SOFTWARE OF OOO "NEFTEGAZGEOFIZIKA"

OOO "Neftegazgeofizika" provides for the correspondence of its software with up-to-date standards of software design from acquisition of customer requirements to software maintenance both within the warranty period and after its expiration.

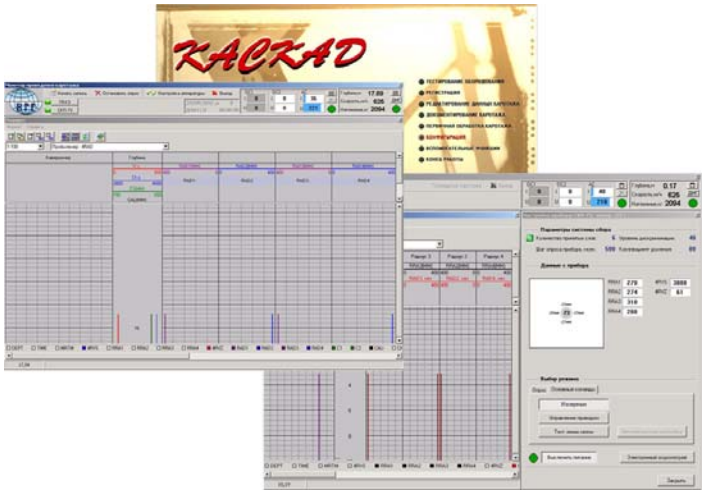
Intellectual potential of the company and its experience in geophysics accumulated for many years provide for functionality of the designed software and support of the whole logging cycle.

Short description of the main software designed by OOO "Neftegazgeofizika" is given below.

NRK Kaskad software

Software of the same name family of log recorders designed for oil and gas well logging provides for the whole recording process from downhole tools operation control to log data field processing:

- log recorder and downhole tools testing;
- basic calibration of tools and recording of calibration data on the hard disk into appropriate basic calibration files;
- required power supply modes and tool settings while logging;
- field calibration of the tools;
- well logging and recording of measurement results on the hard disk;
- log data pre-editing with depth correction by magnetic marks and depth matching of measurement points;
- raw log data hard copy output;
- log data viewing and editing.



ServiceMS

Memory tools and depthometer A1T software.

Provides for all stages of memory tools handling while logging:

– memory tools detailed testing at the base;

– basic calibrations;

– automatic preparation of the tools for logging, assures running of serviceable tools;

– depthometer A1T testing with further recording and visualisation of depthometer sensors readings while memory logging;

– TIME-DEPTH file generation as a result of processing of depthometer A1T log data and tool measurements using downhole tools data, represented with respect to time;

– memory tools main parameters control after logging;

– log data copying on the hard disk;

– log data editing and assessment of quality of measurements made by a memory tool;

– viewing of copied log data in a table;

