

# TomskGAZPROMgeofizika Geophysical Services

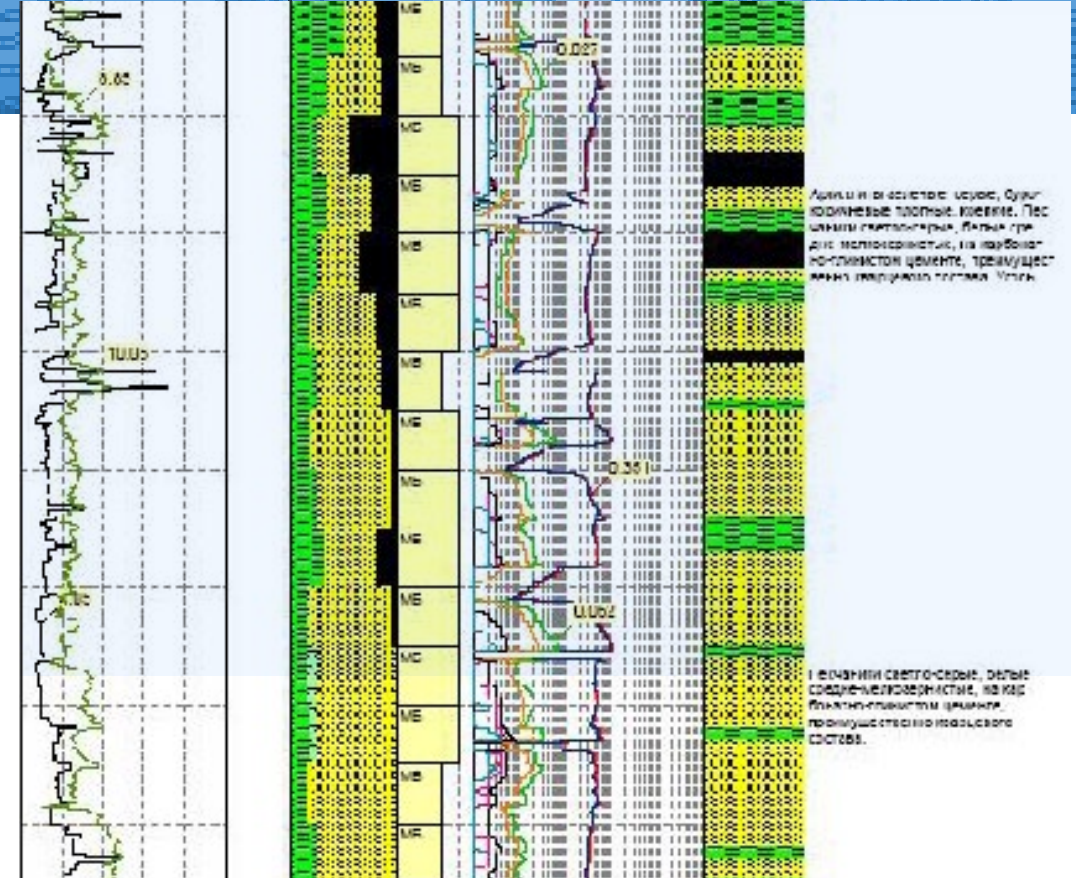
We provide full range of well logging and mud logging operations, cement quality control, MWD and well engineering services throughout Western and Eastern Siberia.

Over 15 years of top quality operation, we have been part of 150 projects, including construction engineering services for Vostok 1 and Vostok 3 super deep (more than 5000 m) stratigraphic wells in Tomsk region, and geological exploration services for Vankor oil field in Krasnoyarsk region.



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# Company Profile

- Logging while drilling
- Logging while drilling in horizontal wells
- Well perforation
- Well stimulation
- Mud logging
- Production logging for reservoir management and well workover purposes
- Downhole drilling telemetry for all well types, including horizontal wells and sidetracks



# TomskGAZPROMgeofizika





**Our operations bases and storage facilities are strategically located around Tomsk region:**

The town of Kedrovyy - Operations base and explosives storage

Myldzhin gas condensate field - Operations base and explosives storage

The town of Strezhevoy - Operations base



**TomskGAZPROMgeofizika**





We employ qualified personnel capable of running logs in both oil and gas wells and performing full range of well servicing operations.

Of the 400 company employees, more than 70% hold university degrees in engineering and have extensive industry experience.

The core of the company is comprised of Tomsk Polytechnic University graduates majoring in Geophysical Exploration.



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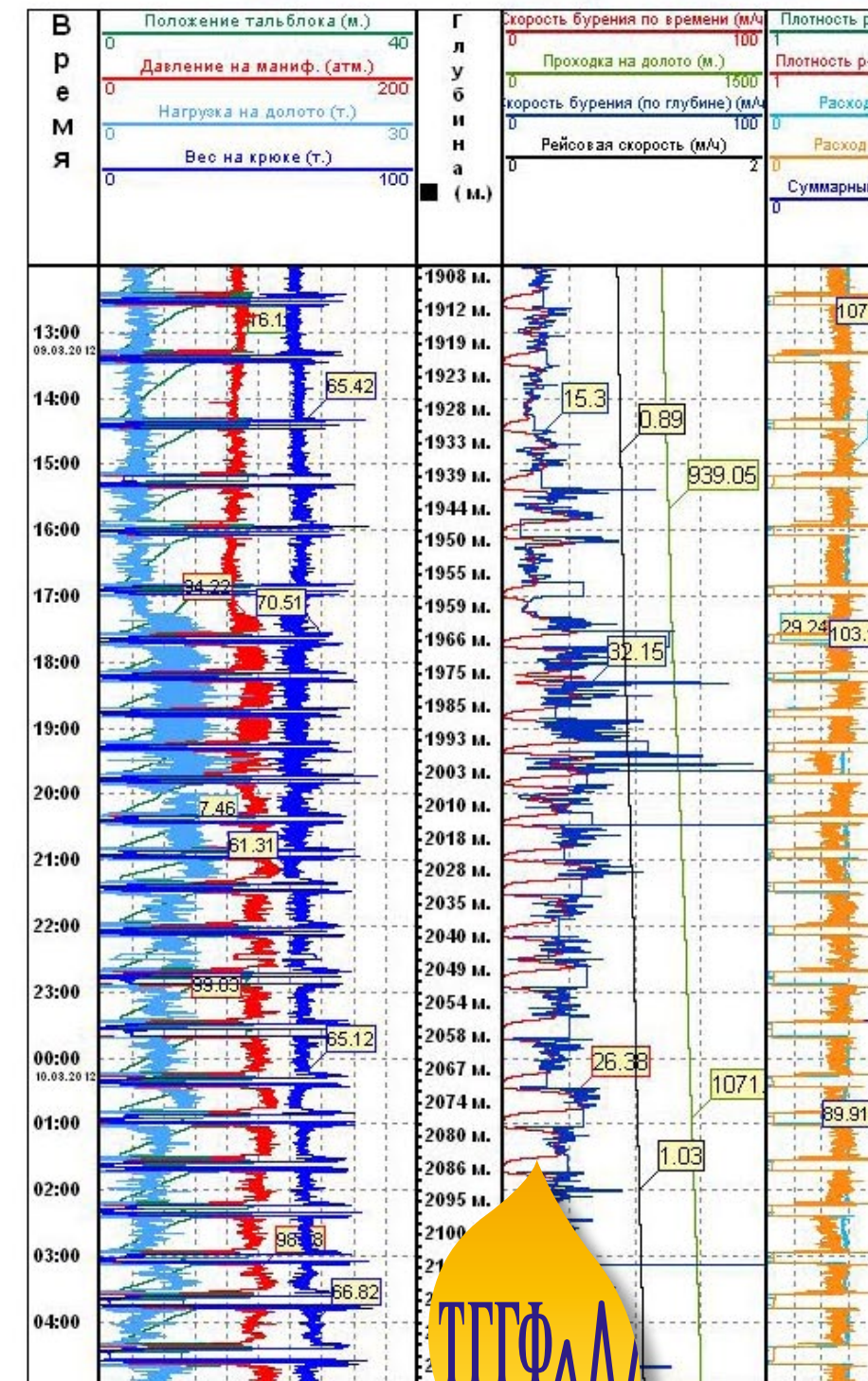


We provide the following solutions to our customers:

## Technology

- Early detection of oil/gas shows and lost circulation
- Well deepening optimization
- Optimum drilling mode selection and maintenance
- Real-time detection of alarm conditions
- Well conditioning and casing control
- Well cementing control
- Well steering

Страна Площадь Скважина Куст	Россия	Заказчик УБР Исполнитель Экспедиция
Цель бурения Тип скважины Проектная глубина Операторы:	поисково-оценочная Наклонно - направленная 2540 Клочан А.Ю	Партия № Нач. партии Тип станции Форма: Диаграмм



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We provide the following solutions to our customers:

## **Geology and Geophysics**

- Optimization of G&G data acquisition techniques
- Lithostratigraphic interpretation
- Identification of marker beds
- Reservoir identification and saturation interpretation
- Well path and well integrity control

Modular logging tools are used for minimum well downtime.

