activities Q1 2018

Quarterly meeting
Frisia Zout B.V. -SODM
11th of April 2018

Contents

1. Updates BAS-1
2. Updates BAS-3O
3. Updates BAS-4
 - Cavern end volume and production
4. Update subsidence
5. Update Havenmond
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BAS-1

Item Description	Wellhead and Xmastree BAS 1 140527	Depth	Depth	Pipe OD	Collar OD	Pipe ID
		m tvd	m ah	in	in	in
36" stove pipe		40	40	28,000		
24" x 1/2" casing		494	494	24,000		
Top cement in 18 5/8" x 13 3/8" annulus						
18 5/8" casing		1175	1175	18,625	20,000	17,688
13.3/8" Annulus filled with diesel/brine solution as of January 2013.						
Straddle Jan 2010; Top at; 2584md Minimum ID; 3.34" Bottom at; 2589 md						
Base of Carnalite 13 3/8" casing		2522 2543	2522 2543			
				13,375	14,375	12,895
Roof height from March 2011 neck echo measurement		2567	2567			
7" Leak at ~2586 m 10 3/4" outer leaching string, internally coated 7" inner leaching string, internally coated		2587 2787	2587 2787	10,75 7,000	11,75 7,375	9,76 6,276
Sump Dec 2004		2832	2832			
Total Depth Cavern		2882	2882			

	Freshwater
	Water/Diesel Solution
	1.20s.g. brine
	Casing cement
	Carnalite

* All depths are from ground level

Status

- Maintain max pressure 10 3/4" at 232bar
- Bleed-off pressure every 4 weeks
- 13 3/8" contains water, however at higher pressure then 10 3/4"

Planned

- HP-shut-in
- Review concept design abandonment

January 2018

10-12	Pressure bleed-off
16 - 18	Bleed-off 13-3/8" annulus pressure for pressure analysis

February 2018

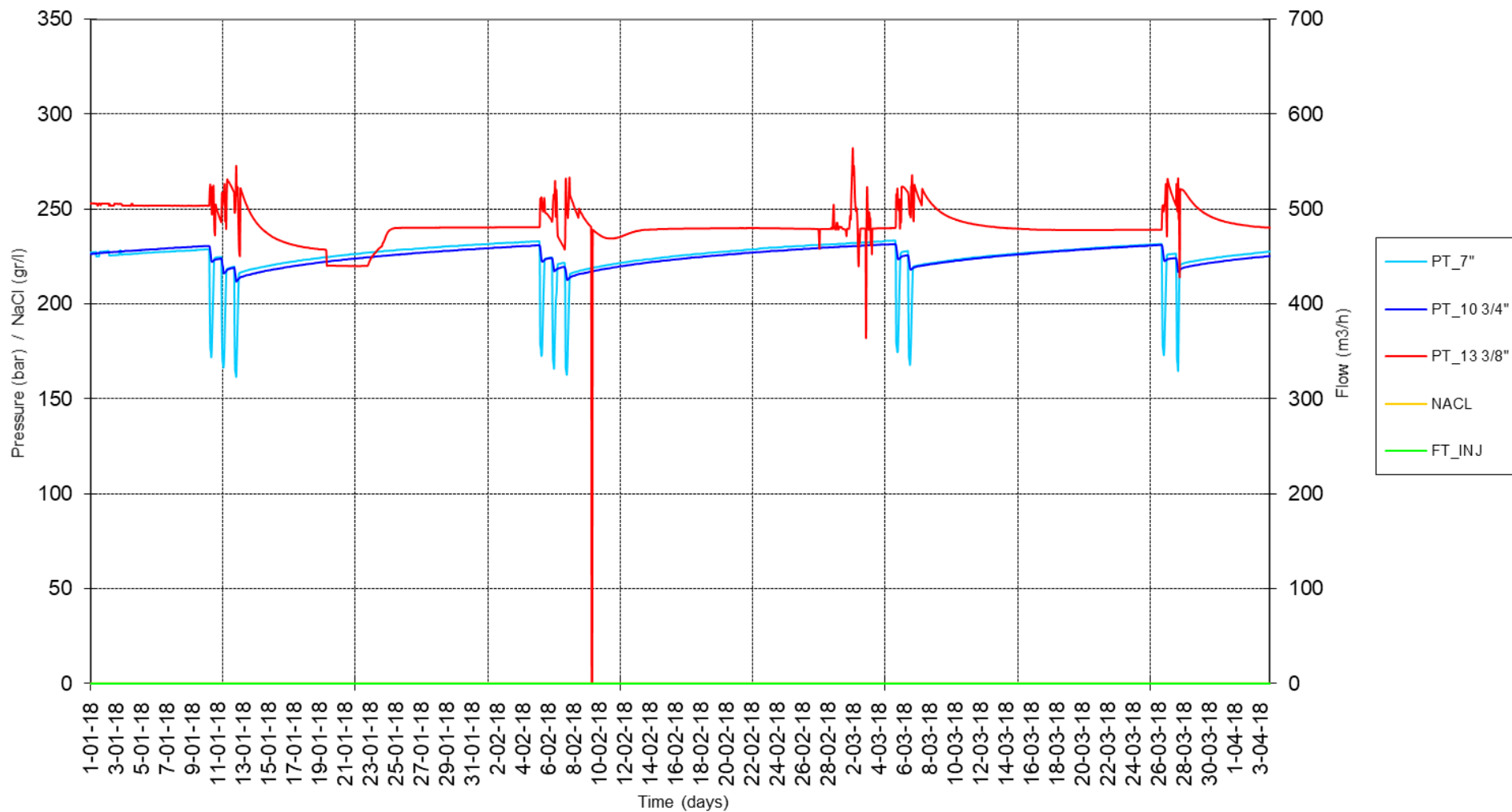
5-7	Pressure Bleed-off
9	Isolation of pressure sensor
27-28	Freezing of 13-3/8" pressure sensor

March 2018

1, 5	Freezing of 7" and 13-3/8" pressure sensor
19 - 20	Pressure Bleed-off
22	Repressurization of 13-3/8"

