



## End of Job Report

**ADK-GT-01-S1 well clean-out and flatpack + permanent ESP installation**

Operator: ECW Geo Andijk B.V.  
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Version: 1.1  
Publication date: November 28<sup>th</sup>, 2018



	End of Job Report – Clean-out, Flatpack & ESP installation		
	ADK-GT-01-S1		
	Revision No.	1.1	
	Operator:	ECW Geo Andijk B.V.	

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	Name	Function	Signature	Date
Approved by	Bertran de Lange	Project Manager		28/11/2018

Document Revision Control:

Revision no.	Version	Date	Changed Items
0	1	14/11/2018	Initial draft for internal review and ECW's review
1	1.1	26/11/2018	Processed ECW's feedback

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## GLOSSARY

AH	Along hole	P/U	Pick up
BGL	Below ground level	PUW	Pick up weight
BHA	Bottom hole assembly	RIH	Run in hole
BHGE	Baker Hughes General Electric	RPM	Rounds per minute
CHH	Casing head housing	RT	Rotary table
ESP	Electric submersible pump	s.g.	Specific gravity
GL	Ground level	SodM	Staatstoezicht op de Mijnen
HSE	Health, Safety & Environment	SOW	Slack off weight
MD	Measured Depth	SSV	Site Supervisor
M/U	Make up	TD	Total depth
NAP	Normaal Amsterdams Peil	TOC	Top of cement
NPT	Non-productive time	TOL	Top of liner
PJSM	Pre-job safety meeting	TVD	True vertical depth
POOH	Pull out of hole	WEP	Well Engineering Partners
ppf	pounds per foot	WH	WellHead

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## 1. General Project data

Table 1: General Project Data

<b>License</b>	Andijk
<b>Well Number</b>	ADK-GT-01-S1
<b>Well Name</b>	Andijk-geothermal-#1
<b>Well Type</b>	Geothermal Producer
<b>Commence Rig up Date</b>	03/09/2018 07:00 hrs
<b>End of Operations Date</b>	13/10/2018 19:00 hrs
<b>Total Days Operational</b>	5 + 3 = 8 days
<b>Operator</b>	ECW Geo Andijk B.V.
<b>Surface Location (Rijksdriehoek)</b>	X: 141,923.43 Y: 526,448.44
<b>Surface Location (ETRS89)</b>	N: 52° 43' 30.91029" E: 5° 11' 37.12308"
<b>Well Site Address</b>	Nieuwe Dijk 2, Andijk, 1619 PK
<b>Personnel</b>	
<b>Project Manager</b>	Bertran de Lange
<b>Operation Manager</b>	Peter Hoving
<b>Senior Well Engineer</b>	Dirk Brinkgreve
<b>HSE Manager</b>	Peter Breed
<b>Wellsite Supervisor</b>	Thomas Schreuder
	03/09/18-07/09/18
	11/10/18-13/10/18
<b>Art de Vetter</b>	03/09/18-07/09/18
<b>Night Wellsite Supervisor</b>	11/10/18-13/10/18
	03/09/18-07/09/18
	11/10/18-13/10/18

### 1.1 Planned operation

Initial installation of the permanent ESP assembly, as well as a flatpack control/inhibitor line. Due to the corrosive nature of the production fluid, it was decided to install a corrosion inhibitor line just above the 7" top of liner to apply a protective film and reduce the corrosion rate of the exposed casing.

### 1.2 Objectives

Table 2: Objectives vs results

Clean-out well until full basin, prove inter-wells communication, and use well as injector while producing from other three Andijk wells	Well cleaned until basin full, inter-wells communication confirmed, injection successful during entire well clean-out campaign
Removal and replacement of Xmas tree assembly (dispensation received) with good pressure test(s)	P-test 5/15min, 20/100 bar (ok)
Installation of flatpack inhibitor line on 4" OD bullnose with 7 ½" centralizers (4x wings/ribs) to ~5m from 7" TOL	Successfully installed above 7" TOL without issues and within estimated timing. 7" TOL at 2051m AHBGL, HUD observed at 2044.5m, flatpack nose installed at 2041m AHBGL.
ESP installation with Motor Centralizer (3-Wing) dressed with epratone (low friction) extensions (310mm/12.20" OD) to prevent local corrosion/wear.	Nose installed at ~722m (intake at ~699m)