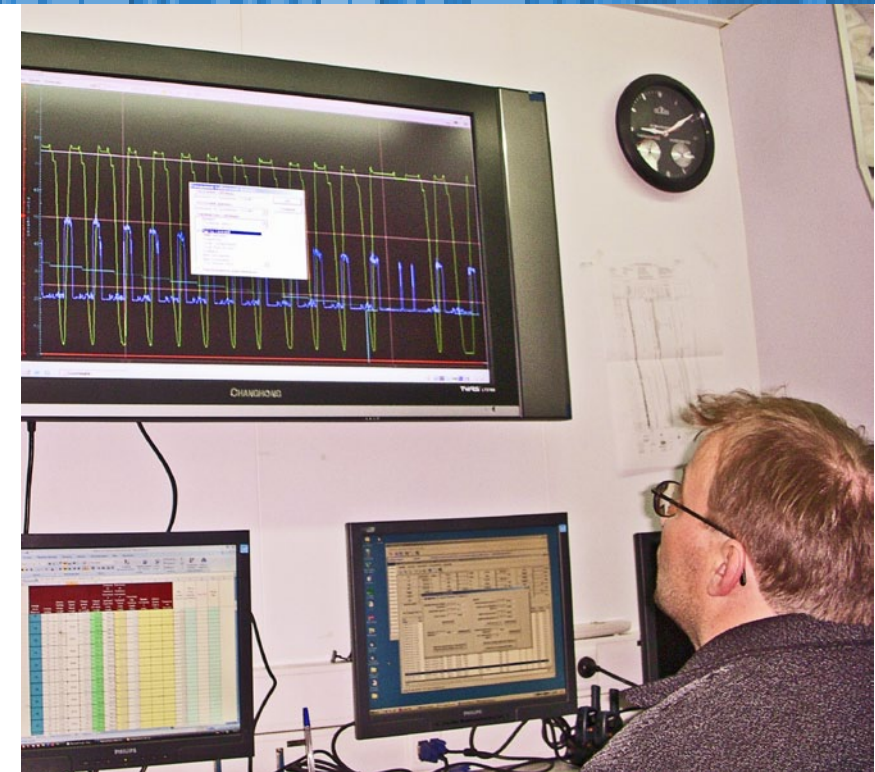




We provide the following solutions to our customers:

## Data Management

- Data is acquired, processed and stored in databases ready for further use
- Data acquired is transferred to the customer in real time





# Logging While Drilling

## In open hole:

- Conventional logging, SP logging, resistivity logging
- Sidewall resistivity logging
- Lateral logging
- Induction logging
- Micrologging, microcaliper logging, microwave logging
- Gamma and neutron logging
- Caliper and profile logging
- High frequency induction logging
- Density logging
- Array sonic logging
- Dip logging
- Thermal logging

## In cased hole:

- Sonic cement bond logging
- Density cement bond logging
- Dip logging
- Nuclear logging
- Thermal logging





# LWD Techniques

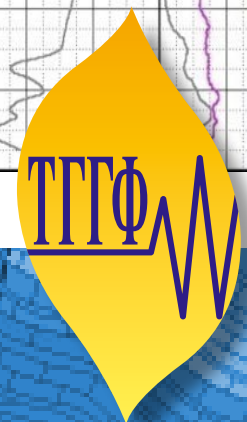
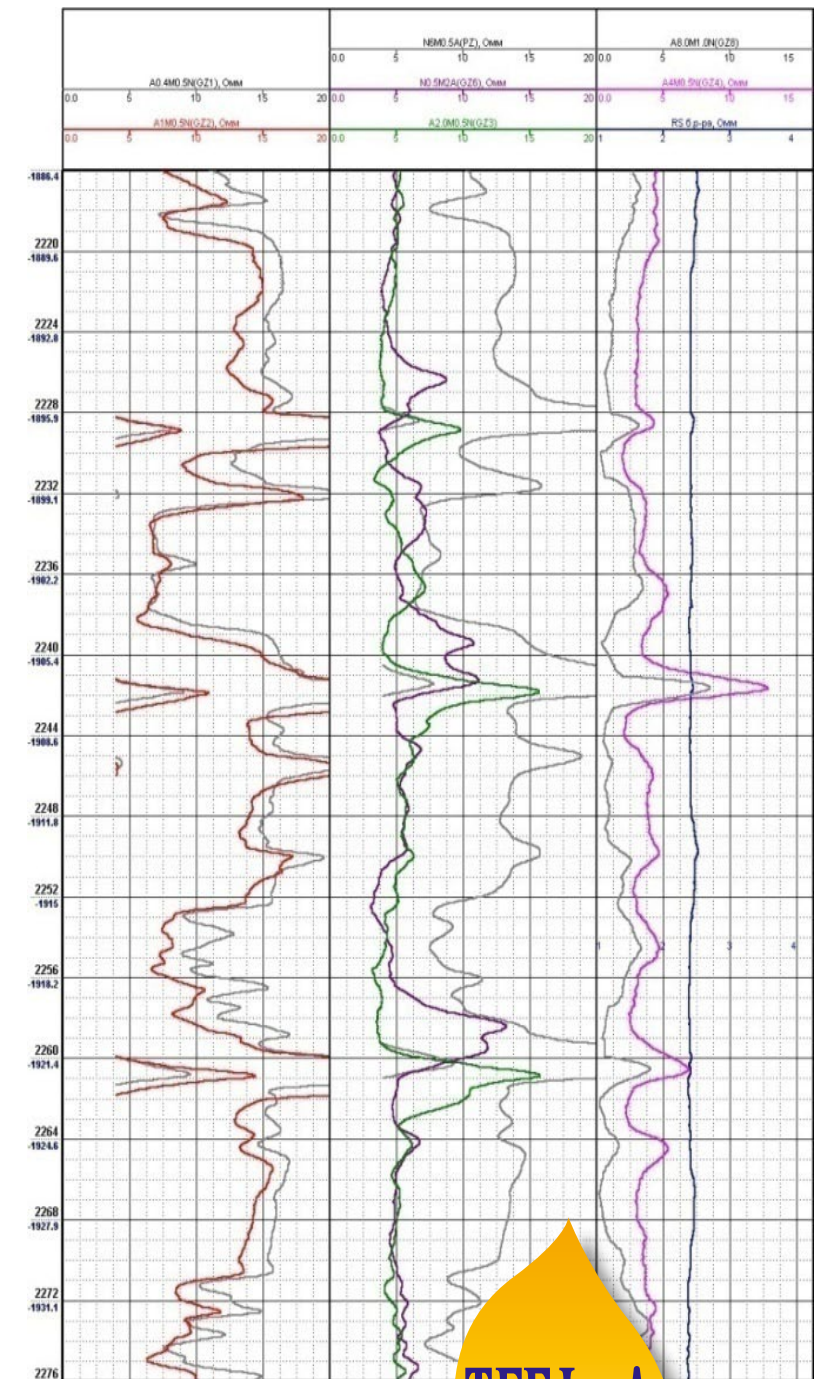
## Sidewall Resistivity Logging:

- formation delineation
- reservoir identification
- porosity determination
- oil-gas saturation determination

Logs are run in each well for well-to-well correlation purposes, stratigraphic interpretation of the penetrated formations, identification of permeable intervals.

## Lateral Logging:

- section stratification, including delineation of thin beds
- resistivity determination in brine-filled wells
- resistivity determination in high-resistivity sections





# LWD Techniques

## SP (Spontaneous Potential)

- section stratification, reservoir identification
- formation evaluation
- shale content determination
- porosity determination

## Mud Resistivity Logging

Mud resistivity data is used for laterolog interpretation.

## Micrologging

- reservoir identification
- detailed stratigraphic section interpretation, identification of dense and permeable beds
- NTG determination
- flushed zone resistivity determination
- identification of radial resistivity gradient





