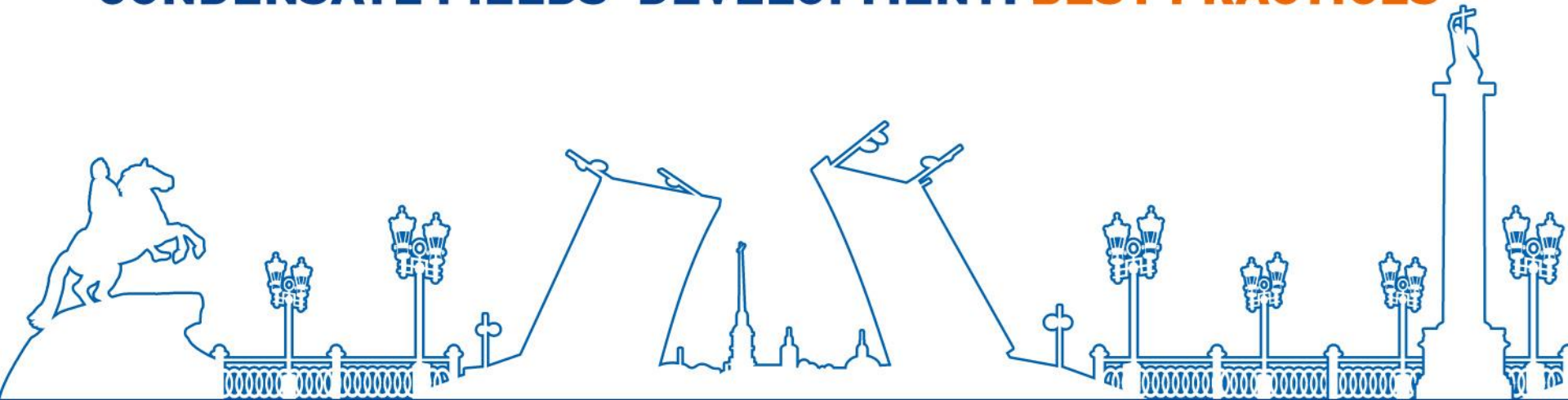


# INTEGRATED MANAGEMENT OF OIL AND GAS CONDENSATE FIELDS' DEVELOPMENT: **BEST PRACTICES**



## Production Control and Monitoring Strategies

Dr. Arthur Aslanyan, Nafta College

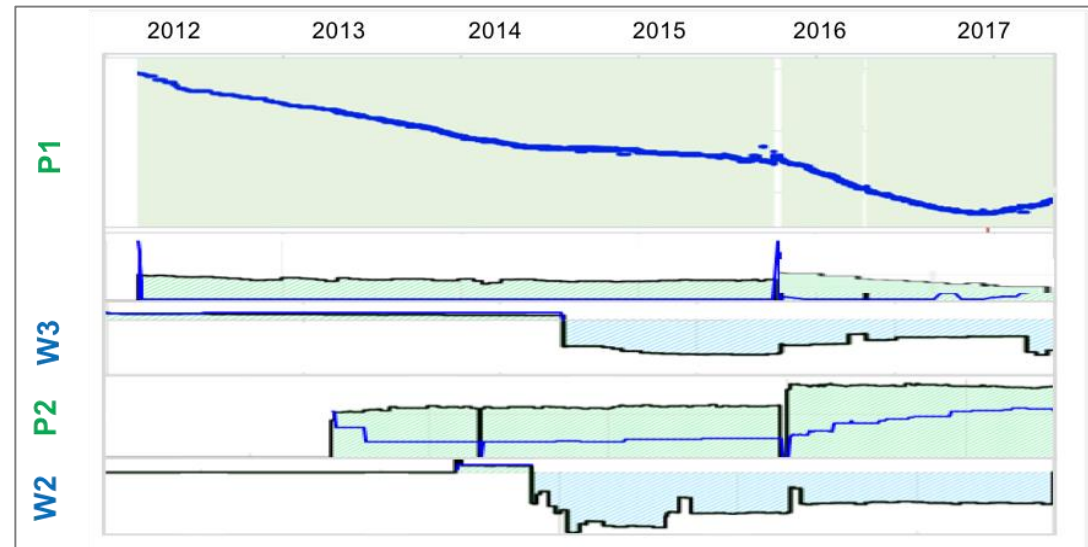
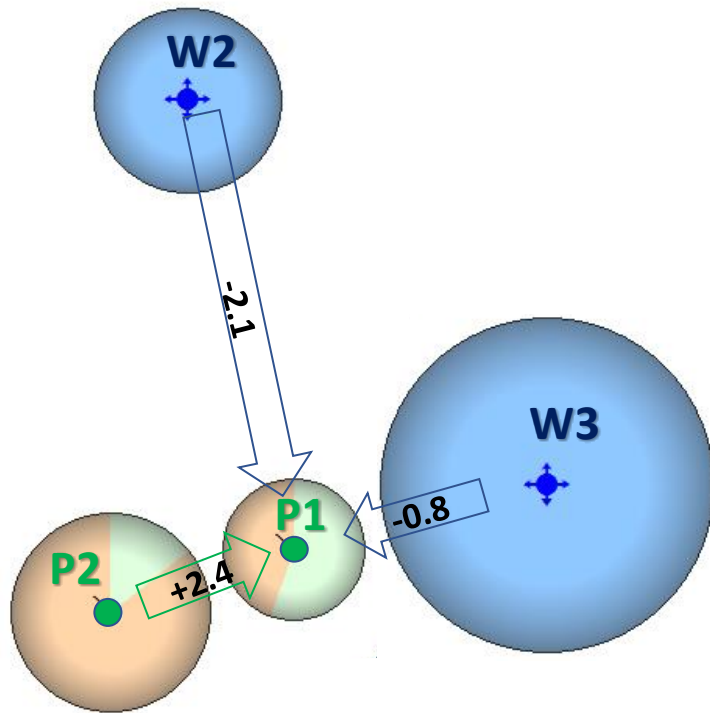
# PRODUCTION CONTROL AND MONITORING WORKFLOW

