

# Research and Development Advances in Geothermal Game Changing Technologies

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# A Force for Sustainable Change



**Solenis: A leading specialty chemical supplier and water treatment company with a truly global footprint**



# Specific Research of more than €5,000,000 has delivered game changing results.

## 1. Increasing existing well capacities in **both reinjection and production wells**

- Well out puts increased by up to 500%
- Free additional heating and MW

## 2. Cleaning existing wells and exchangers **online** to improve capacities

- Removes fouling
- Restores capacity and can double existing capacity = free energy from the same well

## 3. Corrosion and scaling control

- Some of the most corrosive wells in the world are now in production thanks to new advanced technologies

# Online Cleaning Case 1: Three-fold increase in capacity

## Before Cleaning

Flow: 83 m<sup>3</sup>/hr @27barg

Injectivity: 3,07 m<sup>3</sup>/hr/barg

## After Cleaning

Flow: 275 m<sup>3</sup>/hr @26barg

Injectivity: 10,58 m<sup>3</sup>/hr/barg



# Online Cleaning Case 2: Seven-fold increase in capacity

## Before Cleaning

Flow: 50 m<sup>3</sup>/hr @50 barg

Injectivity: 1,00 m<sup>3</sup>/hr/barg

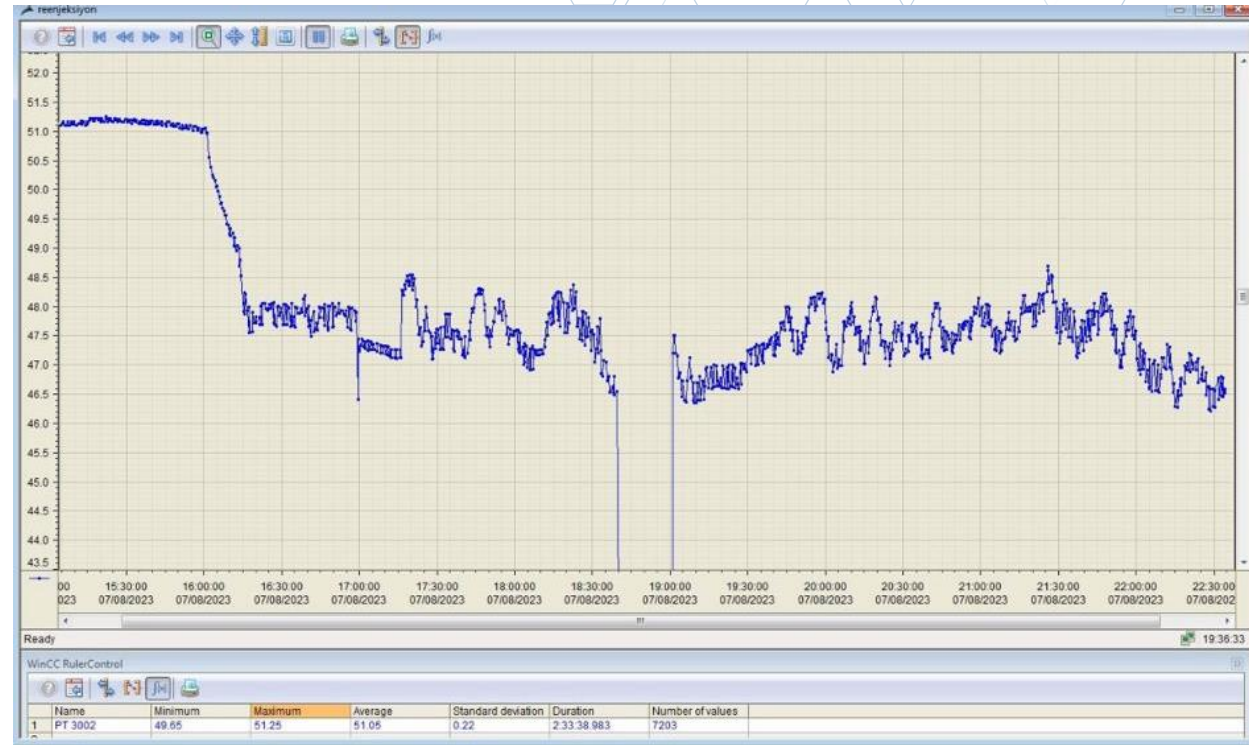
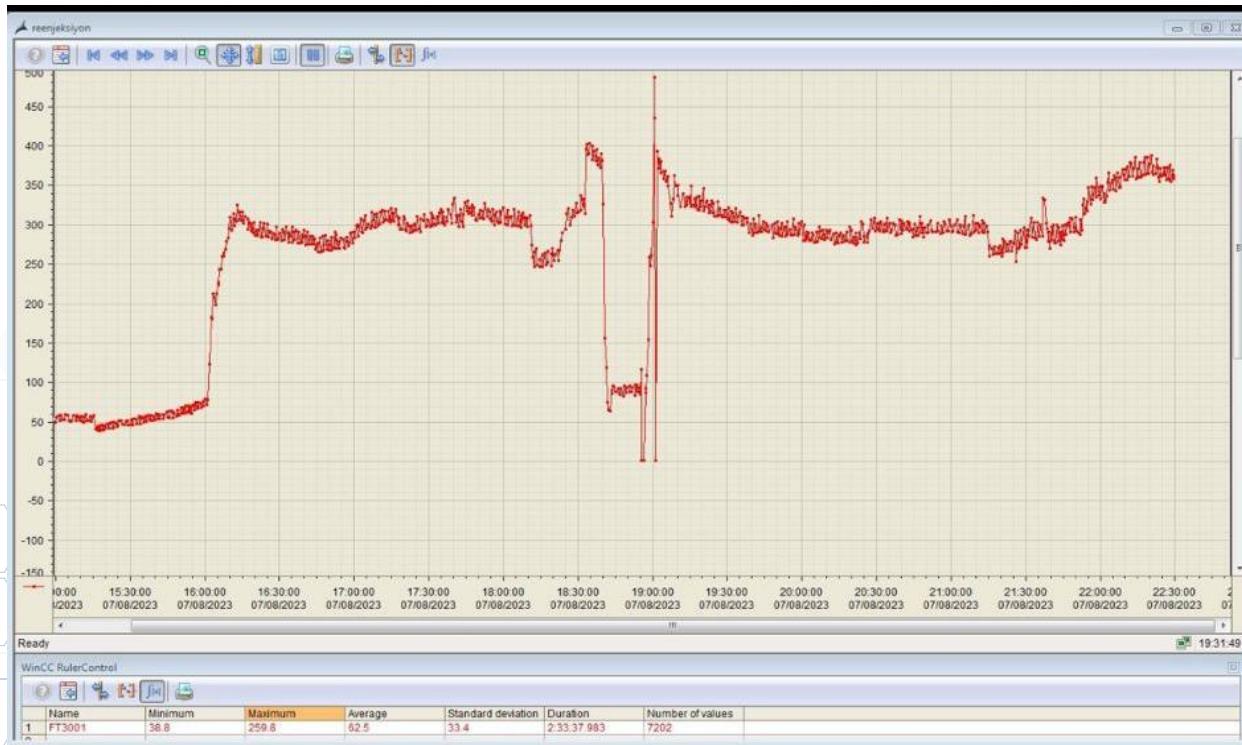
## Flow