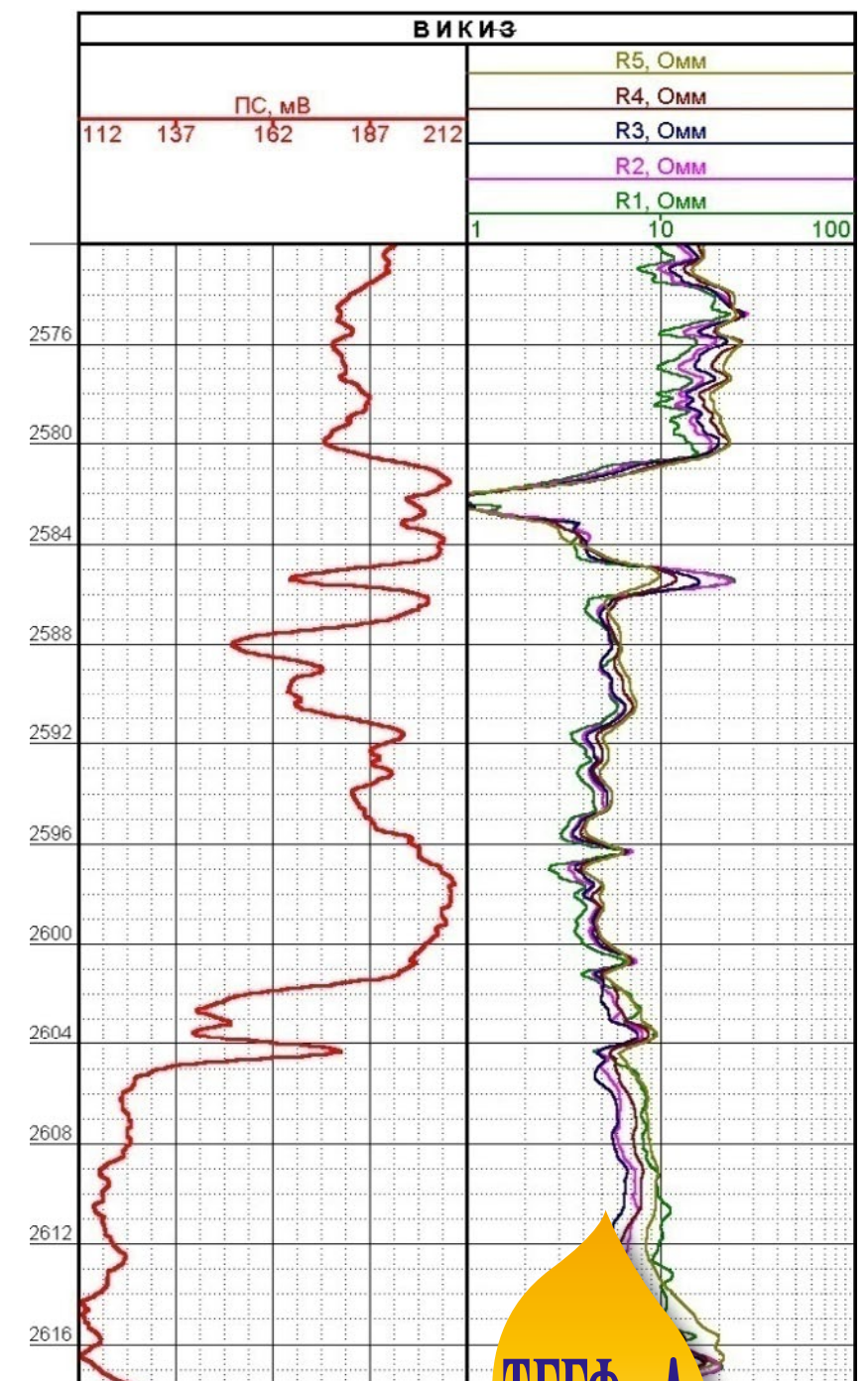
# LWD Techniques

## High Frequency Induction Logging

- formation resistivity determination for oil/gas saturation analysis

Applicable in brine-filled wells.

Applicable in vertical, deviated and horizontal wells.

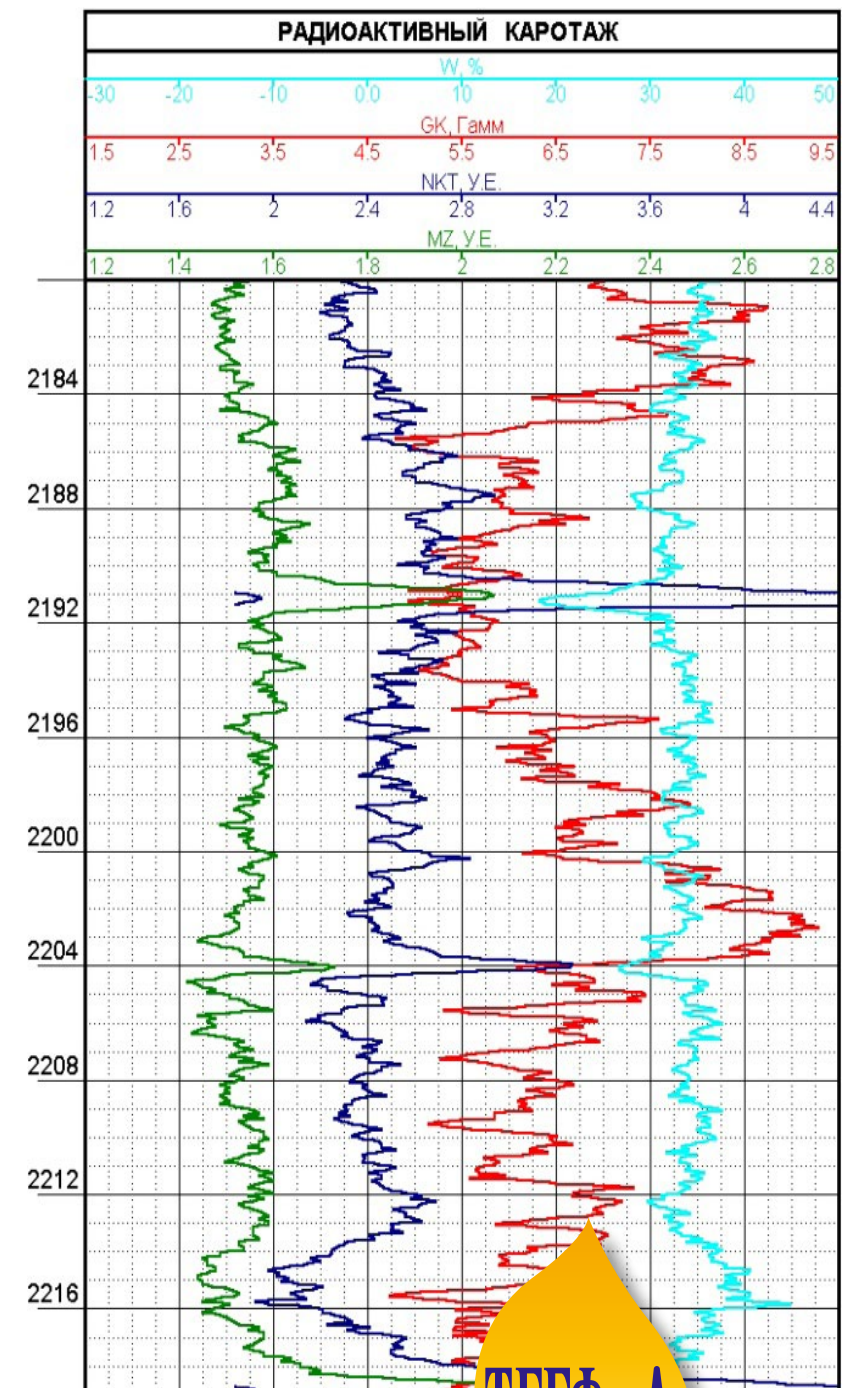




# LWD Techniques

## Neutron and Gamma Logging

- lithostratigraphic interpretation
- well-to-well correlation
- clay content determination
- formation depth positioning
- OGC determination
- casing collar depth positioning
- perforated interval identification and depth positioning
- bulk water content determination
- rock gamma activity determination





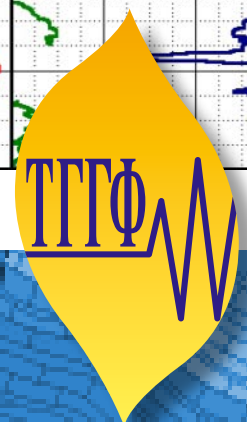
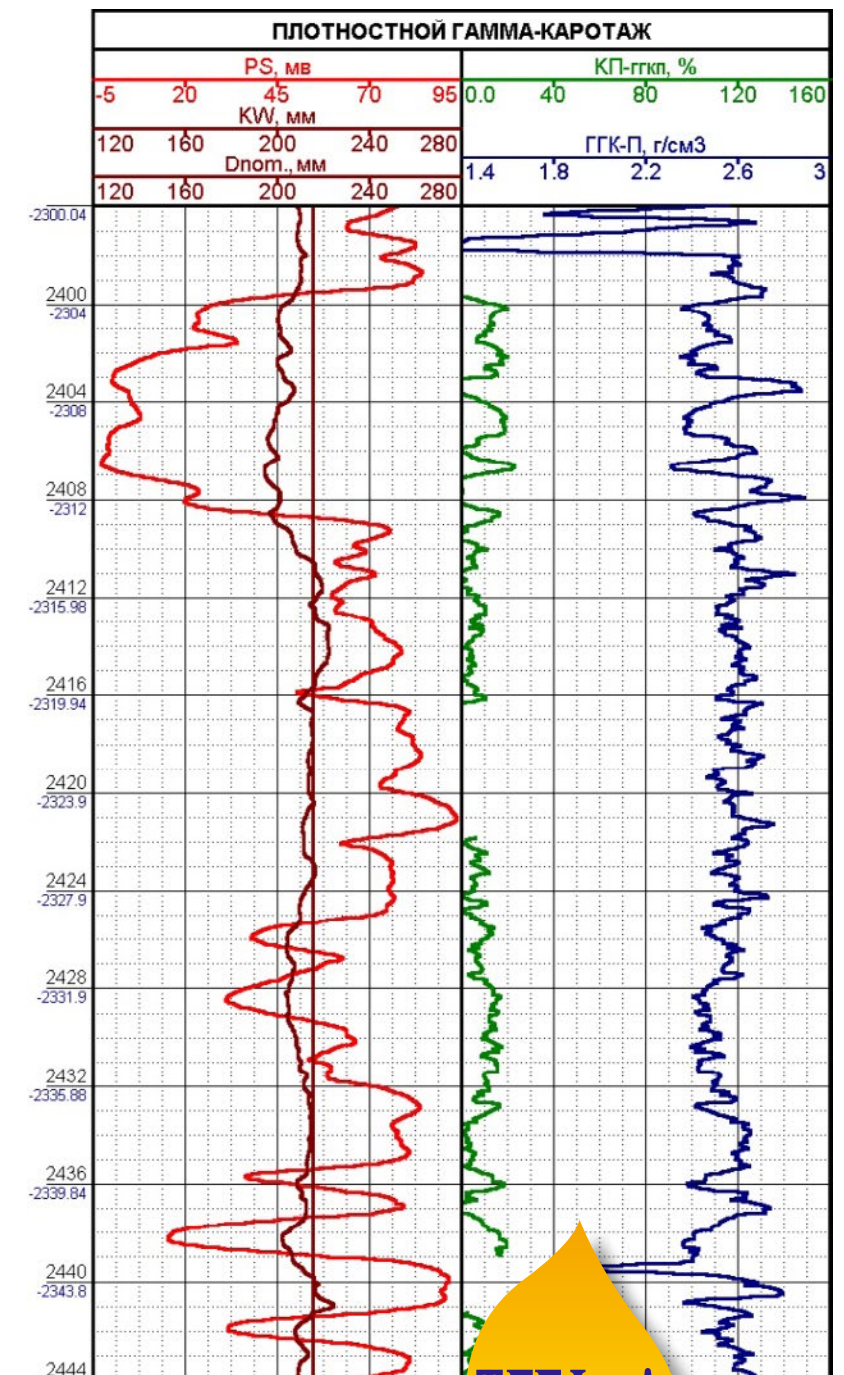
# LWD Techniques