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# PRODUCTION ANALYSIS

Diagnostic issues – Dual-well analysis or non-physical correlations

Technology challenge – Multi-well production & pressure history auto-matching



## Multi-well Deconvolution

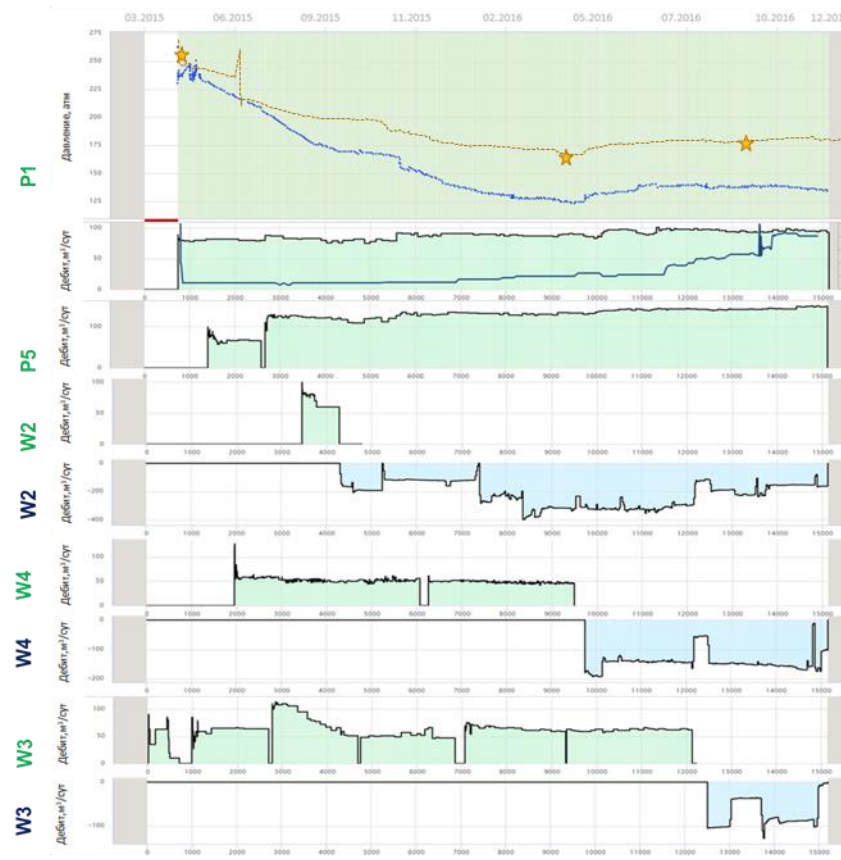
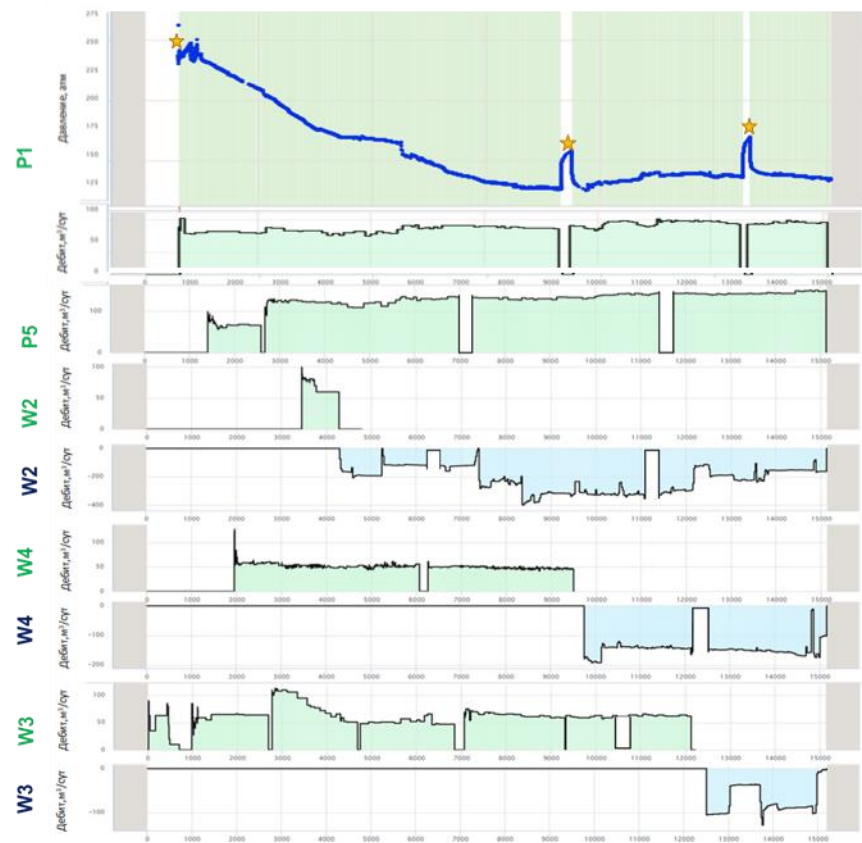
# FIELD-WIDE FORMATION PRESSURE

Diagnostic issues – Poor coverage and production loss

WITH PRODUCTION LOSSES (10%)

Technology challenge – Multi-well production & pressure history auto-matching

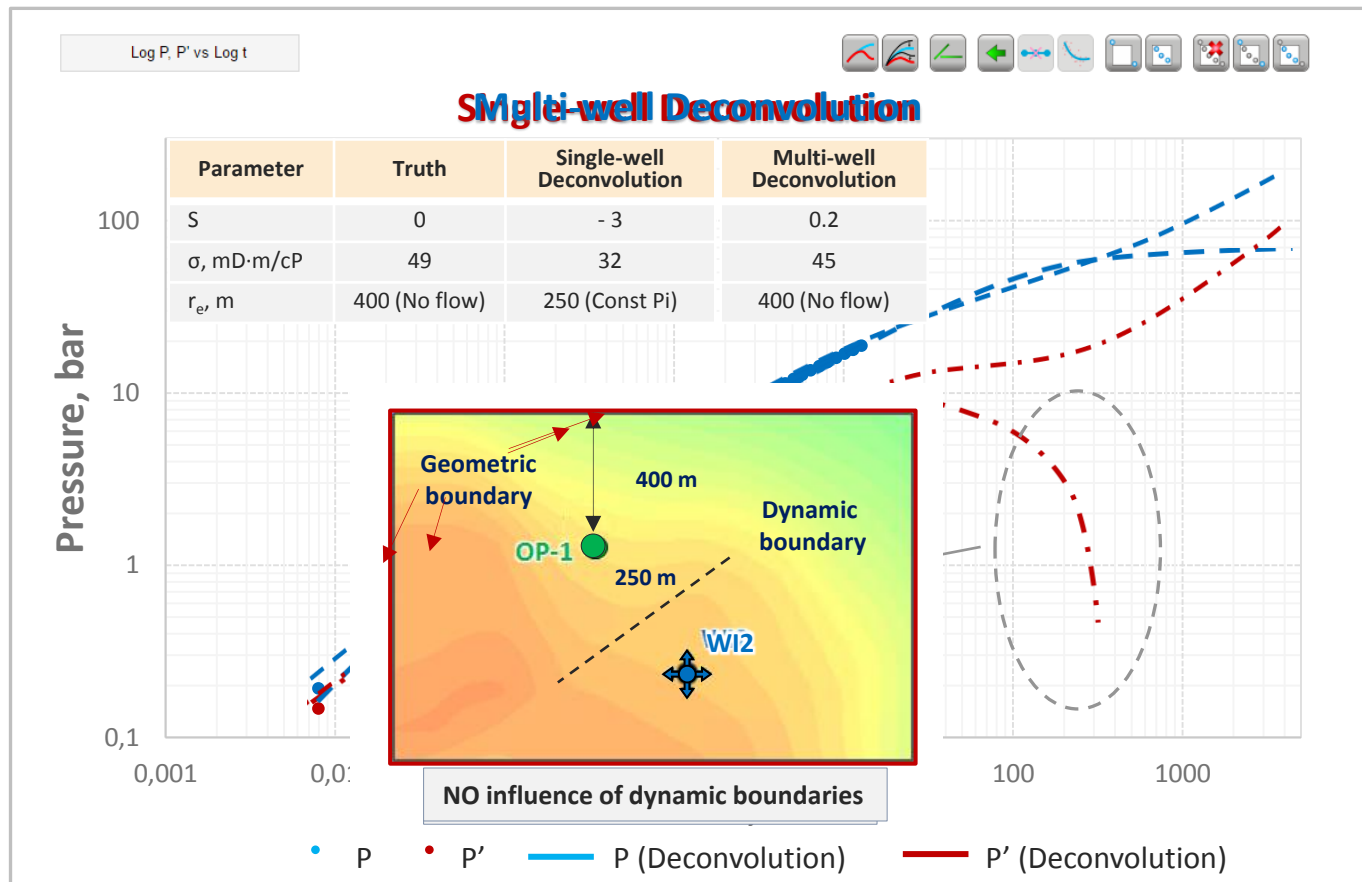
WITHOUT PRODUCTION LOSSES (10%)