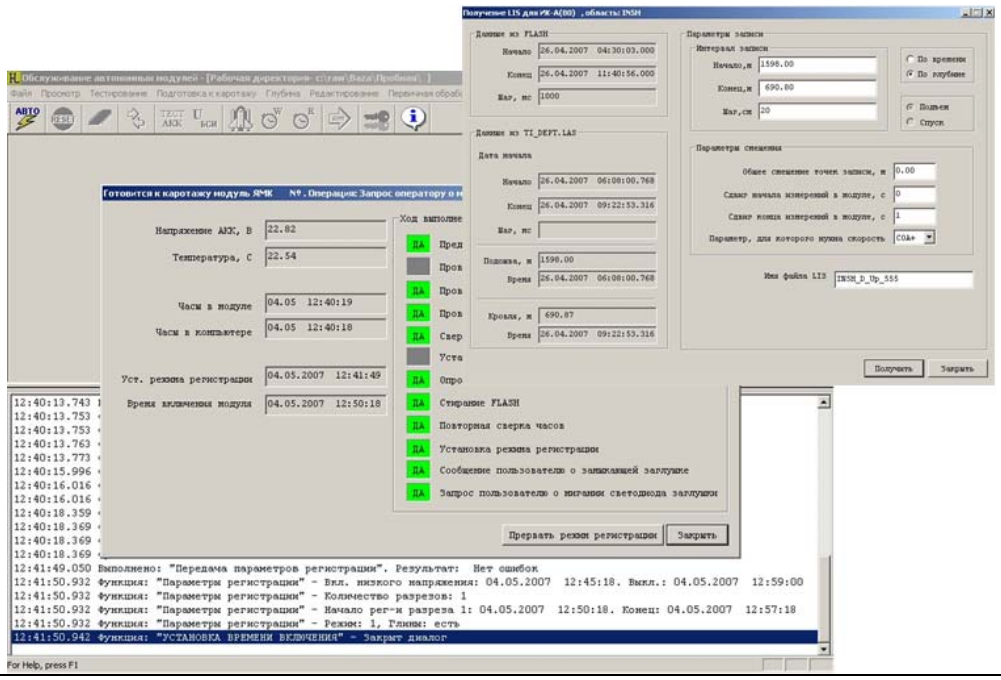
– time editing in TIME-DEPTH file;

– generation of LIS output files with respect to both time and depth with matching of measure points;

– log data preprocessing;

– registration on the hard disk of processes of tools preparation for logging and after logging operations with the tool; such registration provides for assessment of specialists actions at the wellsite and tools performance;

– preparation of logging reports.



ONIX-2

Integrated software system for recording and processing of case hole logging data provides for the complete cycle of works on information support of production and prospecting well logging, including:

– software support of well logging by various types of downhole equipment and log data recording on a disk (when using ONIX recorder);

– input, servicing and storage of production log data;

– production log data processing, up to computerized generation of interpretation report;

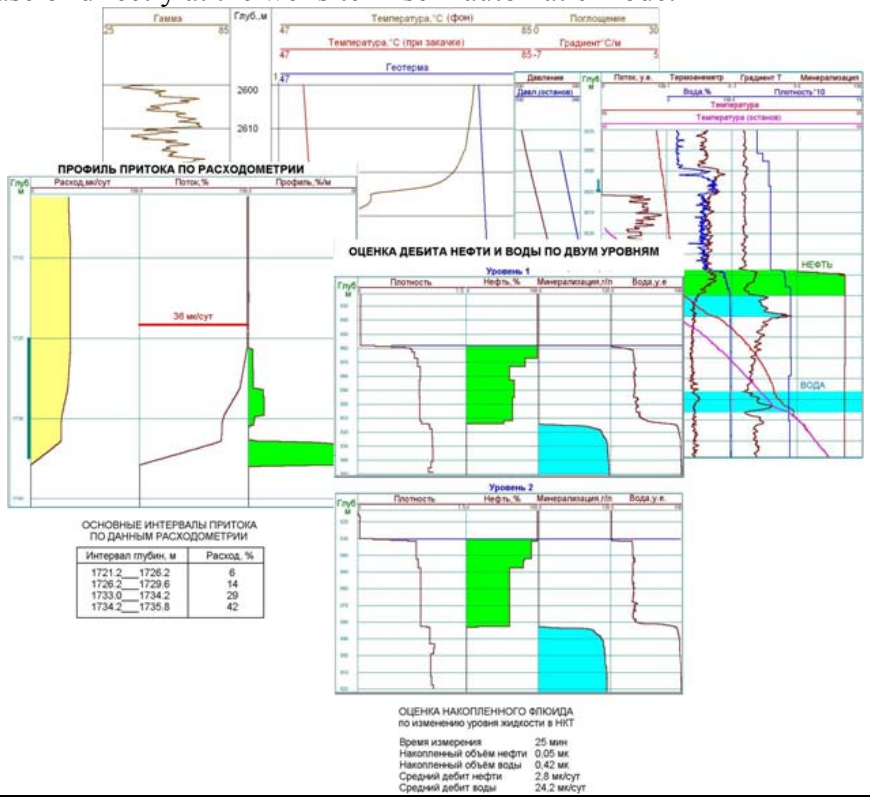
– presentation of logging and processing results in the from of completed reports.