## Density Logging

- rock bulk volume determination
- lithological interpretation
- porosity determination

## Sonic Logging

- lithological interpretation and rock elasticity determination
- primary and secondary porosity determination
- reservoir saturation determination (from sonic array logs)
- fractured and vuggy reservoirs identification
- synthetic seismogram calculation and correlation with seismic data



# LWD Techniques

## Caliper Logging

- annular volume determination for more efficient cement jobs
- determination of optimum surface casing shoe and intermediate casing depth
- determination of optimum drill stem testing interval
- determination of wellbore diameter for laterolog and nuclear log interpretation

## Dip Logging

- determination of wellbore 3D position in open and cased hole
- determination of wellbore section profile with on-site printout
- determination of cased well 3D position



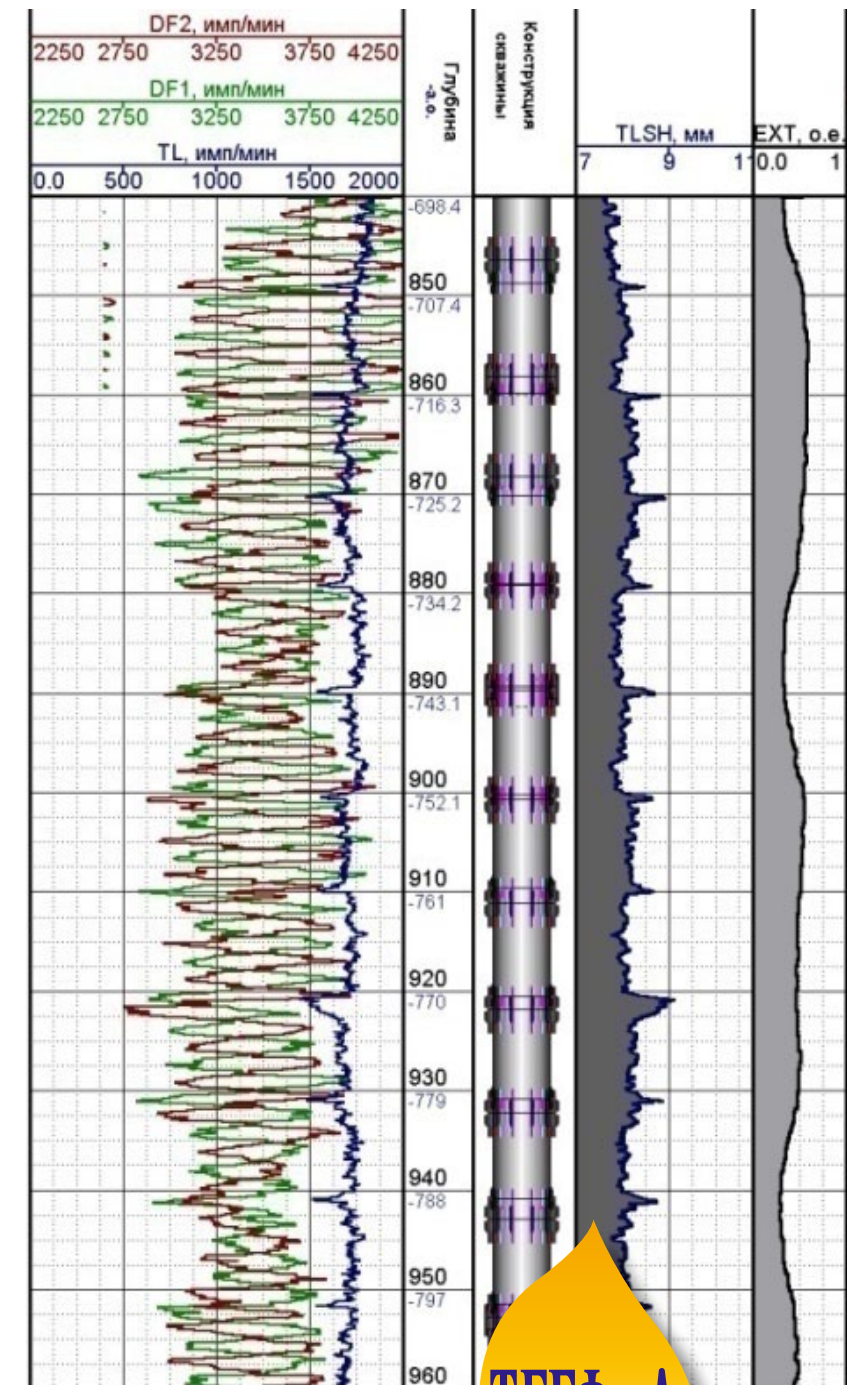


# LWD Techniques

## Cement Bond Logging and Well Integrity Control

Applied in both conventional and complex geology environments requiring use of lightweight and aerated cement slurry.

- determination of TOC
- determination of intervals cemented with various slurries
- determination of string eccentricity
- determination of slurry density where it cannot be measured by a densitometer
- determination of casing wall thickness
- locating collars, centralizers, special packers, etc.