# WELL TEST ANALYSIS – TRUE RESERVOIR PROPERTIES AND BOUNDARIES

Diagnostic issues – True reservoir properties and boundaries are affected by offset production

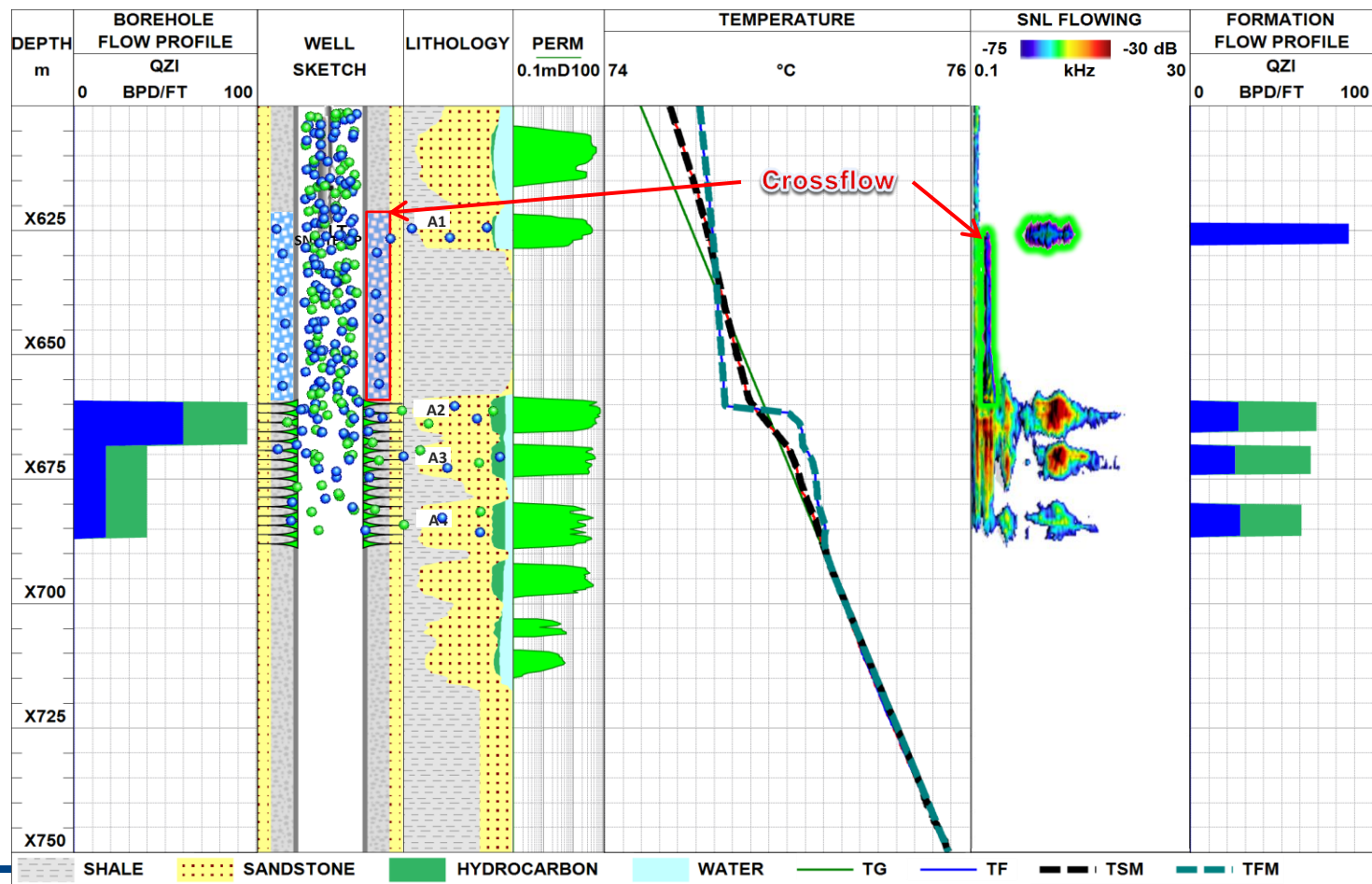
Technology challenge – Using the multi-well deconvolution