ONIX software is used for on-line processing of measurements of different parameters (pressure, temperature, methods an inflow - composition etc.).

Data processing software can be subdivided in two levels.

The first level provides for curves processing by a succession of methods written to files of the microprograms. This level is flexible but at the same time more complicated.

The second level is formed by complex of macroprograms which provide for more complicated processing algorithms. Macroprograms provide for data processing automatization including creation of preliminary interpretation reports. Data processing can be effected both at the base or directly at the wellsite in semiautomatic mode.

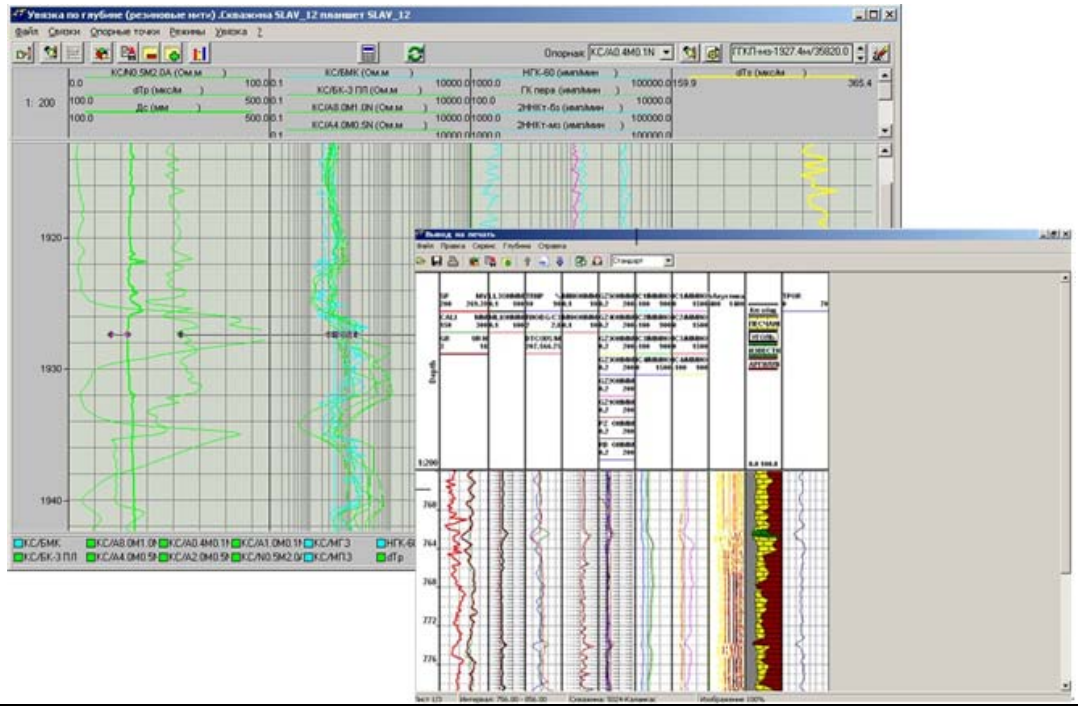


Data processing and interpretation software LogWin

LogWin – is a software system that provides for processing and analysis of oil and gas well logging data obtained by electric, electromagnetic, radioactive, acoustic and other logging techniques for the purpose of acquisition of logging data required for decision making when interpreting data of each well.