# LWD Techniques

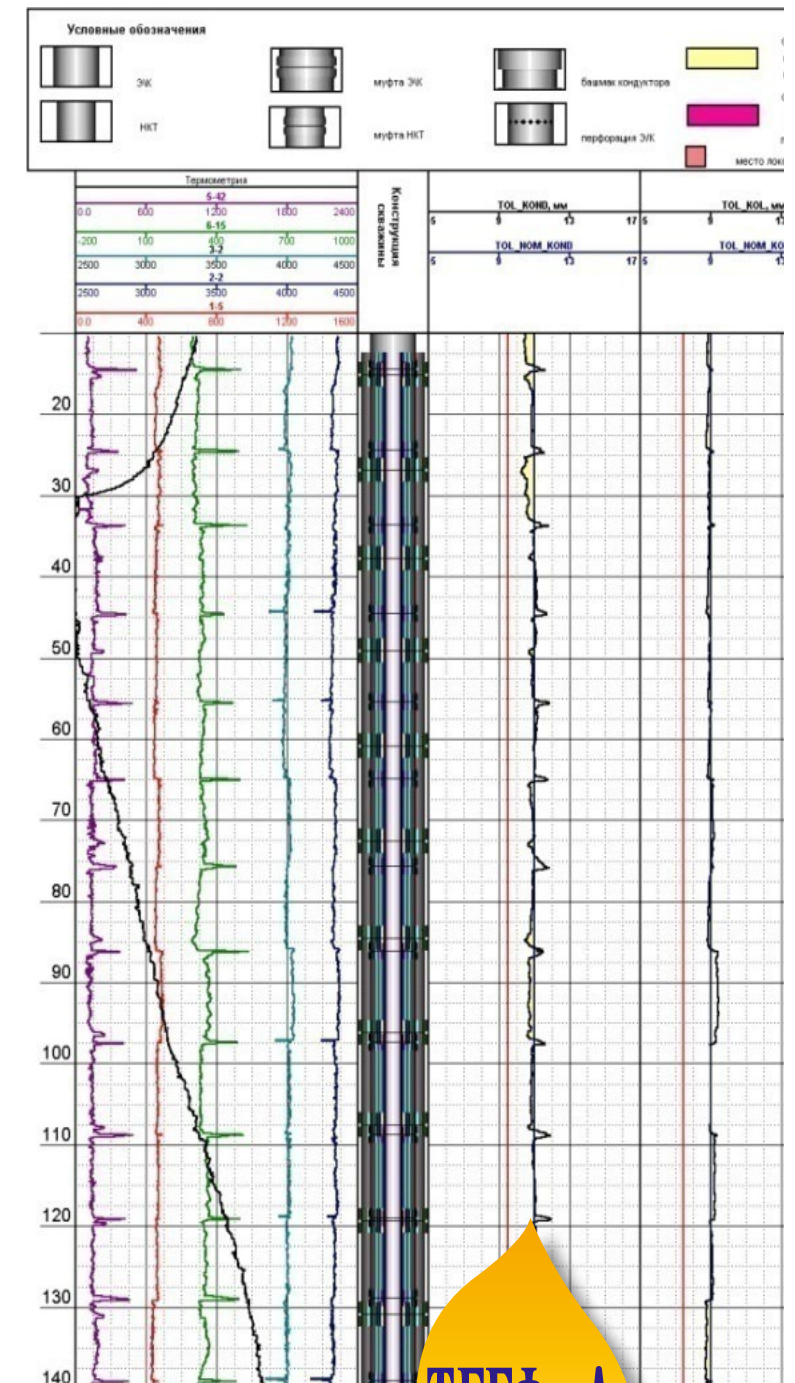
## Casing Integrity Control

MPD logging with wall thickness test in one tool trip.

Does not require production string removal or any other special well preparation.

## Horizontal Well Logging

- sufficient information on reservoir properties and saturation is acquired in one trip

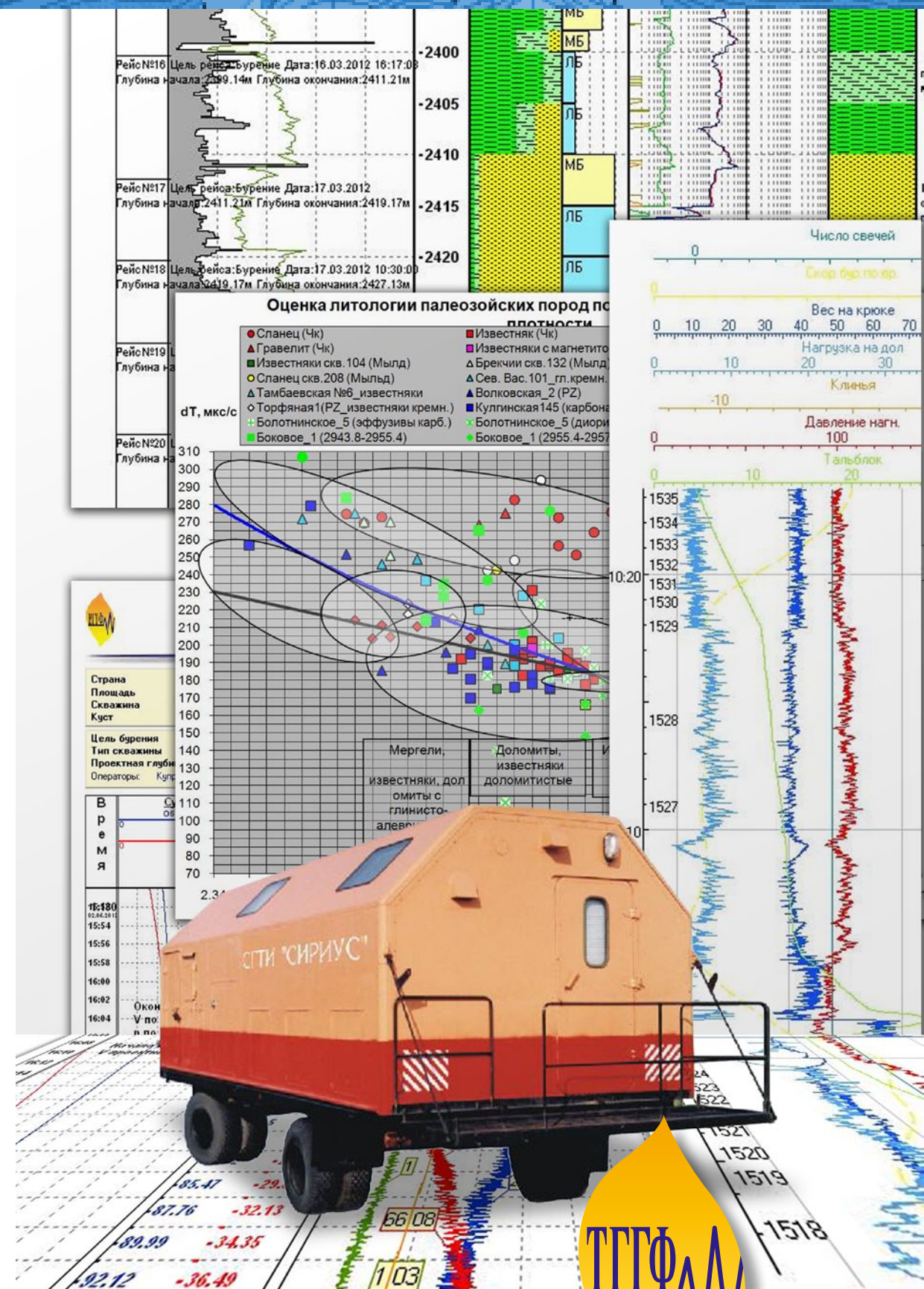




# Mud Logging

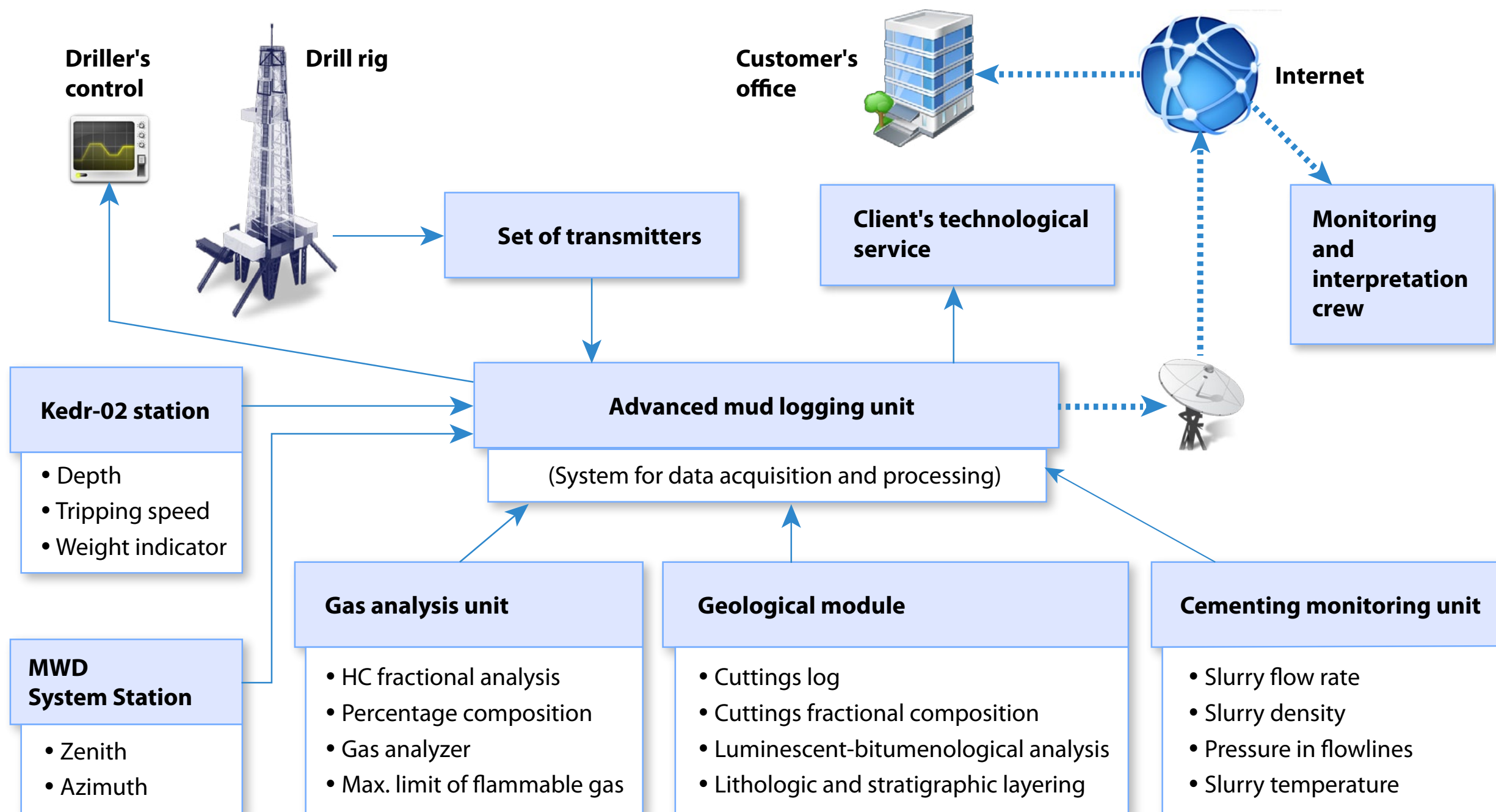
Performed with RAZREZ 2 Mud Logging Unit, including:

- drilling monitoring station
- gas analysis unit
- geological module
- cementing monitoring module
- communication facilities for real-time data transfer



# Mud Logging

## Data exchange

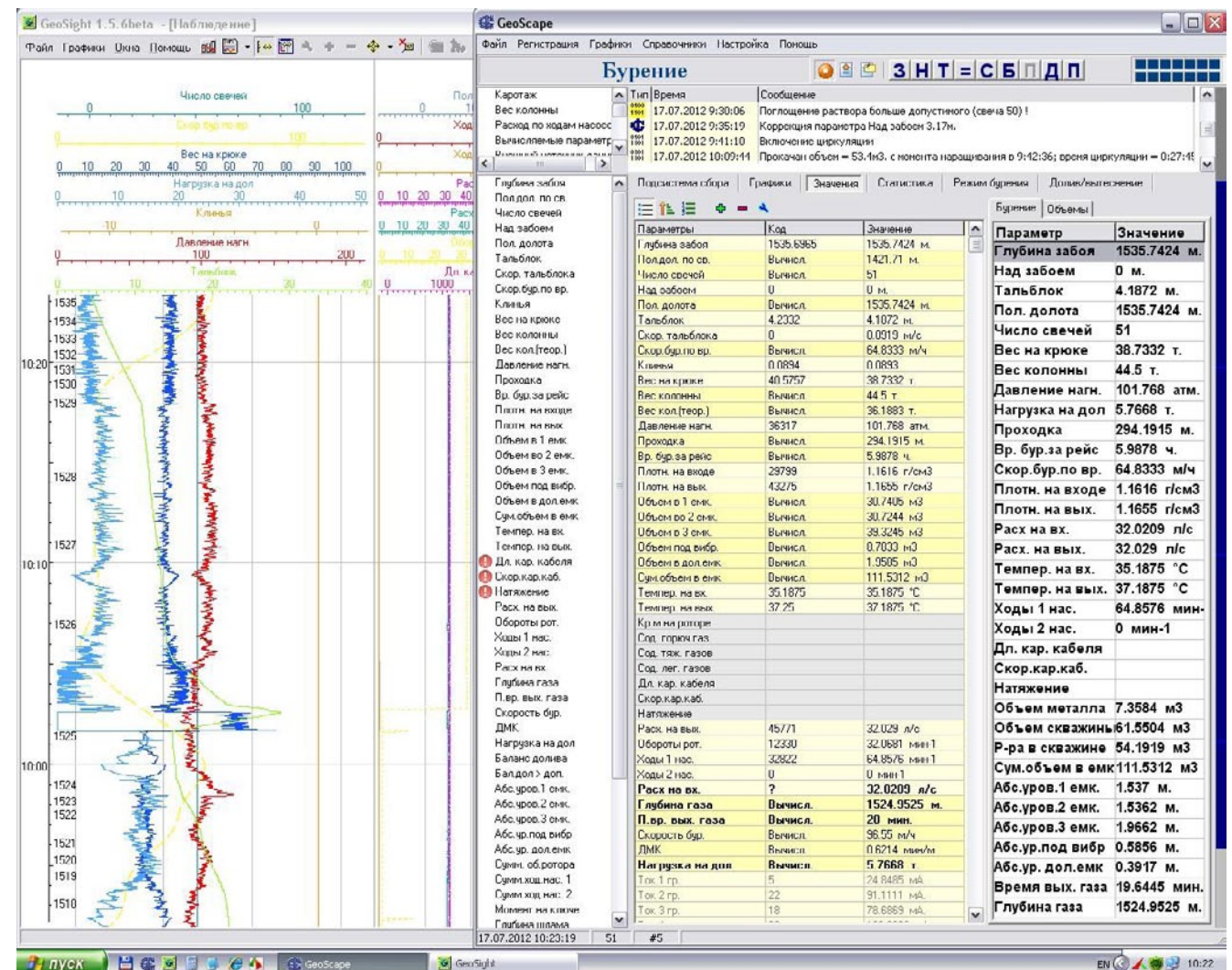




# Mud Logging

## Advanced Mud Logging Unit

- automatically acquires, processes, displays, records and interprets geological and technological data while drilling vertical, deviated and horizontal oil/gas wells
- gives recommendations to customer's Technological Service regarding optimum drilling modes, bit run, etc.
- stores and visualizes about 200 measured and calculated properties

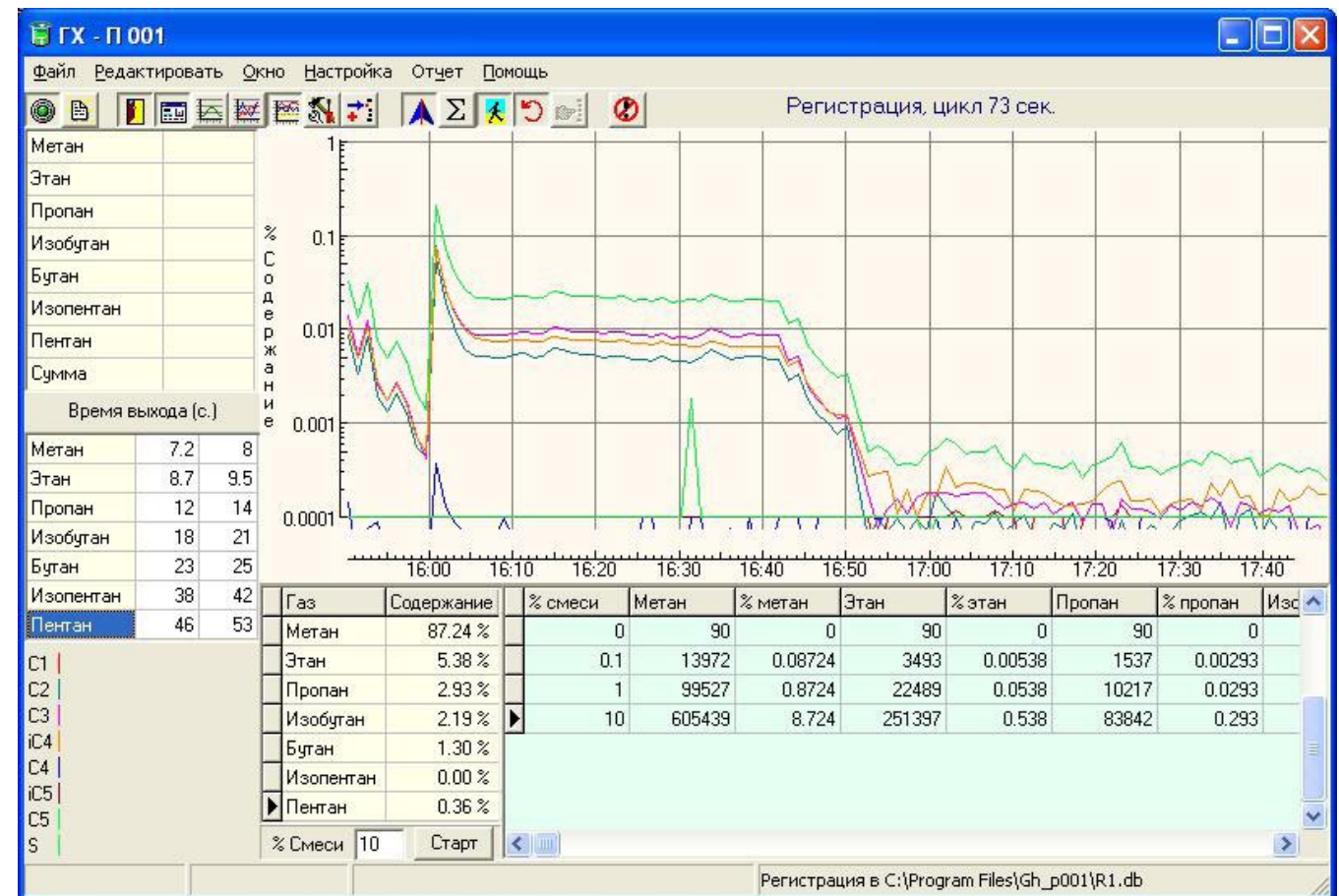


# Mud Logging

## Gas Analysis Unit

- performs mud logging through continuous automated HC content control while drilling
- increases operations safety due to early gas show control system and toxic gas alert system

From mud logging data, potential pays can be identified and formation saturation can be evaluated.