BAS-1

Trends BAS-1



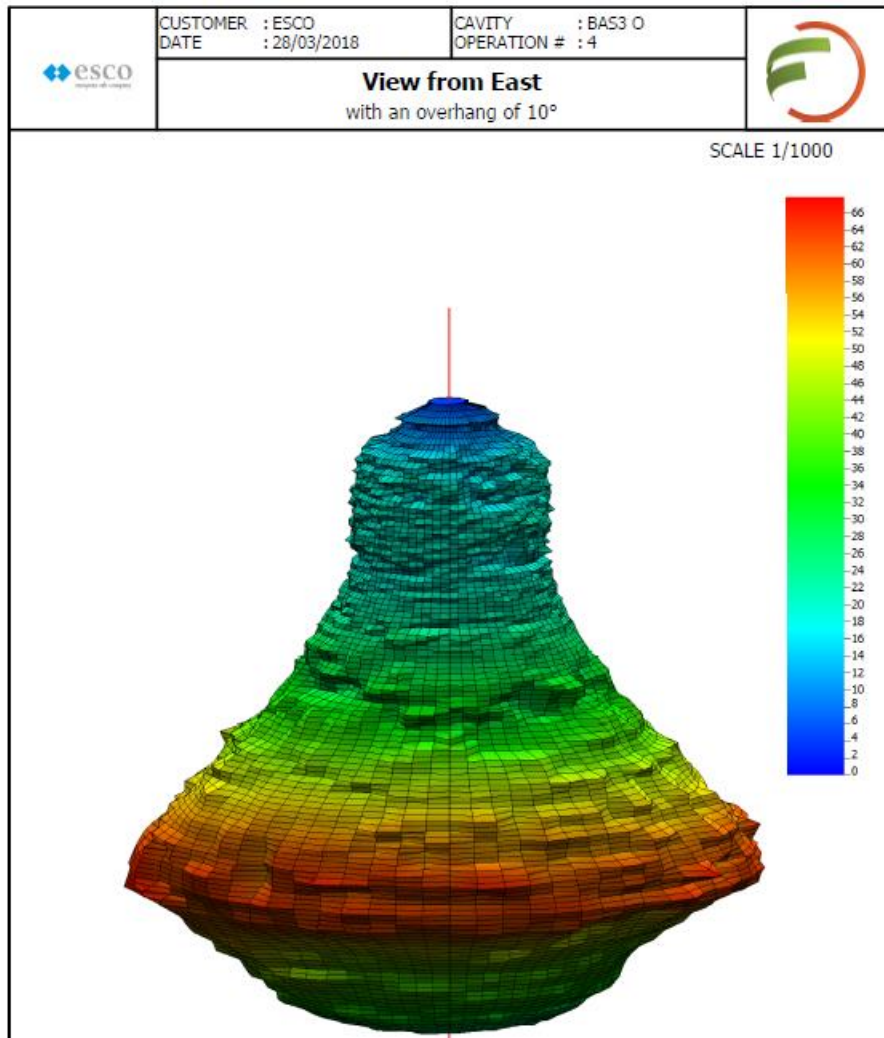
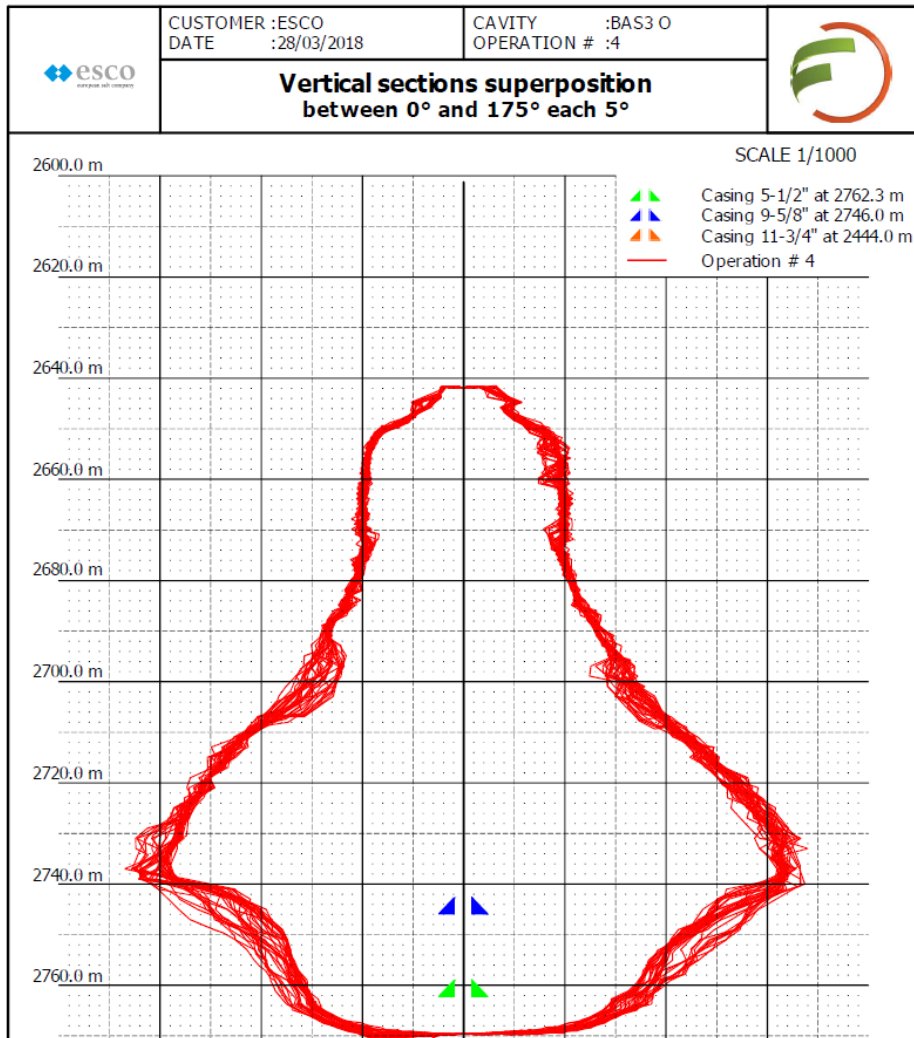
Status