The software system provides a lot of opportunities including, for example:

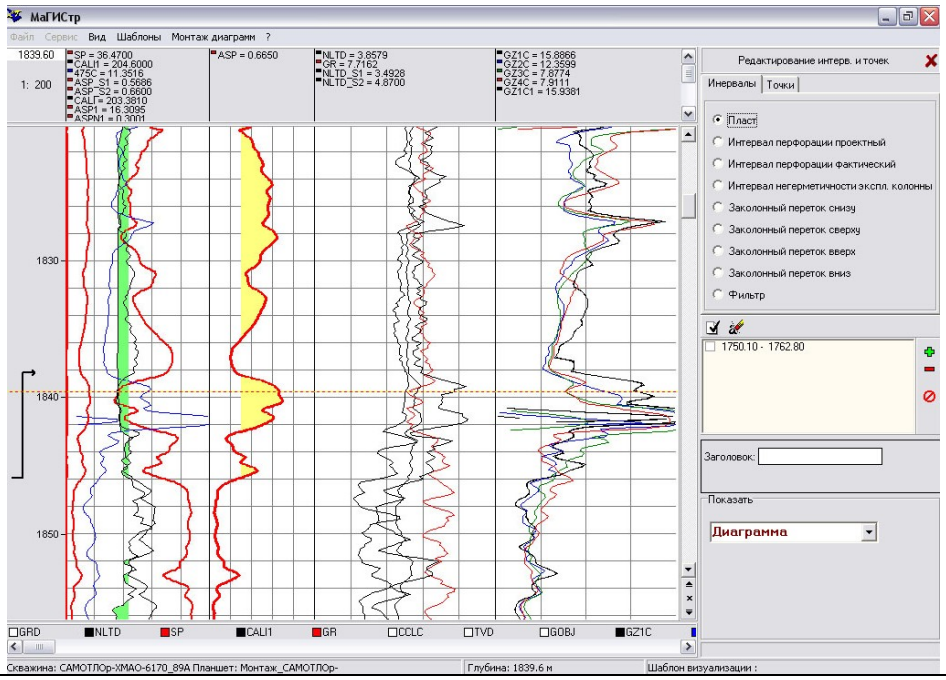
- data management;
- import, export, storage and retrieval of data in archive;
- logging data editing;
- calculation of statistical characteristics and distributions;
- crossplotting;
- assessment of processing results quality;
- interpretation model construction with a record in model library;
- model parameters viewing and adjustment;
- modeling of geophysical parameters for the environment of objects under study;
- rock's volumetrics deriving within chosen interpretation model;
- appraisal of pore space saturation character;
- hard copy printout.



MaGIStr

MaGIStr software provides for the complete cycle of editing of log data presented in different formats (viewing, editing, essembling and diagram output) insuring max computerization of the process. Field of application – it is used by geophysical and geological departments of the company when working with log data.

The main objective of the development was to create log data editor providing for unified logical and user interface for log data import-export, log data viewing and editing and facilitating job of logging and geological departments of a geophysical company.



Certificate on official registration of computer software №2005610952 issued by The Federal Service for Intellectual Property, Patents and Trademarks

LogWin-EK

"LogWin-EK" software provides for logs viewing, tying, bed identification in manual and automatic modes, electric and electromagnetic log data processing in point-to-point and bed-to-bed processing modes.

