

## CASE HISTORY

# STEAM INJECTION IDENTIFICATION GREATLY INCREASES PRODUCTION RATES

### APPLICATION

Steam Injection

### TECHNOLOGY

Vulcan™ FLS 1.44 & 1.75  
(Flow Logging System)

### LOCATION

Middle East

### CUSTOMER CHALLENGE

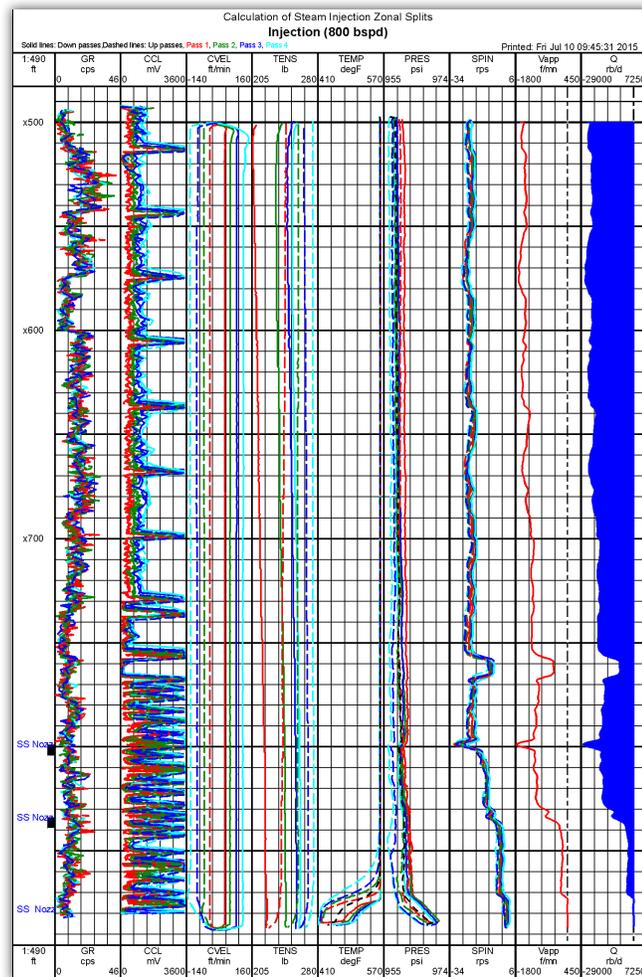
Certain heavy oil fields in the Middle East are subject to thermal enhanced oil recovery techniques to optimize production rates. The customer was challenged with maintaining specific injection rates of steam into targeted zones to follow the reservoir hydrodynamic model. The steam is heated to 600°F, at rates up to 1,200 bbl and 1,200 psi, which would require the customer to identify the flow profile across the steam injection nozzles.

### SCIENTIFIC SOLUTION

Scientific Drilling utilized their Vulcan™ FLS 1.44 & 1.75 tools to log 840 wells in an 18-month period and deliver reports within 24 hours. This was achieved by using their worldwide overseas processing centers in Aberdeen, Thailand and the U.S.A. to provide the data reports within the required timeframe. With such high temperature environments, all tools were heat shielded and able to operate at temperatures up to 600°F. SDI developed a system to provide a complete conveyance and pressure control package. Experienced field personnel and operators had to work shifts to support the non-stop operations, in order to complete two jobs per day as required. SDI has also conducted spinner sensitivity analysis at different steam injection rates for various spinner impeller pitch sizes to identify a response scheme in different injection rates. Knowing the optimum pitch at a given injection rate, will help in the calculation of accurate zonal splits.

### CUSTOMER VALUE

SDI provided the customer with a superior understanding of their reservoir performance and injection profiles for the different completion injectors. Utilizing the results obtained from the data acquisition campaigns, the customer was able to execute workovers to remedy operational and production deficiencies. SDI helped the customer map the steam flow regime inside the reservoir by matching the real flow and calculated rates in the reservoir dynamic model, ultimately increasing production. Due to SDI's ability to provide quality data during the term of the workorder, a multi-year project extension was awarded.



### STEAM INJECTION PROFILING LOG (IPL)

Log showcasing steam injection zonal contributions

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