# PRODUCTION LOGGING – NEAR-WELLBORE INFLOW PROFILE

Diagnostic issues – PLT and Temperature is missing down world thief production

Technology challenge – Spectral Noise Logging

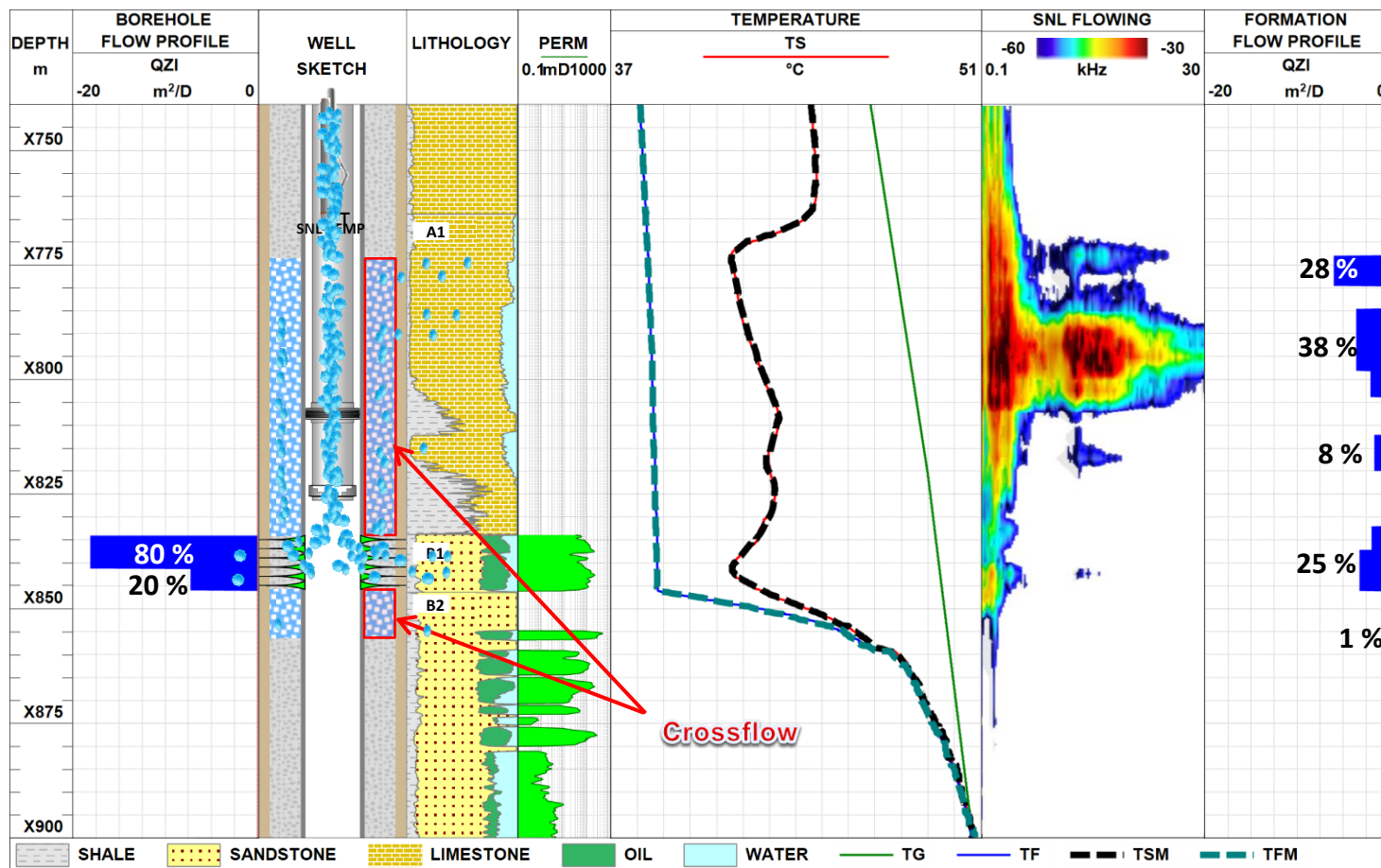




# PRODUCTION LOGGING – NEAR-WELLBORE INJECTION PROFILE

Diagnostic issues – Injection loss is not quantifiable

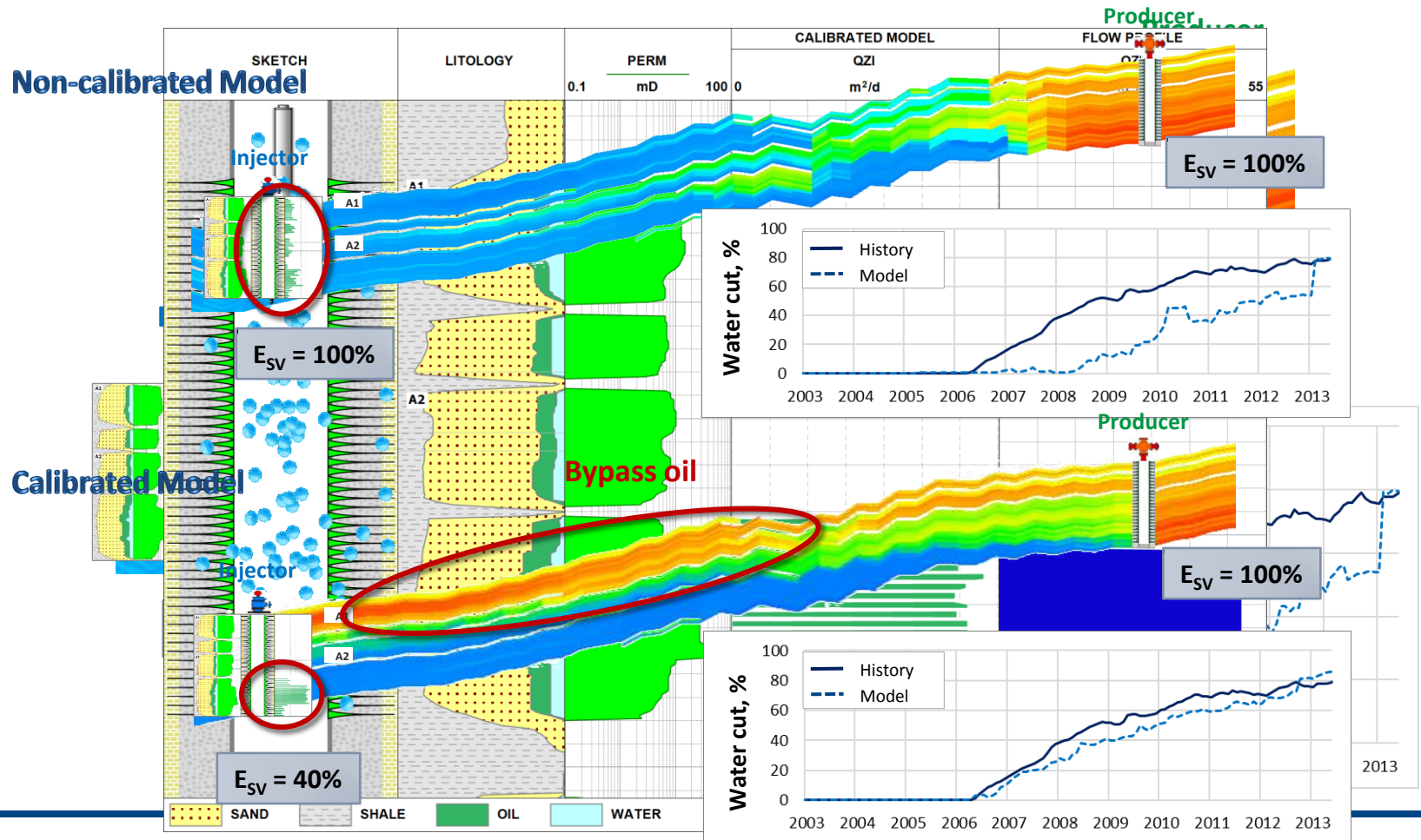
Technology challenge – Numerical modeling of multi-rate temperature logging