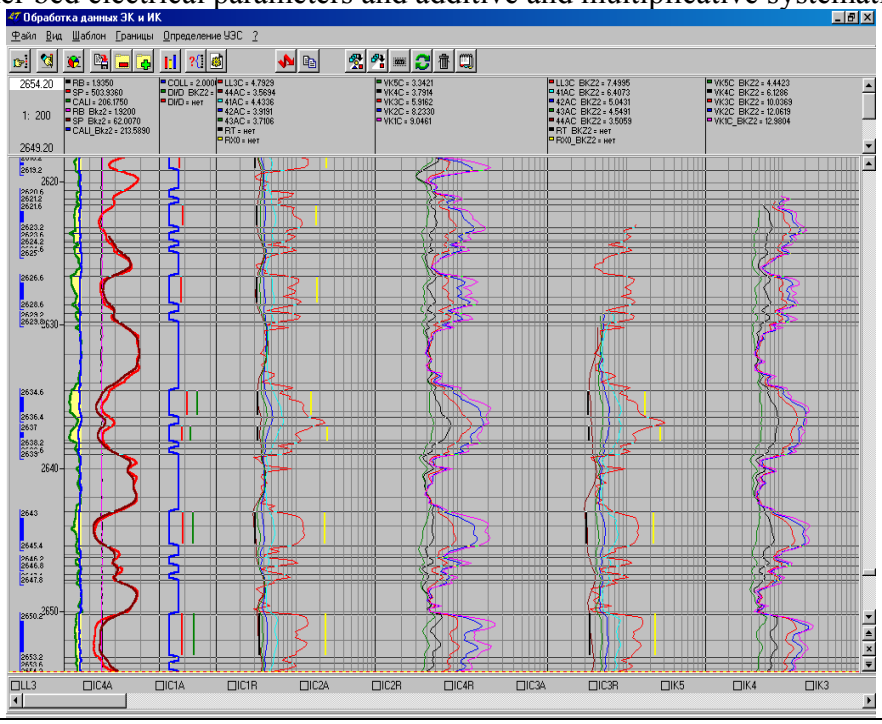
Point-to-point processing of electric and electromagnetic log curves includes introduction of corrections for the borehole effect (IK, BK, BKZ, VIKIZ), skin-effect (IL), shoulder rocks (IL-deconvolution) and conversion of IK, VIKIZ data processing results into resistivity units (Ohm·m).

Bed-to-bed processing includes rock formations resistivity evaluation (by IK, BK, BKZ, VIKIZ, BMK data) taking into consideration flushed zone and shoulder rocks effect and measurement results quality assessment (determination of systematic measurement errors).

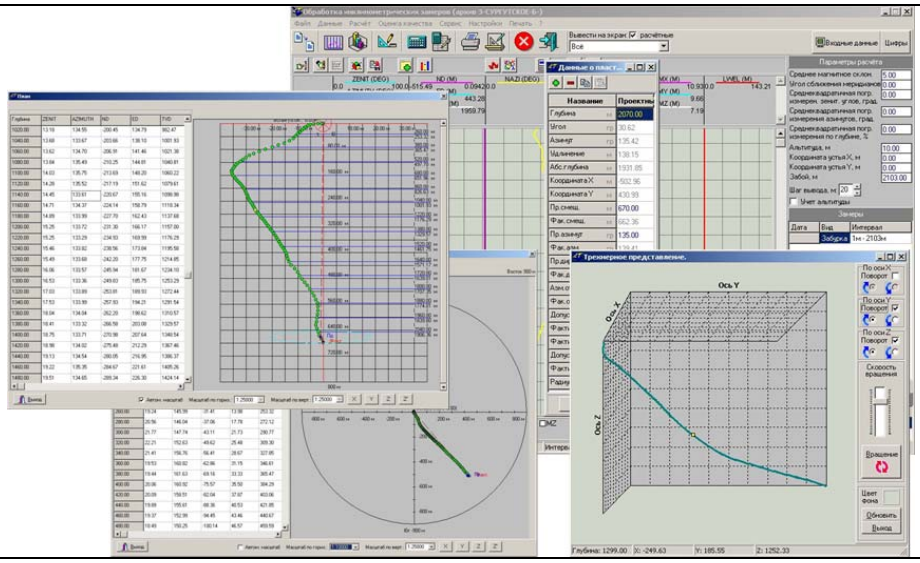
Bed-to-bed processing of single formations taking into consideration flushed zone and shoulder rocks effect is performed using single formation interpretation model in homogeneous shoulder rocks. Technique of formation resistivity evaluation consists in searching of the solution of minimum of residual function of theoretical and actual readings. The results of such interpretation are electrical parameters of the formation: formation resistivity Rt, flushed zone resistivity Rxo and flushed zone relative diameter D/d.

It is possible to determine formation electrical parameters in batch mode (up to 500 formations at the same time).