- **Bottom injection mode since January 2018**
- **Last echo measurement in March 2018, measured cavern volume: 554.926 m³**
 - **Estimated (volume balance) cavern volume April 2018: 547.998 m³**

Planned

- **Continue bottom injection mode**
- **Blanket measurements every 4-8 weeks**
- **Workover → Change configuration inner/outer leaching string (ongoing)**

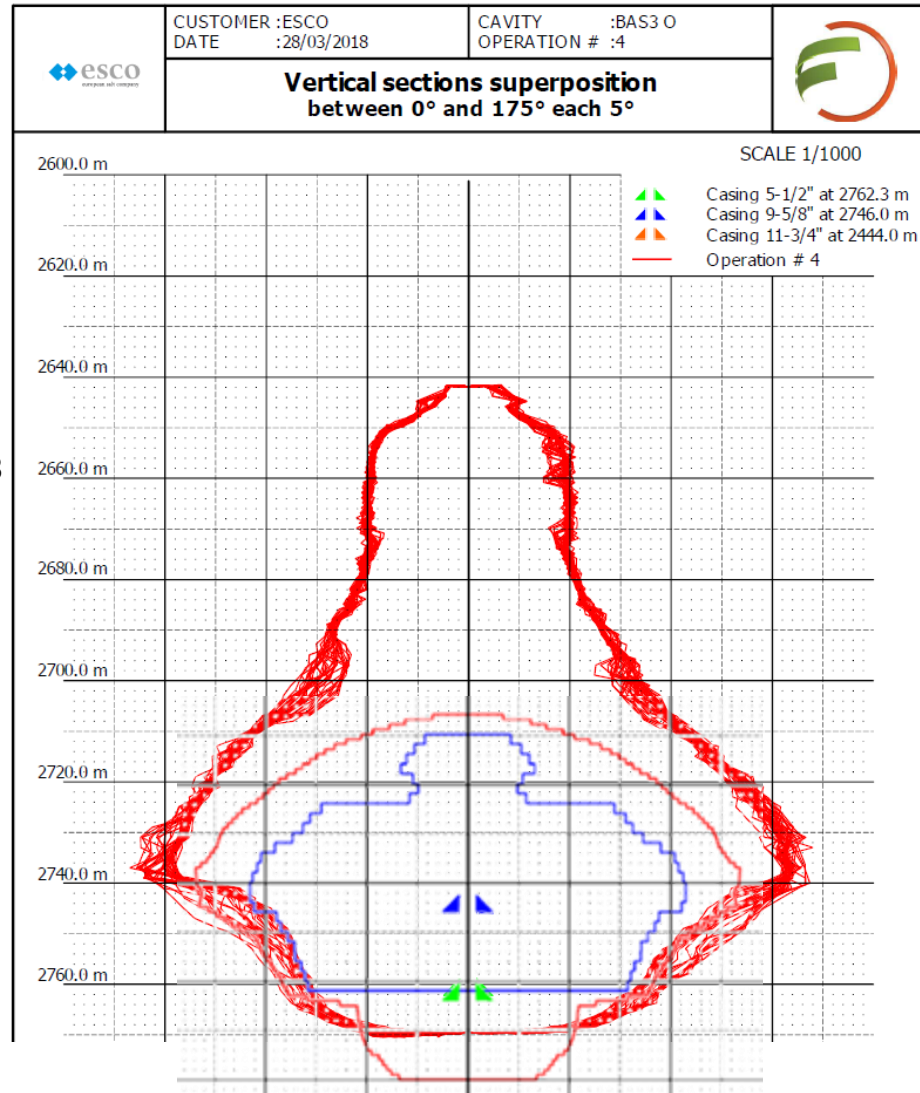
BAS-30 Sonar



Total volume: 554.926 m³

BAS-30 Sonar

Current volume: 554.926 m³
Previous volume: 338,144m³



January 2018

2,5,6,8,11	Counter flush due to blockage 5-1/2"
8	Injection stop due to faulty signal proximity sensor
17,18,19	Fresh water injection into blanket annulus
24-25	Regular blanket measurement
25	Start production in bottom injection mode

February 2018

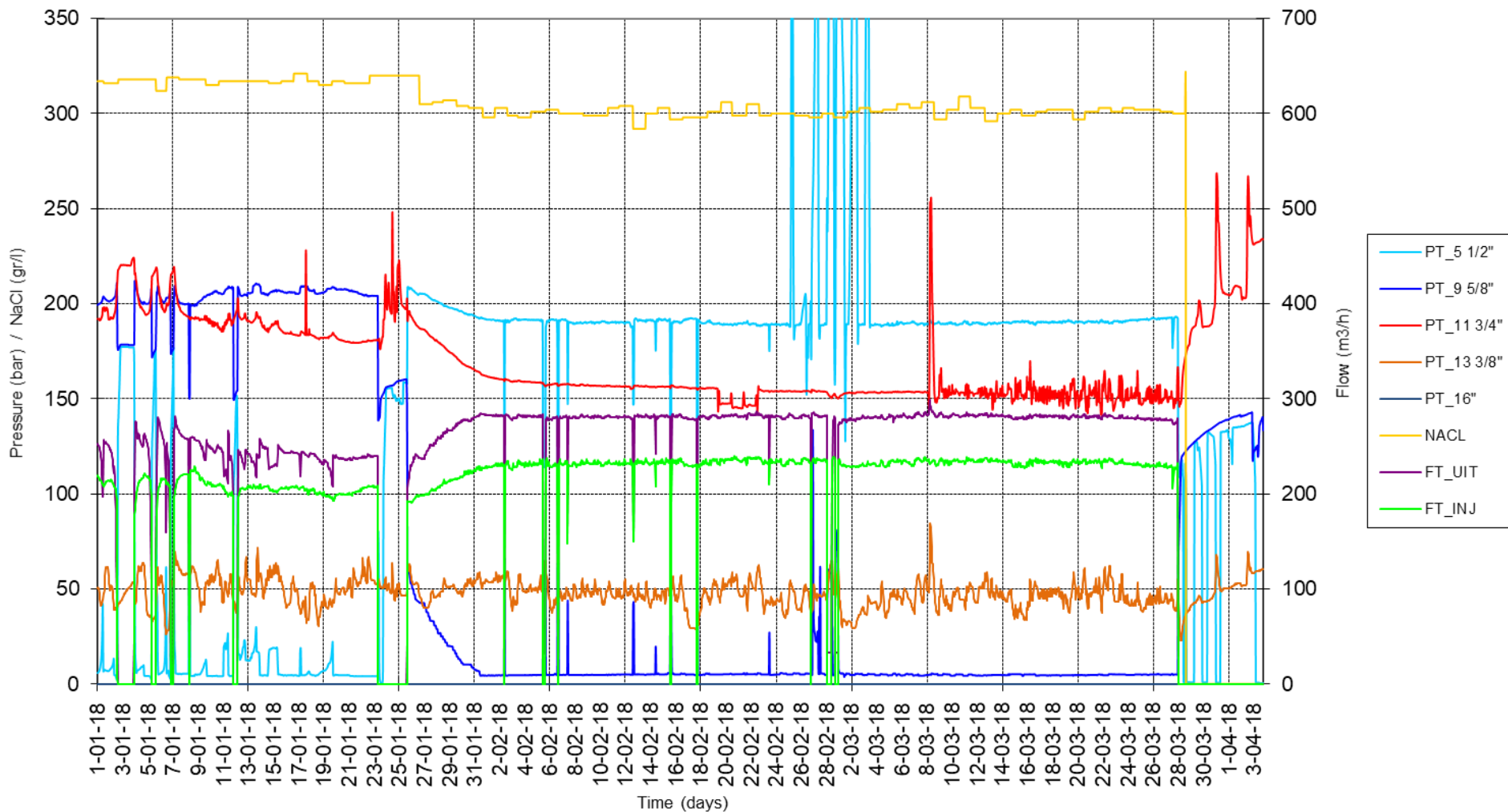
2,5,6,17,28	Injection stop due to faulty signals of break disc in flowline BAS-4
3, 10, 12	Injection stop due to leaking pump gasket
19-22	Neckwash operation
25-28	Freezing of pressure sensor