## After Cleaning

Flow: 350 m<sup>3</sup>/hr @27barg

Injectivity: 7,44 m<sup>3</sup>/hr/barg

## Pressure



# Online Cleaning Case 3: Eight-fold increase in capacity

## Before Cleaning

**Flow:** 44 m<sup>3</sup>/hr @ 46barg

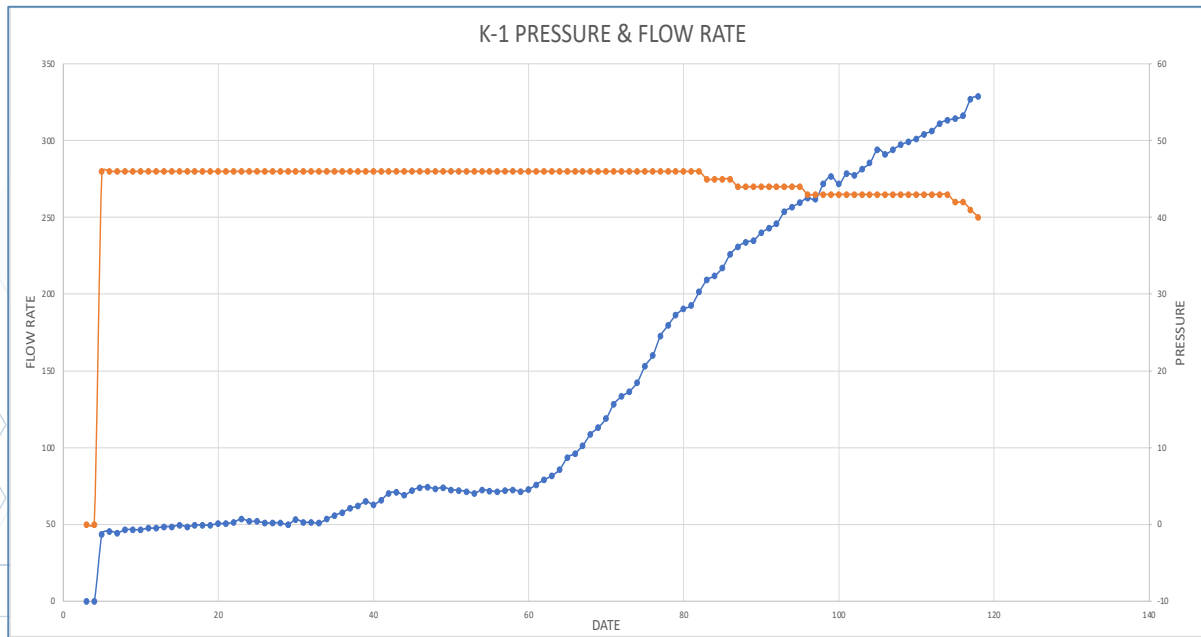
**Injectivity:** 0,95 m<sup>3</sup>/hr/barg