Curves quality assessment includes *visual (qualitative) assessment* of comparability of measurement results obtained by different electrical and electromagnetic logging sondes; this assessment can be made according to point-to-point processing results for example, and *quantitative assessment* of comparability i.e. determination of systematic measurement errors of BKZ, BK, IK, VIKIZ, BMK sondes and mud resistivity refinement in bed-to-bed processing mode. Method of quality assessment and mud resistivity refinement is an issue of search of minimal discrepancies of actual and estimated readings of the sonde by variables that describe marker bed electrical parameters and additive and multiplicative systematic measurement errors.



Certificate on official registration of computer software №2005610807 issued by The Federal Service for Intellectual Property, Patents and Trademarks

LogWin-Azimuth
LogWin-Azimuth software provides for directional log data processing. The Customer gets interval measurement results, cross-section and well path design, 3D display. The software provides for: – curvature assessment by continuous or spot measurements irrespective of different type data input sequence; – well path design on horizontal and vertical planes and well path plots printout; – borehole 3D display; – data analysis for the presence of intervals with highly variated angle and azimuth within one log; – choice of directional log data hard copy output formats.


LogPWin
LogPWin – set of log data preprocessing software. Software package provides for preprocessing of radioactive, acoustic, electric and electromagnetic log data; it also provides for: – editing, import and export of log data in LIS, LAS, ARMG, GEO-ACU and other formats; – assessment of the corrected for the borehole effect measurements of geophysical parameters of radioactive (*porosity* by thermal and epithermal neutron logging in open and cased hole with SRK-1, SRK-42, SRK-73, SRK-76, RK-P, DRST-3-90, ARK, APRK and other equipment; *rock natural gamma activity* by integral gamma-ray in open and cased hole with SRK-1, SRK-42, SRK-73, SRK-76, RK-P, DRST-3-90, ARK, APRK and other equipment; *uranium, thorium, potassium mass content* by gamma-ray spectrometry logging in open and cased hole with SGK-1024, SGK-1024TB and other equipment; *rock density* by gamma-gamma density logging in open hole with SGP-76, SGP-73, SGP-2, RK-P and other equipment; *rock density and photoelectric absorption index* by lithodensity gamma-gamma spectrometry logging in open hole with SGPL-73, SGPL-1T and other equipment; thermal neutron lifetime, capture cross section and other parameters by pulsed neutron-neutron and neutron gamma-ray logging with AINK-42, AINK-73 and other equipment) and other logging methods, measurement quality control; – processing of acoustic logging data (4AK, AVAK-11, AK-G) based on identification of head waves packages in wave forms recorded in open hole: compressional, shear and Stoneley waves and estimation of their slowness, attenuation coefficients for assessment of porosity factor, elasticity modulus, shear anisotropy coefficient and other physical and mechanical parameters of rocks; processing of data recorded in cased holes with 4AK, AVAK-11, AK-42PM equipment (designed for slim hole logging) for annulus cementing evaluation and also making a joint report on cementing quality using SGDT parameters; evaluation of casing inner diameter and thickness and interval of cement-casing contact based on reflected waves technique (ATP-80 tool); – apparent resistivity evaluation of BKZ, BK-3, BK-7, BK-9, MGZ, MPZ, BMK sondes by electric logging tools measurements (EK-1, EK-1T, EK-73-PL, BK-7/9-1T, BK-7/9-1T-K, MK-UTs, BMK, MK-90); apparent conductivity and apparent resistivity evaluation based on IL sondes data of IKZ-2, IKZ-2/40, IK-P, 4IK-45, 3IK-45 equipment; evaluation of phase differences and apparent resistivities by VIKIZ sondes data of VIKIZ and BEMKZ equipment; apparent resistivity evaluation of BKZ, BK-3, BK-7, BK-9, BMK sondes by electric logging tools measurements (EK-1, EK-1T, EK-73-PL, BK-7/9-1T, BK-7/9-1T-K, MK-UTs, BMK, MK-90); resistivities evaluation by BKZ, BK-3, BK-7, BK-9, BMK sondes data of EK-1, EK-1T, EK-73-PL, BK-7/9-1T, BK-7/9-1T-K, BMK, MK-90 equipment with correction for borehole effect (mud resistivity, diameter of borehole, mudcake); resistivities evaluation by IKZ-2, IKZ-2/40, IK-P, 4IK-45, 3IK-45 induction logging sondes taking into consideration shoulder rocks; evaluation of cross section electrical parameters (uninvaded zone resistivity, flushed zone resistivity, relative depth of invasion) obtained by BK-7/9-1T-K, IKZ-2, IKZ-2/40, 4IK-45, 3IK-45 tools.
Certificate on official registration of computer software №2005612569 issued by The Federal Service for Intellectual Property, Patents and Trademarks