March 2018

1-3	Freezing of 5-1/2" pressure sensor
8-31	Fluctuating pressure 11-3/4" due to blockage
19	Stop injection / production (factory maintenance)
28-31	Workover operations

BAS-30

Trends BAS-30



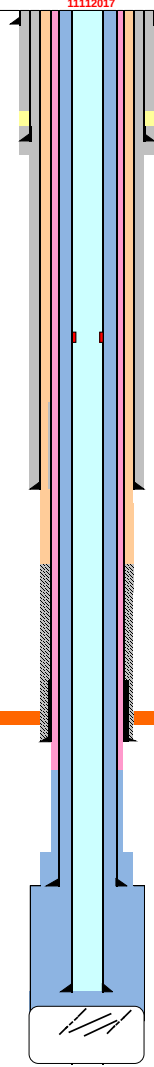
BAS-4

Remarks

- Production to fit factory requirements
- Increased back pressure
- Sonar measurements were unable to enter cavern, observed a new HUD → changed toolstring configuration

Planned

- Continue bottom injection mode
- Blanket measurement (every 6 months)
- Wijziging instemmingsbesluit
- Perform sonar measurement 12th of April.
- Estimated (volume balance) cavern volume April 2018: 981.330 m³

Item Description	Wellhead and Xmastree BAS 4	Depth GL	Depth GL	Hole ID	Pipe OD	Collar OD	Pipe ID
		m tvd	m ah	in	in	in	in
28" x 1" X 52E conductor shoe		15	15	driven	28,000	welded	28,000
7" 29 ppf N80 VAM TOP inner leaching string, internally coated		319	319				
7" 26 ppf L80/N80Q VAM TOP inner leaching string, internally coated		366	366				
24" x 1/2" WT 35 ksi conductor, welded		279	279	26,00	24,000	welded	23,000
7" 29 ppf N80 VAM TOP inner leaching string, internally coated		319	319				
7" 26 ppf L80/N80Q VAM TOP inner leaching string, internally coated		366	366				
7" 29 ppf N80 VAM TOP inner leaching string, internally coated		577	577				
7" 23 ppf N80 VAM TOP inner leaching string, internally coated		591	591				
7" 29 ppf N80 VAM TOP inner leaching string, internally coated		604	604				
7" wireline profile 5.75" Otis 'RPT'		966	966				5,75
Top cement in 18 5/8" x 13 3/8" annulus		916	916				
18 5/8" 87.5 ppf K55 Big Omega casing		1126	1126	22,00	18,625	20,000	17,688
13 3/8" 68 ppf P110 VAM-TOP casing		1980	1980	16,00	13,375	14,375	12,415
14" heavy wall VAM TOP 106 ppf N80		2382	2382	16,00	14,000	14,000	12,500
Base of Carnalite		2410	2410				
BM 23-10-2017		2470,6	2470,6				
EM (Oct 2015, Roof = 2478m) Mar 2012, Not possible to inject more diesel below 2496m -> indicating leak at that point in 11 3/4" connection.		2506	2506	26	11,750	11,965	10,682
11 3/4" 65 ppf VM 80HC, VAM FJL outer leaching string, internally coated		2509	2509				
		2530	2530				
7" 26 ppf N80 VAM TOP inner leaching string, internally coated. Explosive cut.		2628	2628	17 1/2"	7,000	7,375	6,276
Sump level Oct 2017 (EM)		2639	2639				
Total Depth Cavern		2810	2810				

* All depths are from ground level

January 2018

3, 6	Injection stop due to stop BAS-30
8	Pump stop due to pressure outside operating range
24-31	Production stop for installation of new injection pumps
29	Sonar measurement