# 3D MODEL CALIBRATION – TRUE SWEEP PROFILE

Modeling issues – Inaccurate sweep profiles

Technology challenge – Calibrate production /injection profiles and shale breaks



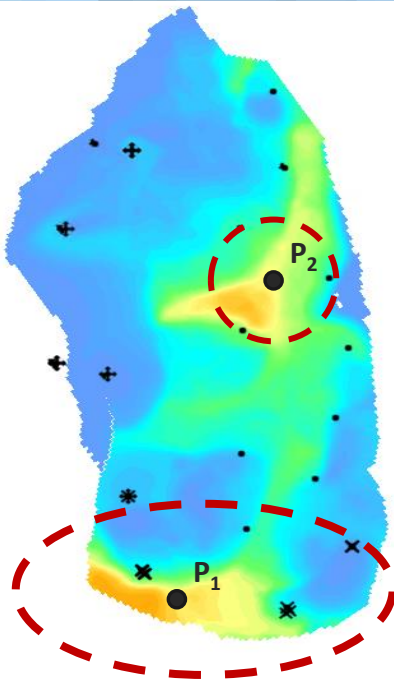


# PRODUCTION OPTIMIZATION – PLANNING TOOLS AND METHODOLOGY

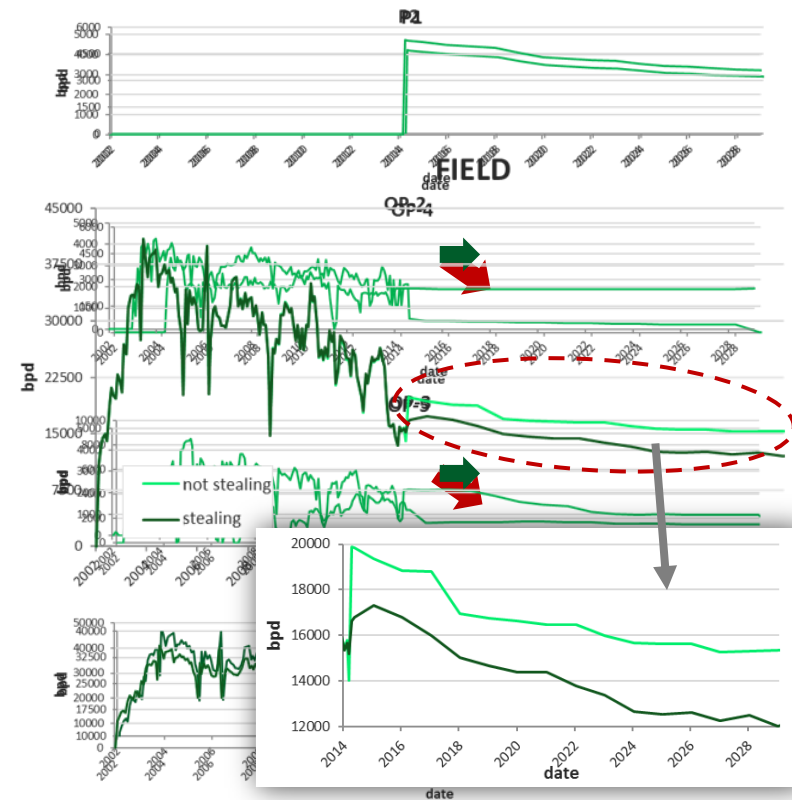
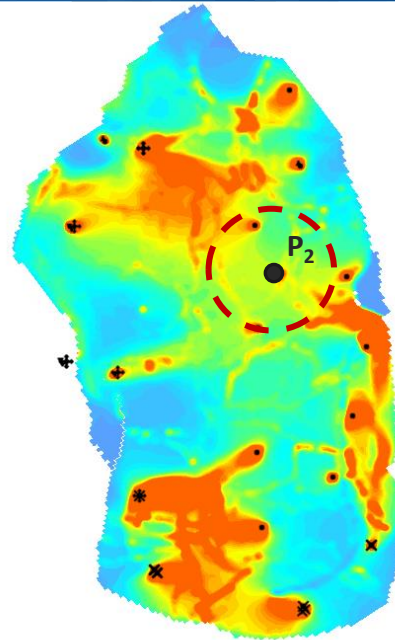
Modeling issues – Non-optimal sequence of production optimization activities