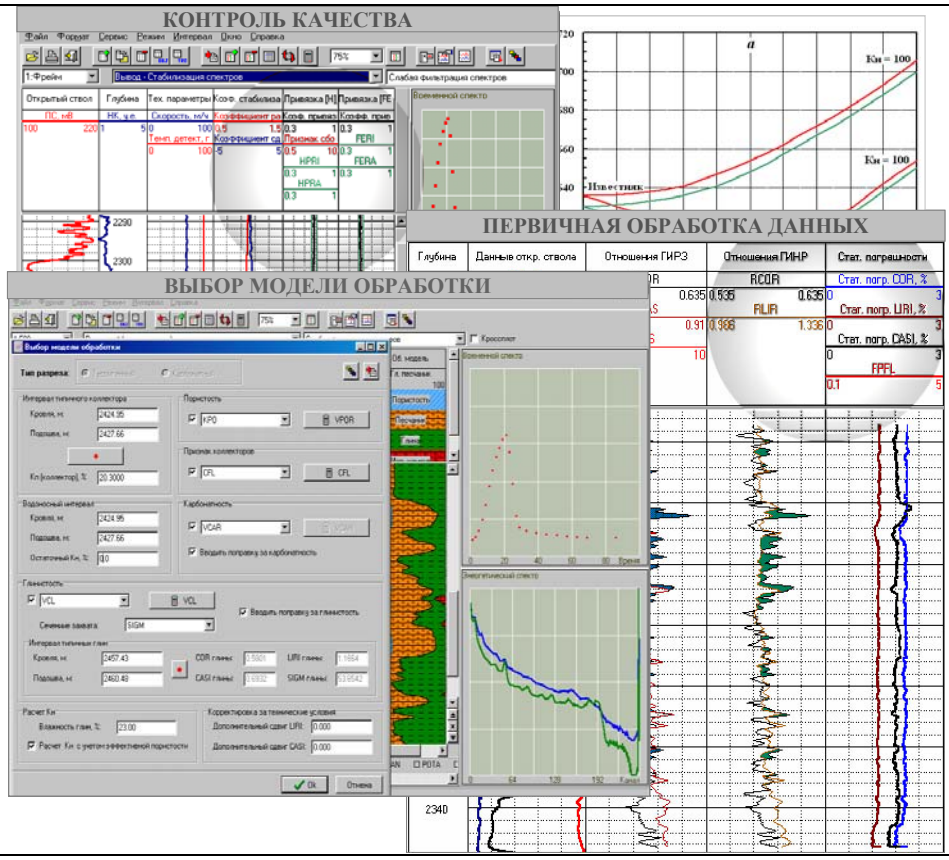
LogPWin-AIMS

The software is designed for pulsed spectrometry neutron gamma-ray log data processing and provides for: raw log data editing, raw and calculated data quality control, rocks current oil saturation evaluation, issue of reports and hard copy output, processing results recording in LIS and LAS formats for their transfer to the Customer.

Quality control when obtaining rocks current oil saturation is performed at the level of raw log data and at all stages of processing by the results of corresponding accuracies appraisal.