February 2018

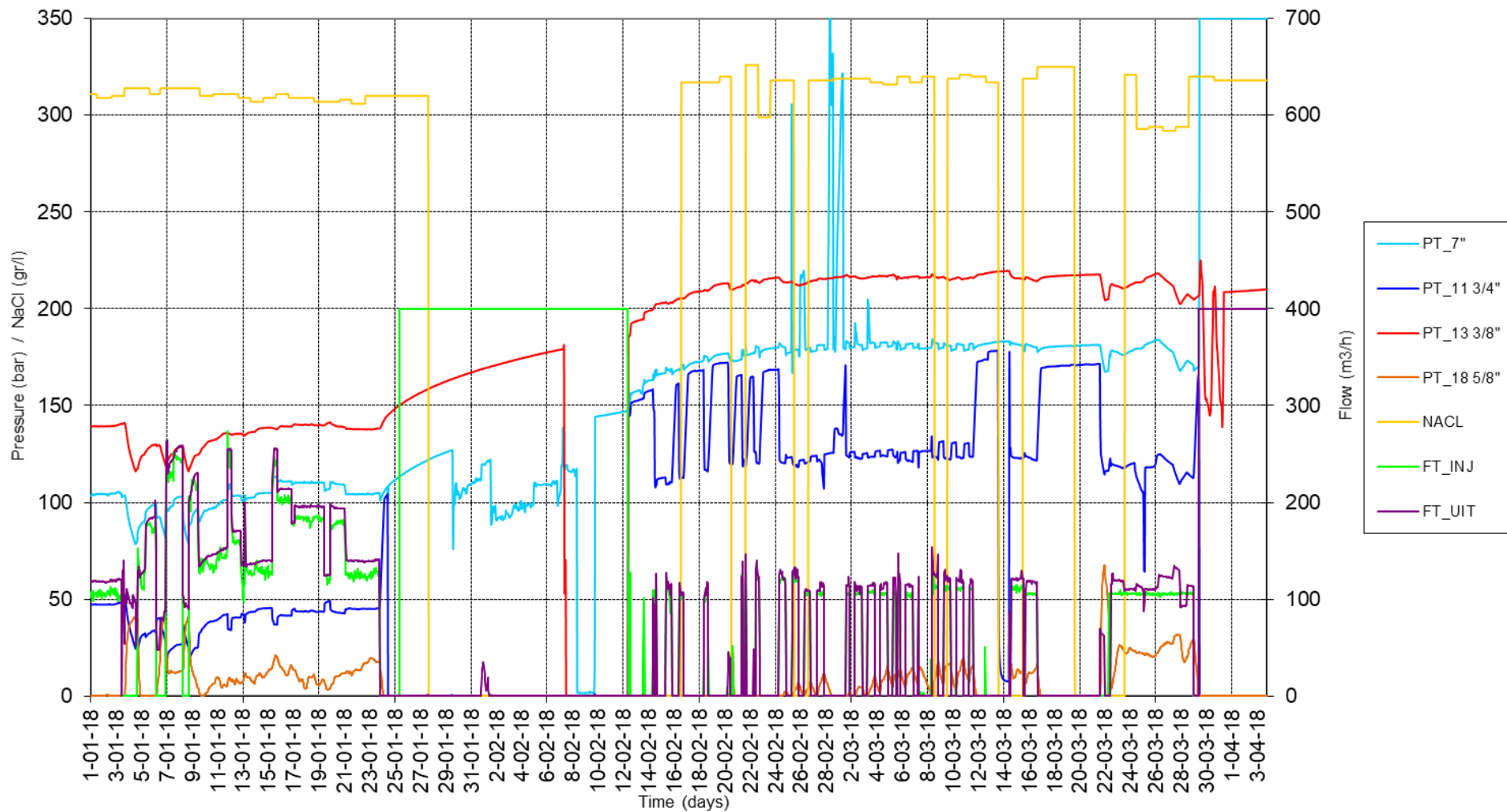
1-14	Installation of new pump unit
7-12	Isolation of 13-3/8" pressure sensor
8-9	Isolation of 7" pressure sensor
12-28	Commissioning and testing of new pump unit, intermittent injection/production
28	Freezing of pressure sensor

March 2018

1	Injection stop due to maintenance at the factory
1-16	Intermittent production (during the day) due to vibration new pump unit
12-14	Stop injection/production due to pump issue
17-21	Stop production as sufficient salt was delivered from K+S
23-28	Start continuous production, vibration issue new pump unit solved
29-31	Stop injection/production (factory maintenance)
30, 31	Isolation of 13-3/8" pressure sensor