## After Cleaning

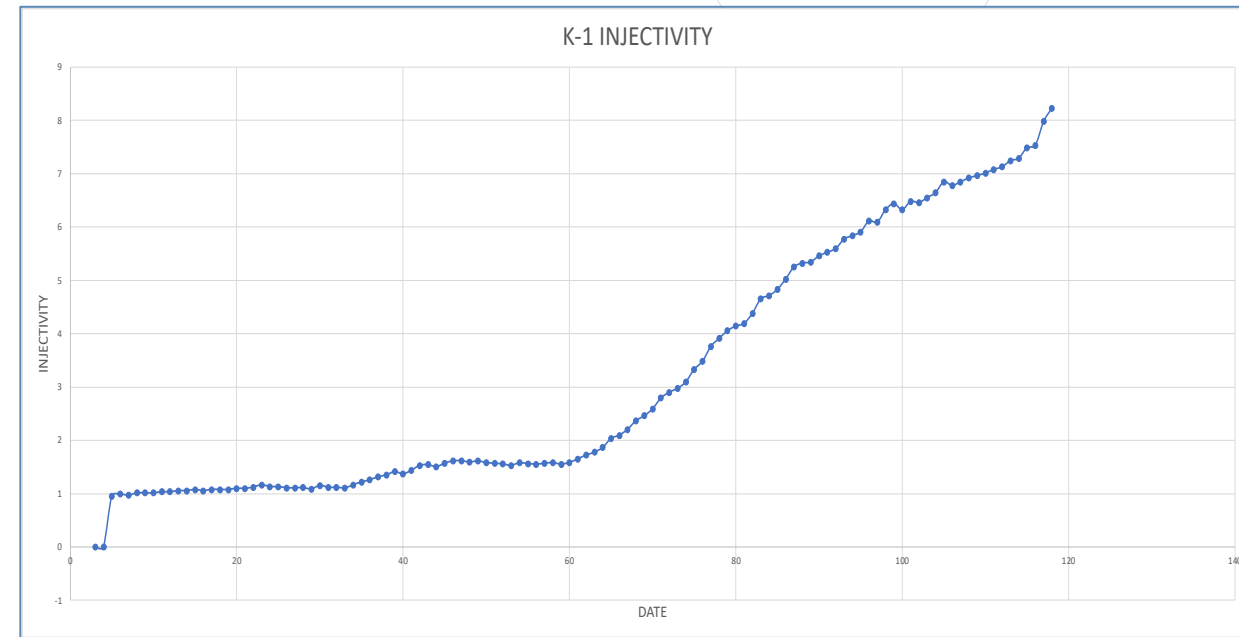
**Flow:** 330 m<sup>3</sup>/hr @ 40barg

**Injectivity:** 8,23 m<sup>3</sup>/hr/barg

### Pressure & Flow



### Injectivity





## In Summary

1. New technologies have allowed plants to increase their capacities and income without drilling new wells. This is a **FIRST** in Geothermal history for formation scaling
2. Cleaning and recovering capacities easily and economically, have avoided significant costs for operators. Results are significantly cheaper, better and safer than old techniques
3. World class R&D have allowed some of the most acidic wells in the world to be put into production. Implication for EGS systems and secondary use.
4. Over €200 million in savings to the industry

# THANK YOU

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