Technology challenge – Automatic selection and grading of candidates

Oil Reserve Density Map



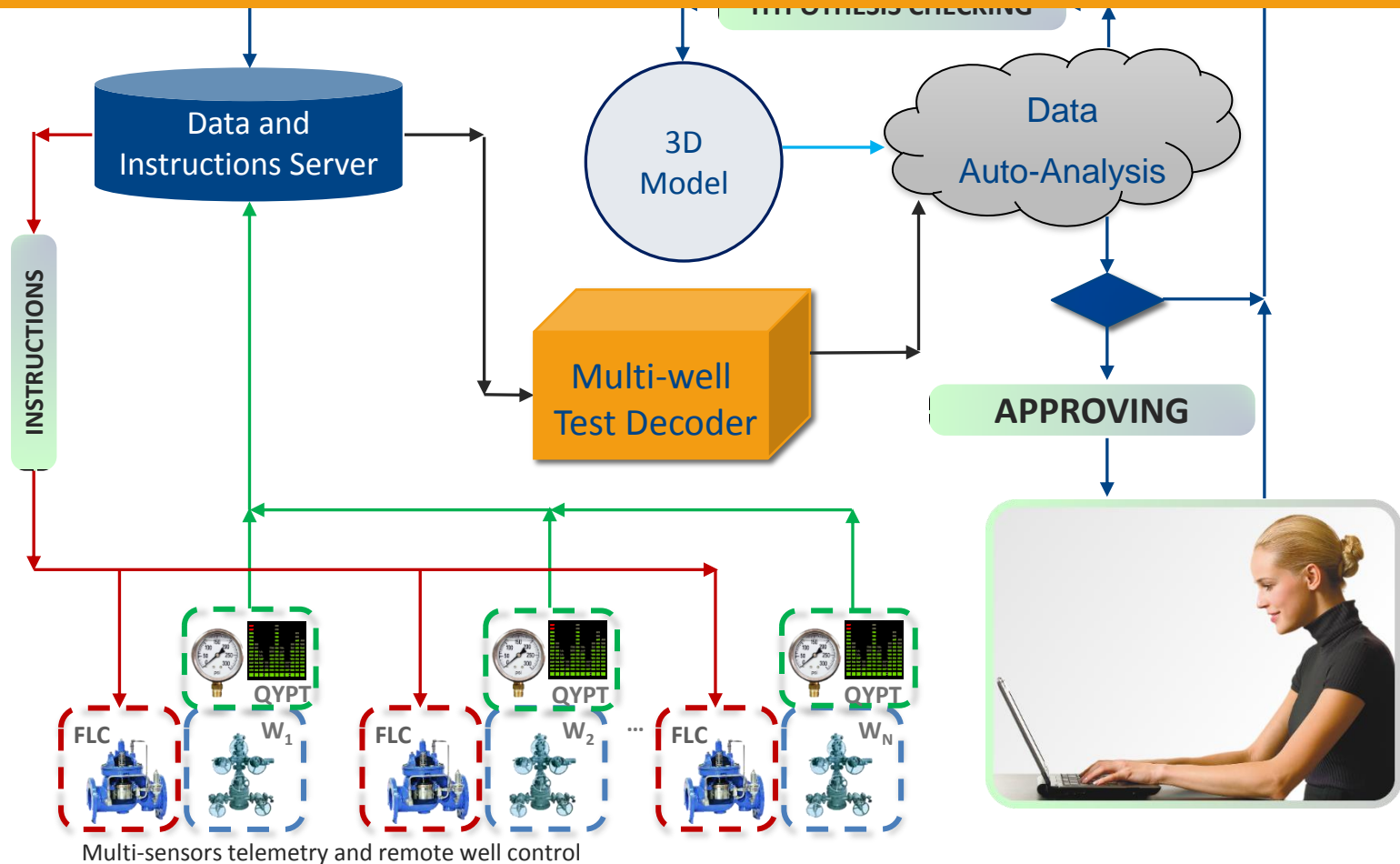
Oil Reserve Mobility Map



# CONTROL & MONITORING SCALABILITY

Control and Monitoring issues – Subjective, man-based, under-resourced process

Technology challenge – Automated pro-active monitoring and data analysis



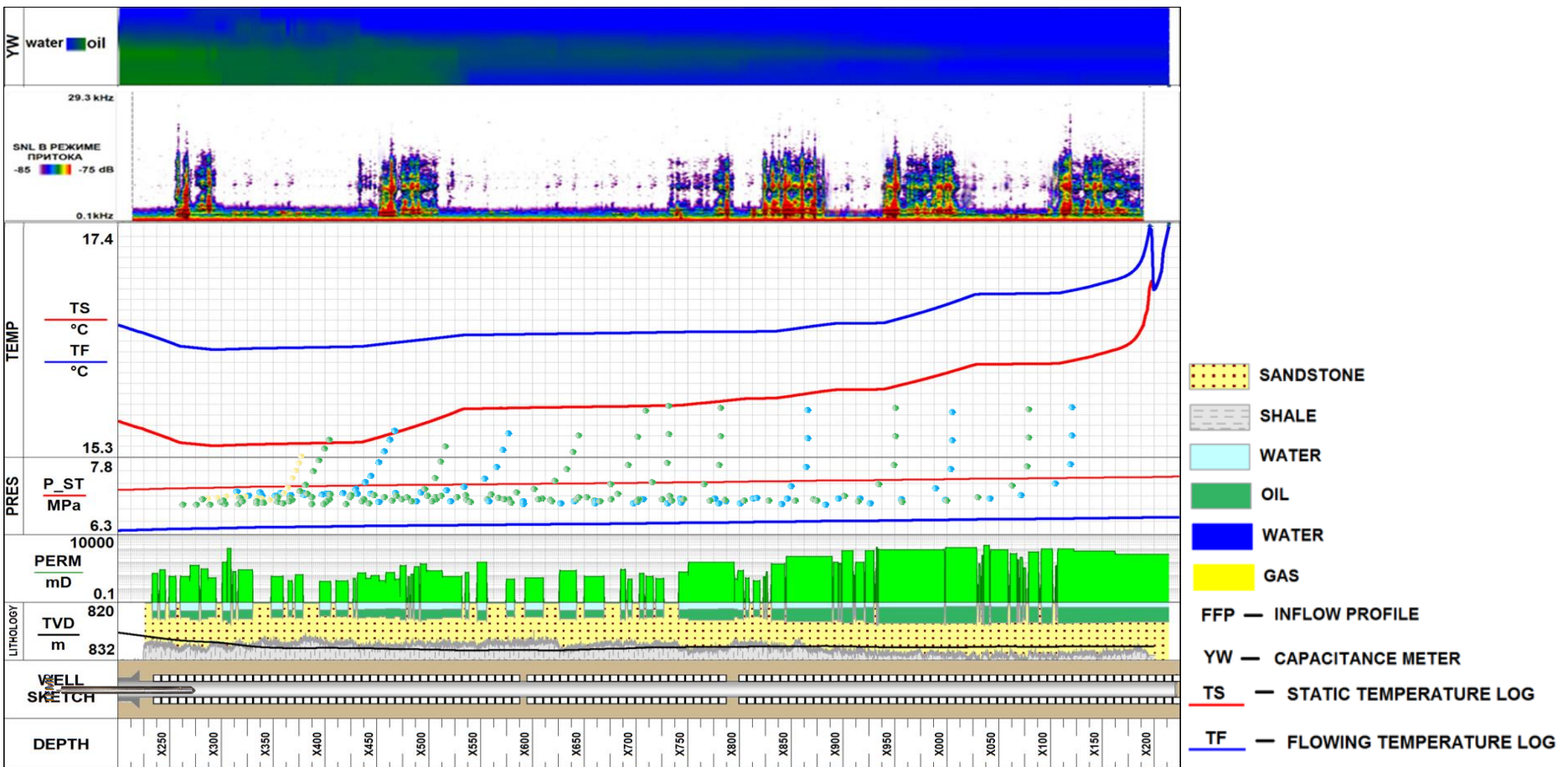
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**THANK YOU!**