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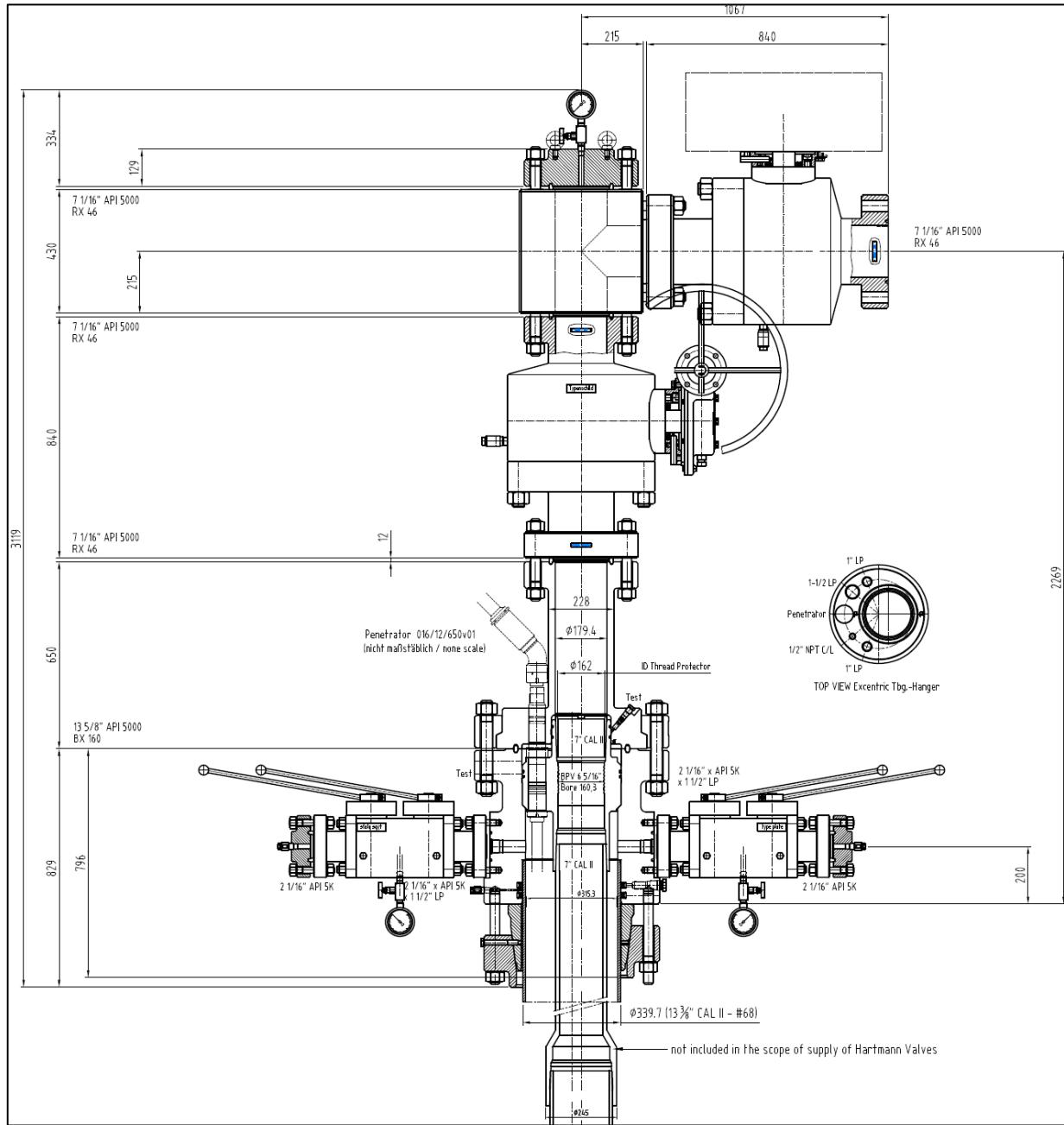
## 2. Technical Summary

### 2.1 Final Well Status

Nr.	Item Description Production well	ADK-GT-01-S1 ≥13 5/8" 5000psi WH	Depth	Depth	Depth	Depth	Hole ID	Pipe OD	Collar	Pipe ID	Pipe ID
			rt m ah	rt m tvd	blg m ah	blg m tvd	in	in	in (nom)	in	(drift)
1	28" casing, X70, welded		100	100	91	91	driven	28.000	welded	26.250	25.043
	Theoretical top of tail cement										
2	18 5/8" casing, 87.5#, K55, BTC  8 ½" coated production tbg. 40#, L80, HC Polseal1 ESP Intake Depth ESP WNE 1600 Bullnose dept.		339	339	330	330					
			510	509	501	500	24.000	18.625	20.000	17.755	17.568
					695	691	12.347	8.625	9.650	7.725	7.600
					699	695	12.347	10.750			
					722	717	12.347	12.200			
	Theoretical top of tail cement										
	9 ½" Liner Hanger/Packer + PBR										
3	13 3/8" casing, 72#, L80, VAM Top  Theoretical top of lead cement		1055	1041	1046	1032					
			1217	1186	1208	1177	Top of liner				
			1270	1231	1261	1222					
			1331	1298	1322	1289					
			1390	1326	1381	1317					
	Theoretical top of tail cement										
	3/8" Chemical injection line (flatpack 28x22mm) Chemical injection line Bullnose		1912	1721	1903	1712					
					2041	1821					
4	7" Liner with PBR  9 5/8" liner, 53.5#, L80, VAM Top Top Slochteren (Reservoir)		2060	1853	2051	1844	Top of liner				
			2111	1874	2102	1865	12.250	9.625	10.520	8.535	8.500
			2116	1878	2107	1869					
5	Base Slochteren (Reservoir)  7" pre-perforated liner, 26#, P110, VA Roughneck 8 ½" (TD)		2356	2059	2347	2050					
			2358	2063	2349	2053	8.500	7.000	7.644	6.184	6.059
			2358	2063	2349	2054	8.500				

Figure 1: Final Well Schematic

## 2.2 Wellhead & Xmas Tree



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### 3. Contractor List

Company	Supplier of
ECW	Operator, Day-supervision & execution of work program
Panterra geoconsultants	Well Test & samples analysis
Baker Hughes General Electric (BHGE) Centrilift	ESP equipment & installation
PST Power	Medium Voltage connections
Bakker Oilfield Supply (BOS)	Well Test equipment, service & installation
Odfjell Well services (OWS)	Work Platform & Tubular Running
Wagenborg	Crane services
Deep Drill Services	Wellhead & Xmas Tree installation & P-testing
Baker Hughes General Electric (BHGE) Capillary Coil	Flatpack + accessories & installation
Expro	Wireline services (sampling)
Stralingsupport B.V.	Measuring & define NORM / LSA measurements. Radioactive analysis of produced solids
Q-con GmbH	Seismic monitoring
Well Engineering Partners B.V. (WEP)	Advisor & Office Support, Night-supervision