BAS-4

Trends BAS-4



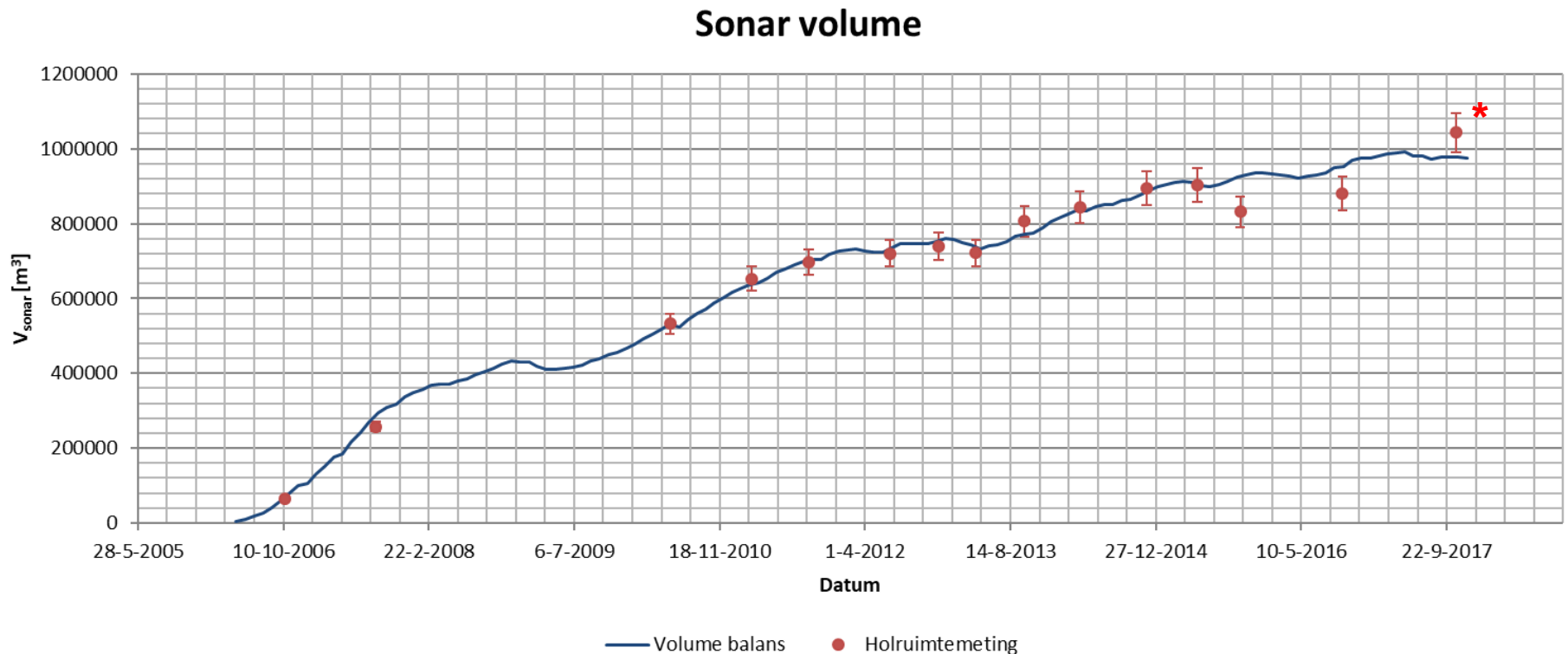
BAS-4

Cavern end volume

Letter from SodM to Frisia: December 5th 2017

- Cavern end volume of 1.000.000 m³ until approval of actualisation of winningsplan
- Current cavern volume over 1.000.000 m³ will be deducted from subsidence budget
- Production at higher pressures is within limits of current winningsplan
- Remaining production from the 1st of December 2017 onwards: 300.000 tons (within current winningsplan)
 - Produced since 1st of December: 79.833 tons

Volume balance BAS-4



*** Echo survey doubtful**

Waterpassing

M&R 2017

➤ Measurements were performed November/December 2017 by ANTEA and analyzed

➤ Subsidence winningsplan:

➤ Winningsplan (Barradeel II):

➤ Current GPS (23-3-2018):

➤ Subsidence above the cavern:

➤ Subsidence / year current*:

BAS-30

300 mm

186,5 mm

196,5 mm

13,1 mm/y

BAS-4

300 mm

276,9 mm

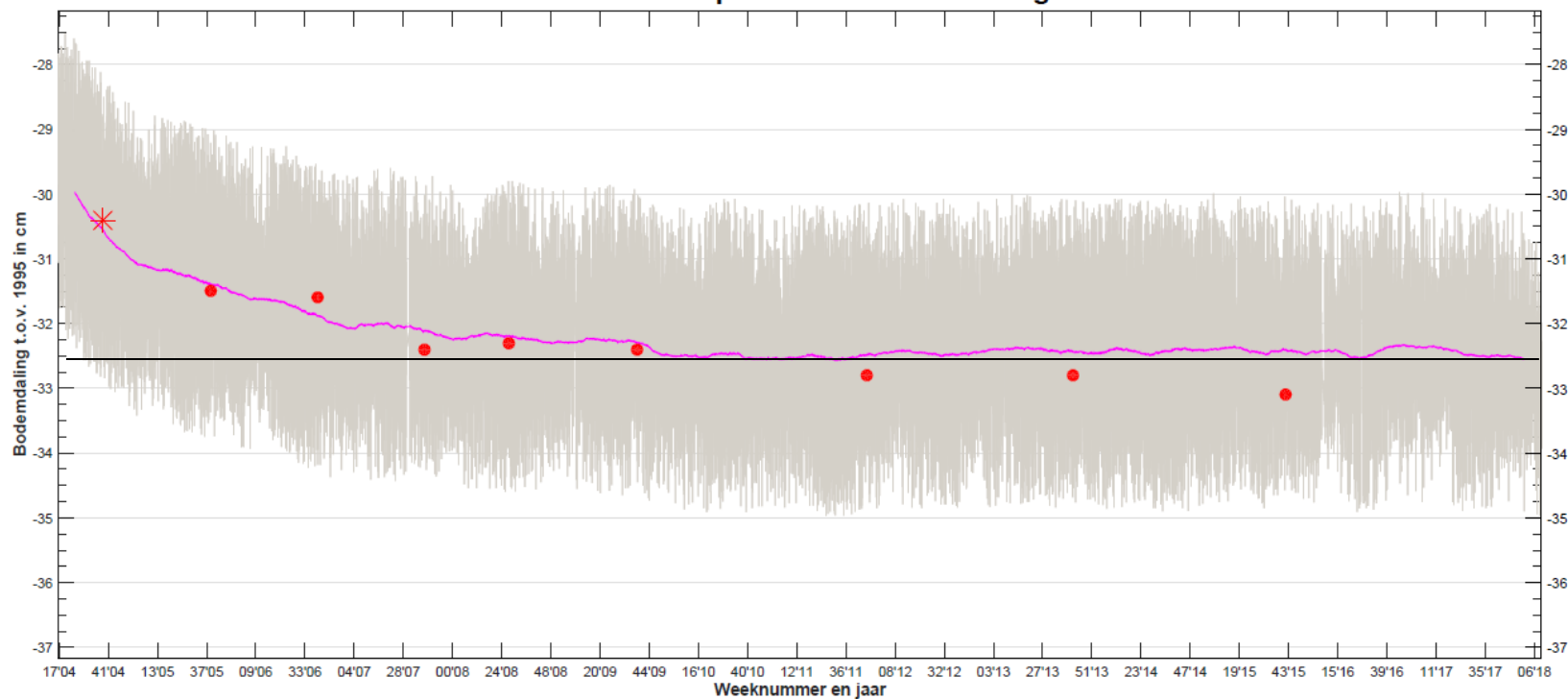
278,9 mm

11,4 mm/y

Based on full previous year

GPS BAS 1/2

Bodemdaling GPS station Barradeel*
Resultaten uit permanente GPS meting***



- Moving Average 16 weken
- Gemeten bodemdaling
- * Week 40 2004 = -30.4 cm**
- Week 40 2005 = -31.5 cm**
- Week 40 2006 = -31.6 cm**

- Week 40 2007 = -32.4 cm**
- Week 29 2008 = -32.3 cm**
- Week 40 2009 = -32.4 cm**
- Week 47 2011 = -32.8 cm**
- week 44 2013 = -32.8 cm**
- week 43 2015 = -33.1 cm**