# WELL TEST ANALYSIS – PULSE NEUTRON LOGGING – HORIZONTAL WELLS

Diagnostic issues – Identifying of the zones with water and gas invasion

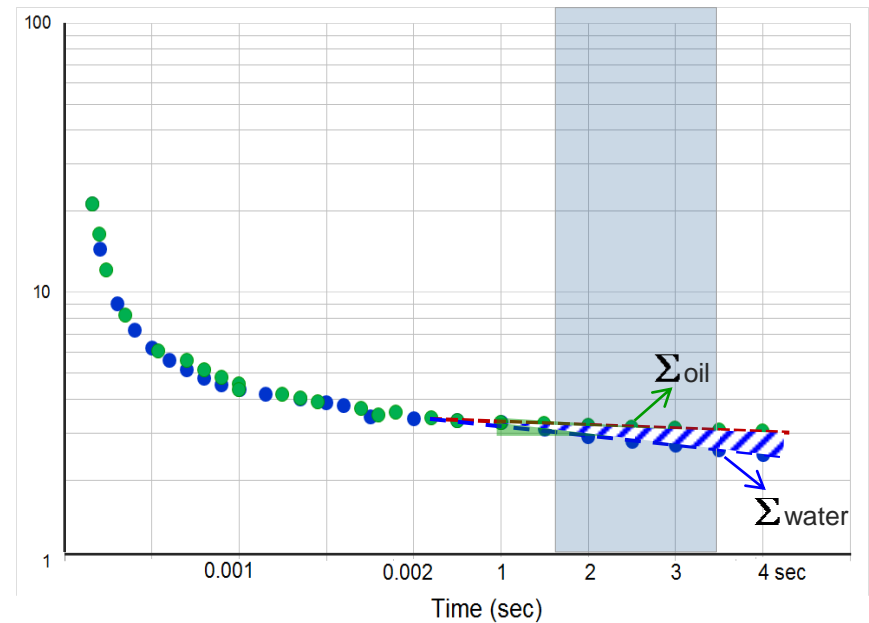
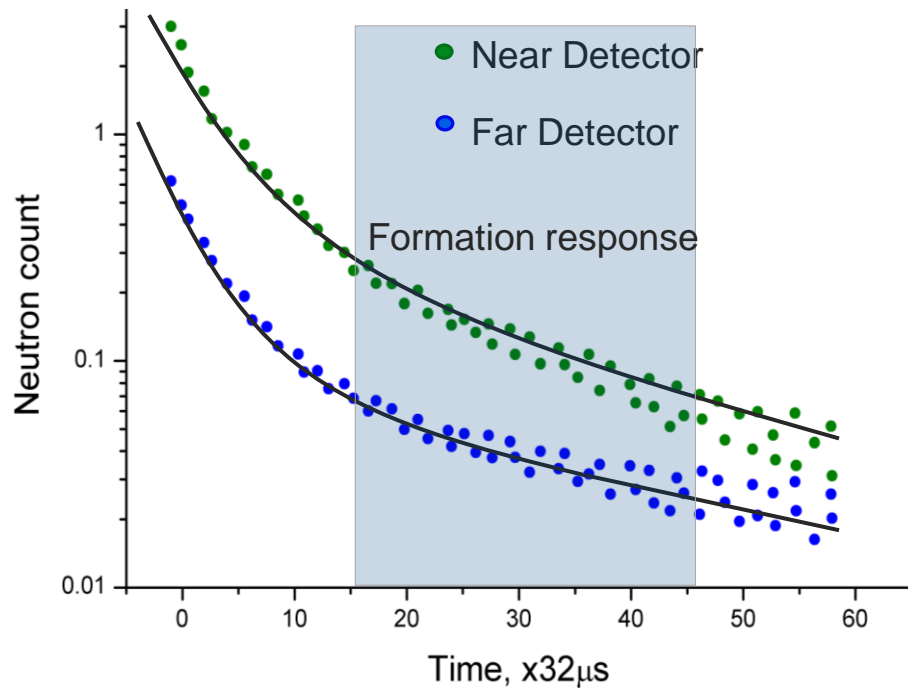
Technology challenge – Developing the memory PNL tool



# WELL TEST ANALYSIS – PULSE NEUTRON LOGGING – LOW SALINITY

Diagnostic issues – Identifying of the zones with fresh water invasion

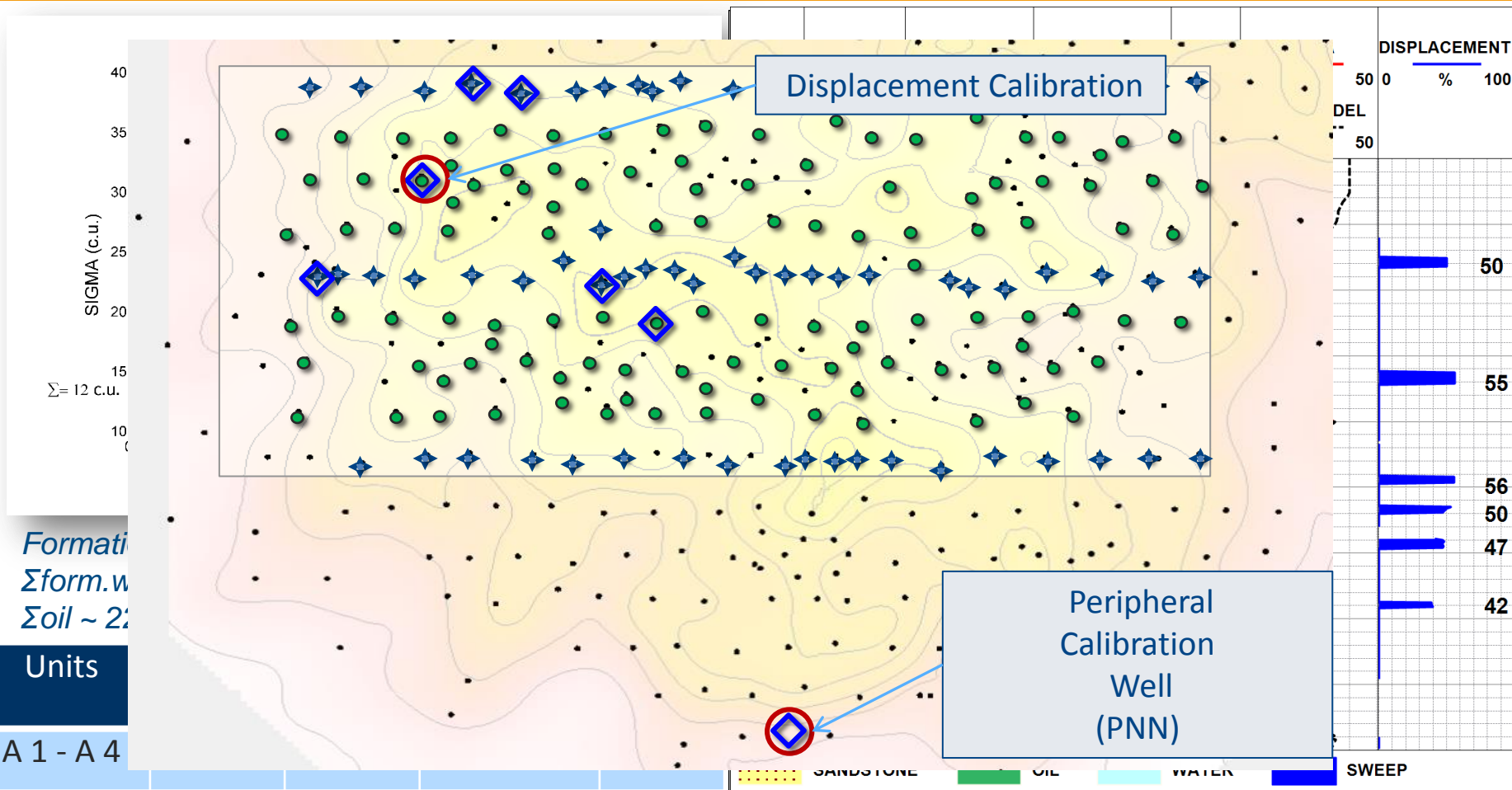
Technology challenge – Developing the PNN tool with long counting of neutrons