Rocks oil saturation evaluation includes selection of processing model (dimensions, considered factors), determination of a source (import, calculation) and a method of additional information obtaining (porosity, clay and carbonate content), energy scale precise tying and oil saturation evaluation using a schema that presents a combination of evaluations using normalized relations <C/O> and $<Ca/Si>_{inelastic}$, increment of curve <C/O>.

Report issue includes preparation and output in tabular or graphic form of the results of rocks oil saturation evaluation results and their accuracy appraisal for their transfer to the Customer.



Certificate on official registration of computer software №2006610807 issued by The Federal Service for Intellectual Property, Patents and Trademarks

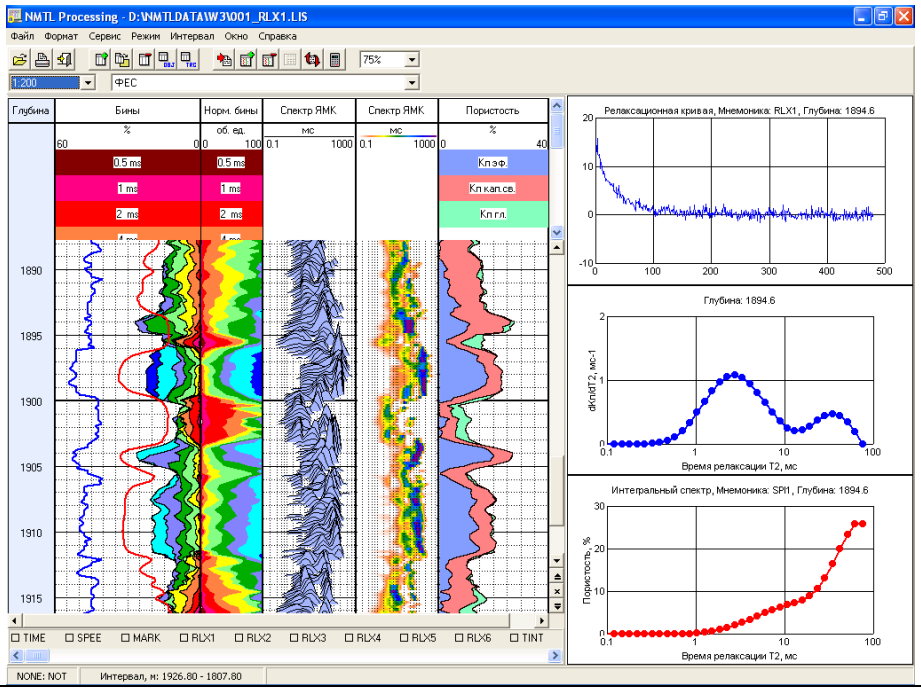
NMR Processor

The software is designed for NMR logs processing using метода регуляризации. The processing is based on obtaining of relaxation time spectra and calculation of formation main petrophysical parameters based on relaxation time spectra.

It is used for oil and gas well logging using nuclear magnetic resonance in strong magnetic field; provides for measurement results analysis and rocks reservoir properties evaluation.

The software provides for:

– evaluation of relaxation time differential spectra;
– evaluation of relaxation time composite spectra;
– evaluation of relaxation time partial spectra;
– calculation of bins;
– total porosity evaluation;
– total porosity dividing into components: clay porosity, effective porosity, capillary-bound water;
– permeability computation using capillary-lattice model;
– permeability computation using Timur Model;
– permeability computation using Timur-Coates Model;
– permeability computation using average T2 model;
– preliminary filtering of signal using low-frequency filter;
– preliminary filtering of signal using Wavelet - filter;
– subtraction of spectra (for evaluation of formation saturation with different fluid types);
– substraction of relaxation curves;
– interval processing (recalculation of particular intervals using corrected parameters, etc.).



Certificate on official registration of computer software №2003612705 issued by The Federal Service for Intellectual Property, Patents and Trademarks