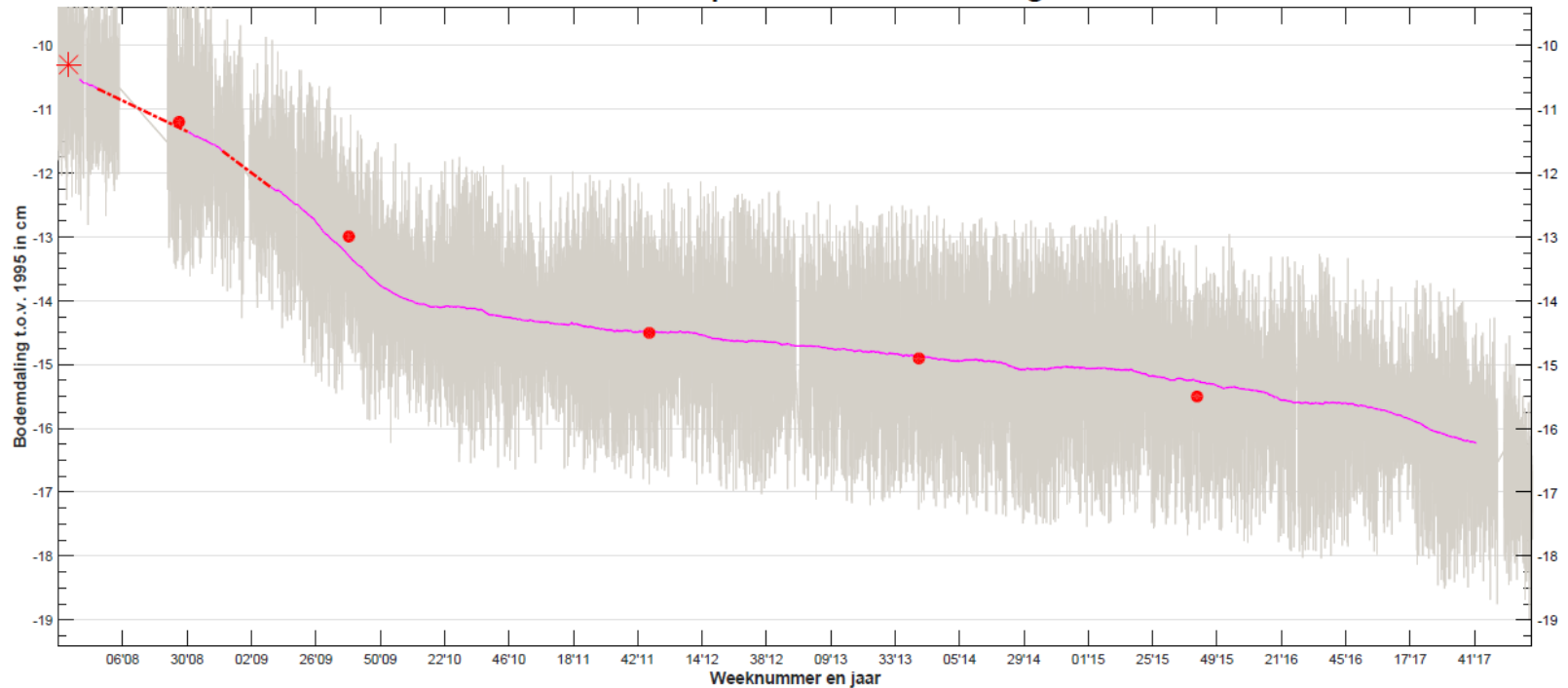
Op basis van WEP Analyse WP 2015 bedraagt in 2015 daling van diepste punt in winningsvergunning Barradeel 1,65 cm meer dan daling van GPS-station Barradeel.

Daling GPS station berekend uit "best fit" dalingskommen. (ref. WP 2015 Zweins, glijdende PM, 3 kommen v1.2- Dkrit 13 mm, gamma 4,3)

*GPS is een relatieve meting tussen station Barradeel en het station te Zweins. De relatieve GPS meting is gekoppeld aan de absolute daling vastgesteld in WP 2004 (rode ster)

GPS BAS 3/30

Bodemdaling Barradeel II GPS station BAS-3* & BAS-3-O
Resultaten uit permanente GPS meting***



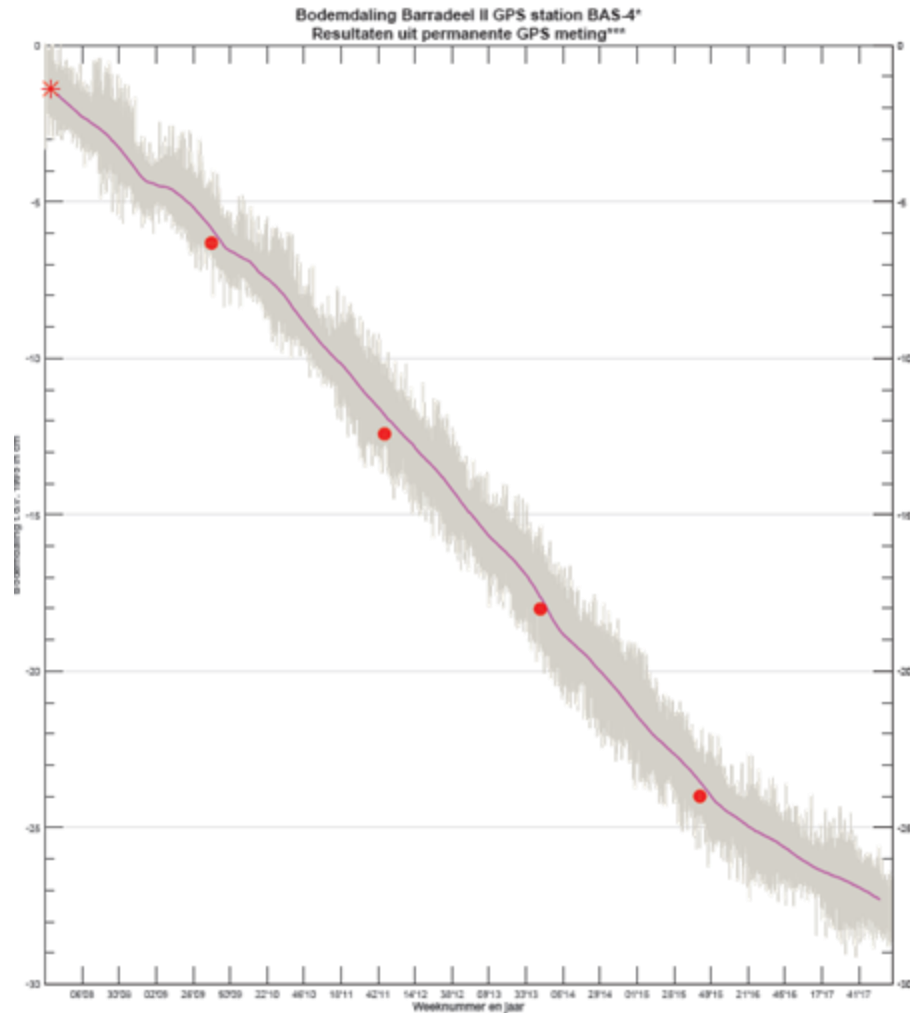
- * week 40 2007 = -10.3 cm**
- week 29 2008 = -11.2 cm**
- week 40 2009 = -13.0 cm**
- week 47 2011 = -14.5 cm**
- week 44 2013 = -14.9 cm**
- week 43 2015 = -15.5 cm**