# WELL TEST ANALYSIS – PULSE NEUTRON LOGGING – CALIBRATION

Diagnostic issues – Estimation of displacement

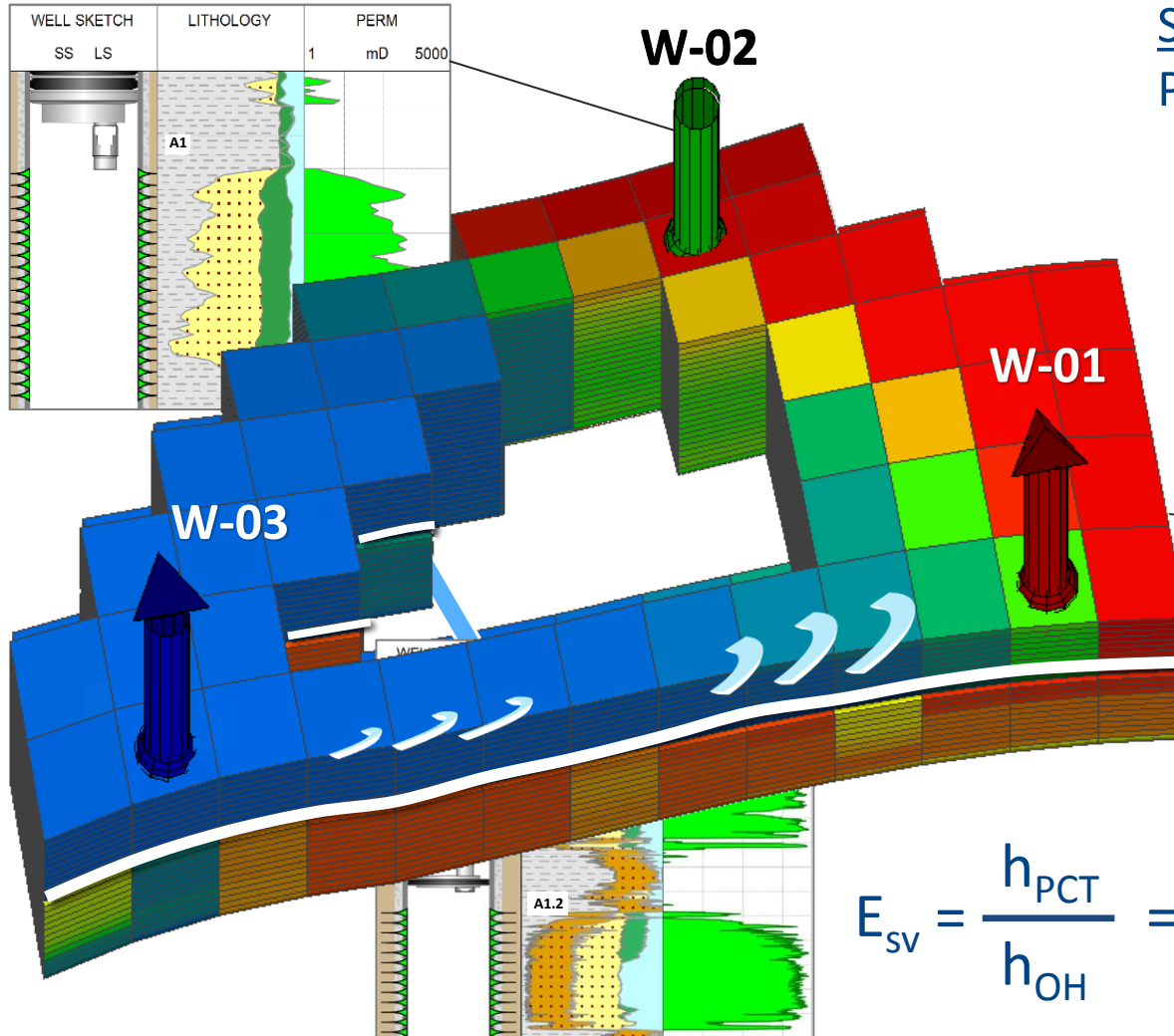
Technology challenge – Conducting the PNN survey in the calibration wells





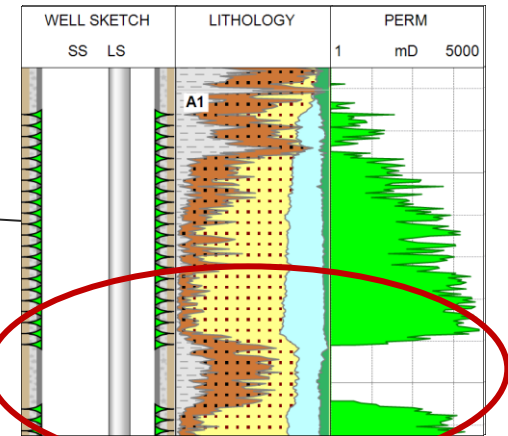


# 3D MODEL CALIBRATION – SHALE BREAKS



Survey:

Pressure Pulse Code Test (PCT)



$$E_{sv} = \frac{h_{PCT}}{h_{OH}} = \begin{cases} 0.8 & \text{3D Survey} \\ 0.4 & \text{Field Survey} \end{cases}$$

# 3D MODEL CALIBRATION – TRUE AIR PERMEABILITY

Modeling issues – Inaccurate air permeability calibration

Technology challenge – Multi-well statistics on air permeability from PTA-SNL and cross-well interference

After calibration