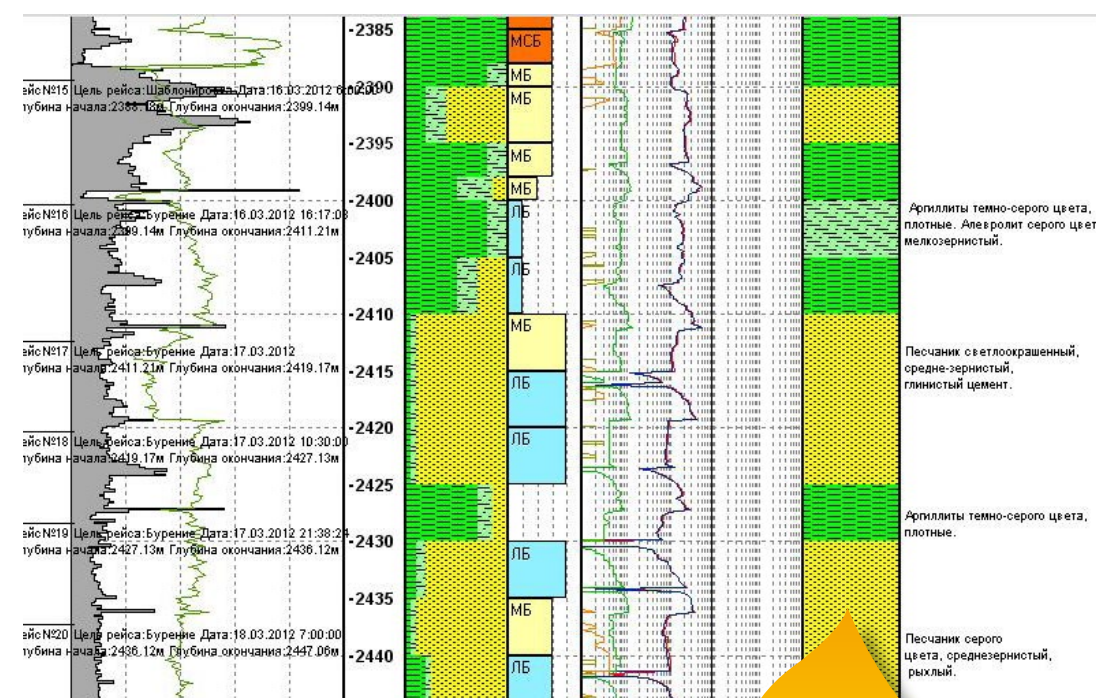




# Mud Logging

## Geological Module

- provides reliable geological information on drilling cuttings and cores
- evaluates oil saturation
- carries a microimaging unit storing sample images in a database



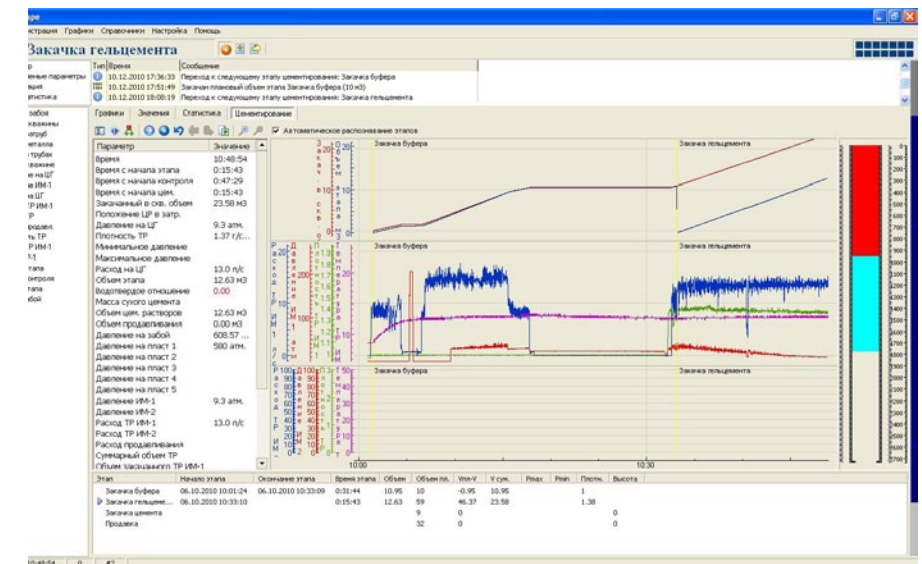


# Mud Logging

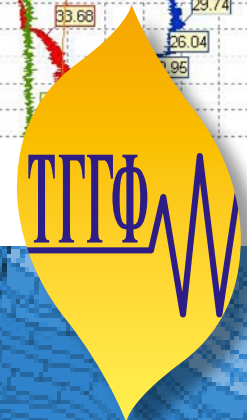
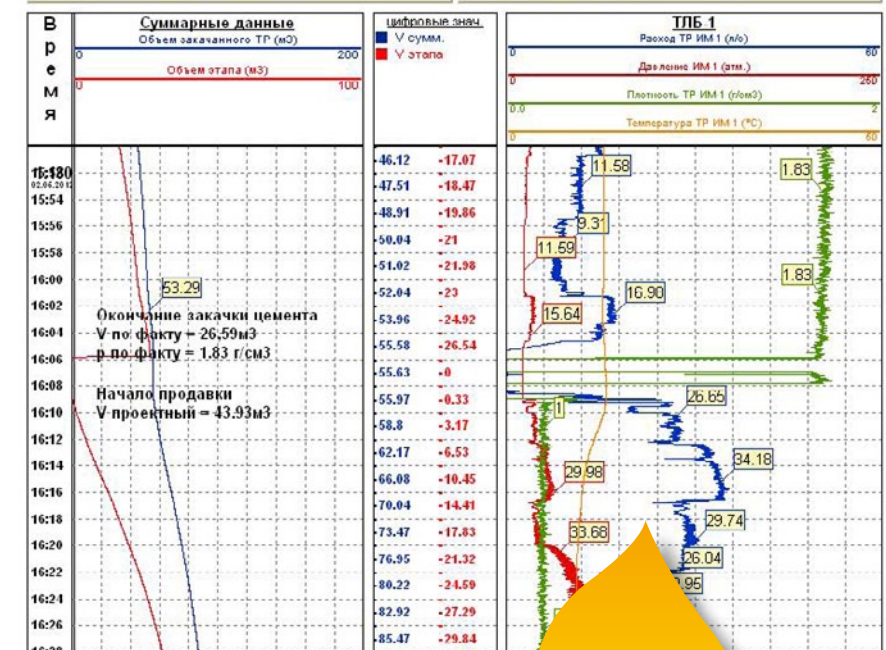
## Real-time Cementing Monitoring Module

- independent operation monitoring enhances quality and safety of cement jobs
- provides continuous control of technological operations, slurry parameters, slurry pumping rates, pressure in flowlines, warning the operator if any of the design parameters are breached

The module is 100% compatible with RAZREZ 2 unit and can be used both as part of a mud logging station and as a stand-alone tool.



Страна	Россия	Заказчик	ОАО "Томскгазпром"
Площадь		УБР	ООО "БСК" "ГРАНД"
Скважина		Исполнитель	ООО "ТомскГАЗПРОМгеофизика"
Куст		Экспедиция	МПГЗ
Цель бурения	Эксплуатационная	Партия №	
Тип скважины	Наклонно - направленная	Нач. партии	Щуканов А.Г.
Проектная глубина	2772.1	Тип станции	КС-Цемент
Операторы:	Куприсов Ю.А., Федоров А.С.	Форма:	Диаграмма с привязкой по времени





# Mud Logging

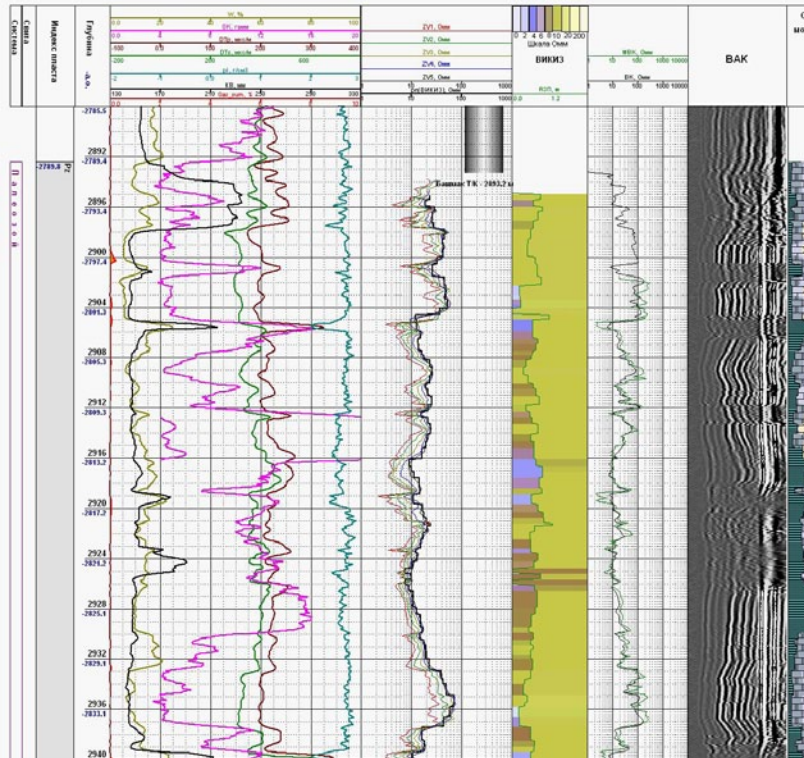
## Communication Facilities

- allow remote monitoring of drilling operations through real-time information transfer from drillsite to customer's management

Reliable, immediate, well-organized information.