* Op basis van WEP Analyse WP 2015 bedraagt in 2015 bodemdaling boven caveerne BAS-3 1,95 cm meer dan daling van GPS-station BAS-3.

** Daling GPS station berekend uit "best fit" dalingskommen. (ref. WP 2015 Zweins, glijdende PM, 3 kommen v1.2- Dkrit 13 mm, gamma 4,3)

*** GPS is een relatieve meting tussen station BAS-3 en het station te Zweins. De relatieve GPS meting is gekoppeld aan de absolute daling vastgesteld in WP 2007 (rode ster)

GPS BAS-4



- * week 40 2007 = -1.4 cm**
 - week 40 2009 = -6.3 cm**
 - week 47 2011 = -12.4 cm**
 - week 44 2013 = -18.0 cm**
 - week 43 2015 = -24.0 cm**
- Gemeten bodemdaling
— Moving Average 16 weken

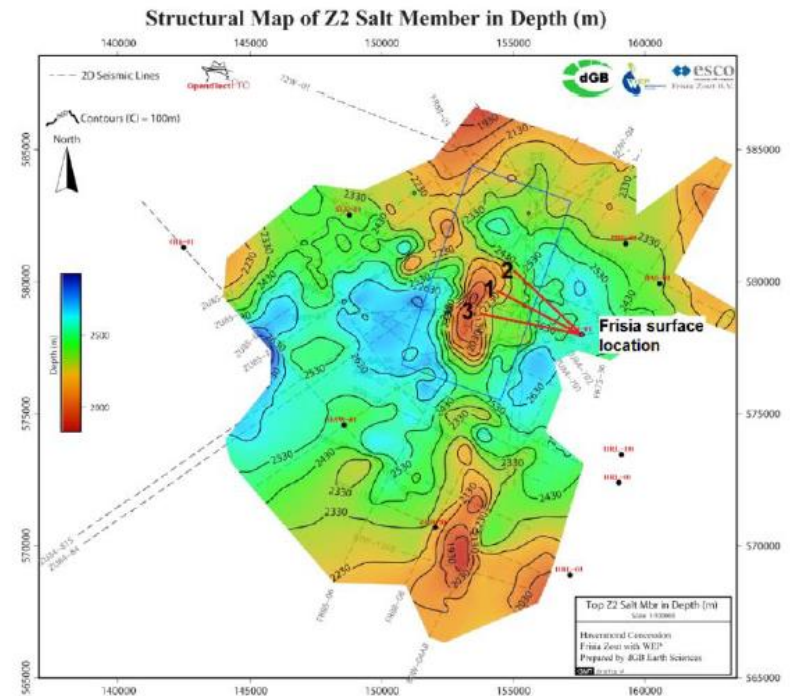
* Op basis van WEP Analyse WP 2016 bedraagt in 2016 bodemdaling boven cauerne BAS-4 0,3 cm meer dan daling van GPS-station BAS-4.
 ** Daling GPS station berekend uit "best fit" dalingskromme, (ref. WP 2016 Zuivens, glijdende PMA, 3 krommen v1.2- Okt 13 min, gamma 4.3)
 *** GPS is een relatieve meting tussen station BAS-4 en het station te Zuivens. De relatieve GPS meting is gekoppeld aan de absolute daling vastgesteld in WP 2007 (rode ster)

GPS logbook

24-1-2018	Alle	<i>Vanwege antenne wissel op station Zweins geen ontvangst tussen 9:59 en 14:59 uur.</i>
10-2-2018	Alle	<i>Onderbreking van data ontvangst BAS12, BAS3 en BAS4 tussen 9-2-2018 23.00 uur en 10-2-2018 23.00 uur.</i>
15-2-2018	Alle	<i>Onderbreking van data ontvangst BAS12, BAS3 en BAS4 15-2-2018 tussen 06.00 uur en 24.00 uur.</i>
16-2-2018	Alle	<i>Onderbreking BAS12, BAS3 en BAS4 tussen 16-2-2018 0 :00 uur en 17-2-2018 10 :00uur</i>
23-2 t/m 15-3-2018	BAS12	<i>Diverse (korte) onderbrekingen in de data ontvangst. Onderbrekingen worden / zijn gemeld aan Frisia. Na een melding wordt de ontvanger door een medewerker van Frisia opnieuw opgestart. Door het tijdsverloop tussen melden en opnieuw opstarten gaat er in sommige gevallen data verloren.</i>

Havenmond

- Zero measurements can start, installation of poles planned for Q2/Q3 2018. Licence received, PO issued to local supplier
- Alternative blanket fluid, under investigation
- Finalize engineering mid/end 2018
- Start drilling summer 2019
- Sluitingsplan before start production



WVTTK

- Next meeting 11th of July 2018, 10:00-15:00 SODM
- Risk ID, state of the sector