Information is server-based and accessible any time.





## Geological Interpretation Service

- performs prompt interpretation of well and mud logs
- facilitates customer's ability to manage field development and operation
- interprets well testing data
- digitalizes and edits archive hard copies for further reinterpretation

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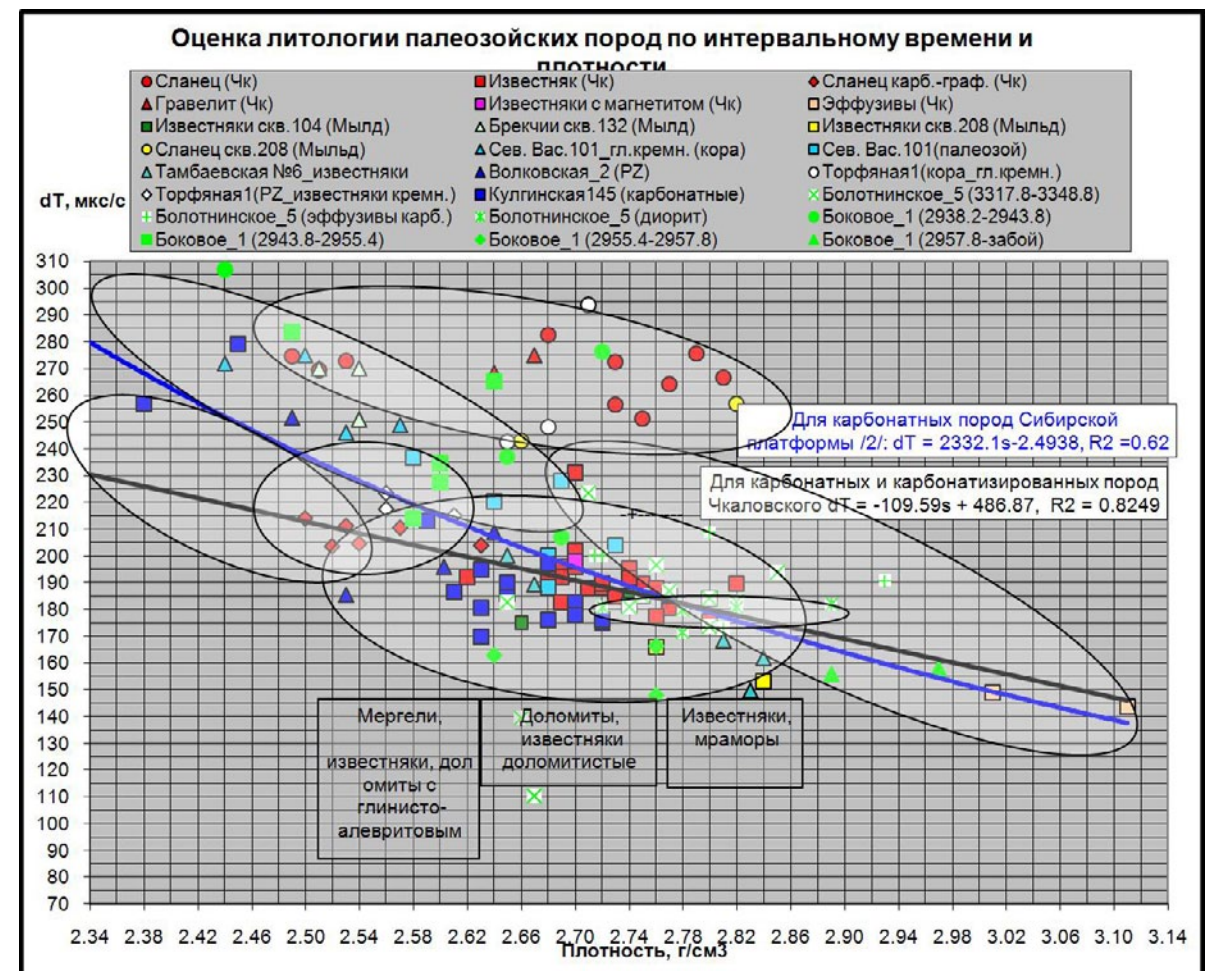




# Геолого-интерпретационная служба (ГИС)

## Test Survey Crew

- tests and implements new software
- communicates with software development teams
- develops well logging operating instructions
- fine-tunes software for new fields based on petrophysical models

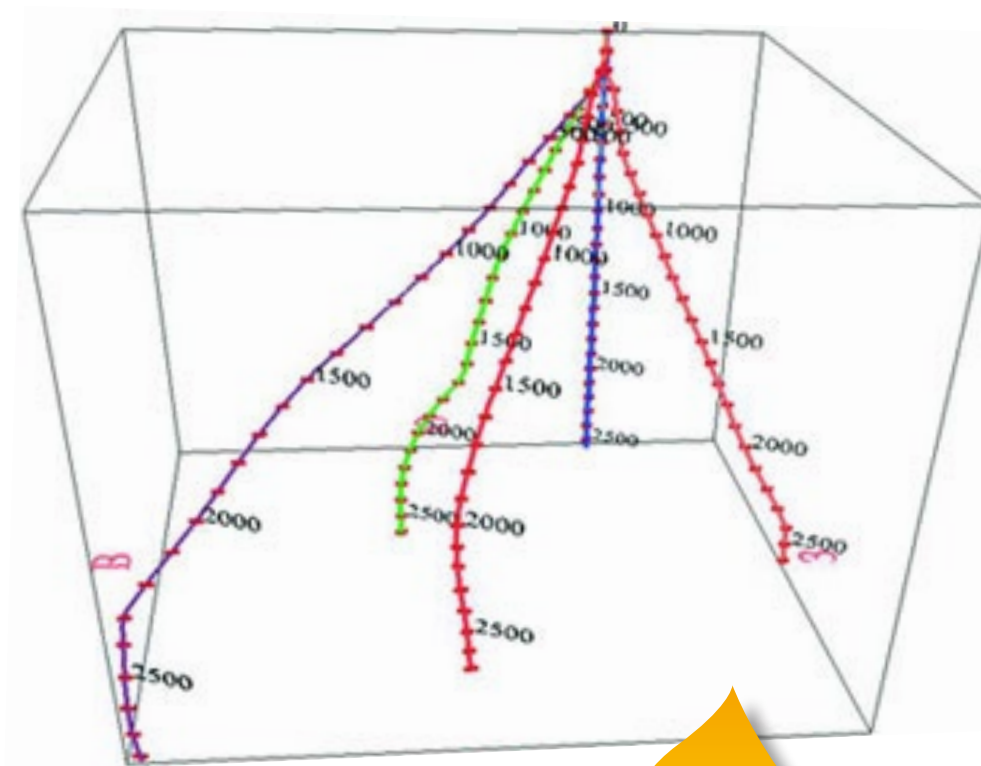


# Downhole Drilling Telemetry

Downhole drilling telemetry systems allow for precise well steering according to the design without extra measurements.

We provide both telemetry and engineering support. All telemetry systems used are designed for turborotary drilling, with better ROP and lower accident risks.

- electromagnetic telemetry system SIB 2 provides higher data rates
- hydraulic telemetry system Sperisan allows for deep drilling unaffected by electromagnetic noise





# Field Development Monitoring

We offer well logging and testing services addressing geological and technical issues emerging on various field development stages.

## Common Operations

- to determine inflow profiles in flowing oil wells
- to determine inflow profiles in gas and gas condensate wells
- to determine inflow profiles and water sources in oil and gas wells
- to determine phase composition of a fluid in the wellbore



# Field Development Monitoring

## Common Operations

- to determine inflow profiles and water sources in swabbed or compressor-stimulated wells
- to determine injectivity profiles, casing leaks and circulation behind pipe in injection wells
- to determine downhole equipment sitting depth and monitor perforation jobs
- to determine current GLC, GOC, OWC
- to locate damaged/corroded sections of production string and tubing, and to determine cause of damage
- to run well tests, determine reservoir properties and bottomhole and reservoir pressure





## Well Perforation

We offer well perforation services in vertical, deviated and horizontal oil/gas wells.

We also offer shooting services in case of stuck pipe, or for fishing/salvage operations.

We use only certified perforating systems produced by major manufacturers such as BashVzryvTechnologiya and Promperforator.



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## Our customers are:



Tomskgazprom



Gazpromneft-Vostok



ТОМСКНЕФТЬ

Tosmkneft VNK



Siberian Service Company

Nord Imperial

Podzemburgaz

Alyansneftegaz

SN-Gazdobycha

SGK-Bureniye

Agan-Bureniye

BSK Grand

RusImperial Group

**TomskGAZPROMgeofizika**







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