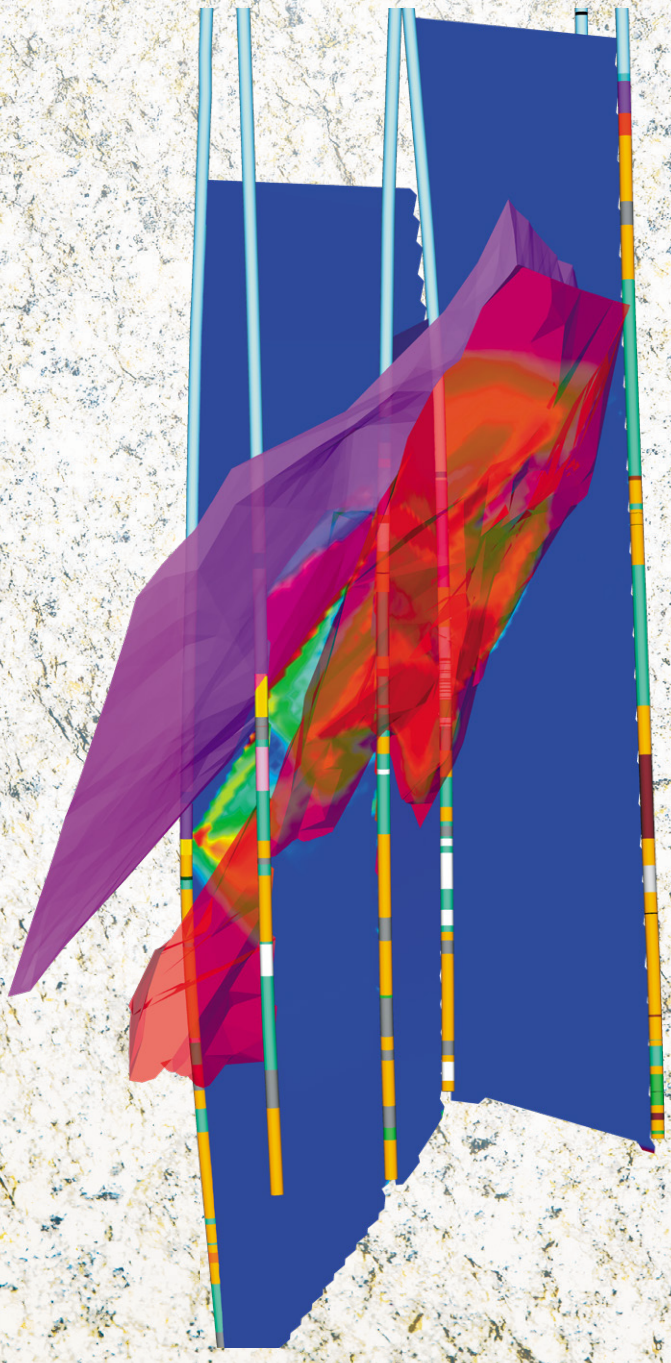
FARA SYSTEM

A simple solution to complex geological problems



WHAT IS FARA?

It is a highly effective tool for carrying out geological exploration at all stages - from searching for undiscovered deposits to a detailed study of known mineral reserves.

The FARA system was created in response to the increasing demand of the mining industry for a fast, reliable and inexpensive way to find, locate, and estimate ore deposits in a sparse drilling network.

WHY CAN YOU TRUST US?

The FARA team has been actively working and developing in the international market of geophysical services in a highly competitive environment since 1997. Many years of experience both on the surface and in the difficult conditions of operating underground mines testify to the high reliability and efficiency of the technology.

WHERE IS IT APPLIED?

FARA is used in the exploration of ore deposits, in-depth engineering and geological surveys, as well as solving any other tasks related to the search for and study of electrical conductive underground objects.

WHY IS FARA COST-EFFECTIVE?

The advantage of the system is the quick receipt of visually easy to understand information about the state of the cross-hole space. It is used to optimize costs when drawing up a drilling program at the exploration and production stages, as well as for prompt correction or placement of clarifying boreholes at the stage of its implementation.

WHAT ARE THE FEATURES OF THE FARA SYSTEM?

1. Continuous accumulation of data during the rapid movement of the measuring unit through the borehole
2. Survey depths of up to 3 km, with up to 1km separating borehole pairs
3. Borehole units not exceeding 42 mm in diameter, therefore permitting boreholes AQ size and larger to be surveyed
4. The use of up to four operating frequencies simultaneously, which significantly increases the reliability of the results without compromising performance
5. Registration of both amplitude and phase characteristics of the signal provides additional information about the environment and expands the possibilities for further processing
6. Intensive attention to quality control of field materials due to a wide range of systems of continuous inspection of the system

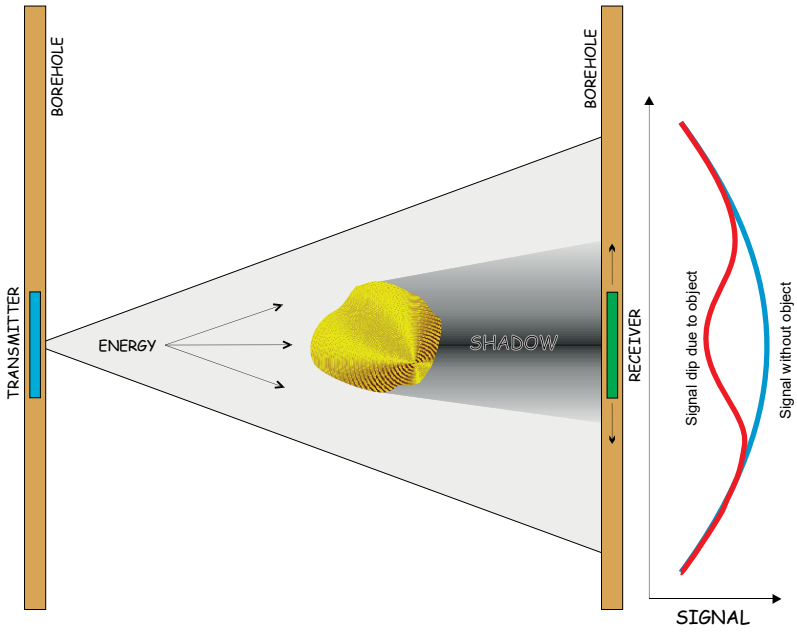
HOW DOES IT WORK?

FARA is a tool for exploring the space between two wells. It allows you to get a visual image of the structure of the cross-hole space and the objects located in it. The principle of operation of the system is based on the ability of materials and media to absorb electromagnetic energy in different ways, depending on their electrophysical properties.

The emitter of electromagnetic energy (transmitter) is stationary in one of the boreholes. The recorder (receiver) collects the characteristics of the signal that passed through the medium while moving through another borehole.

If a conductive object is located in the space between the boreholes, the receiver detects a drop in the energy level, since it is partially absorbed by the object (the object «casts a shadow»).

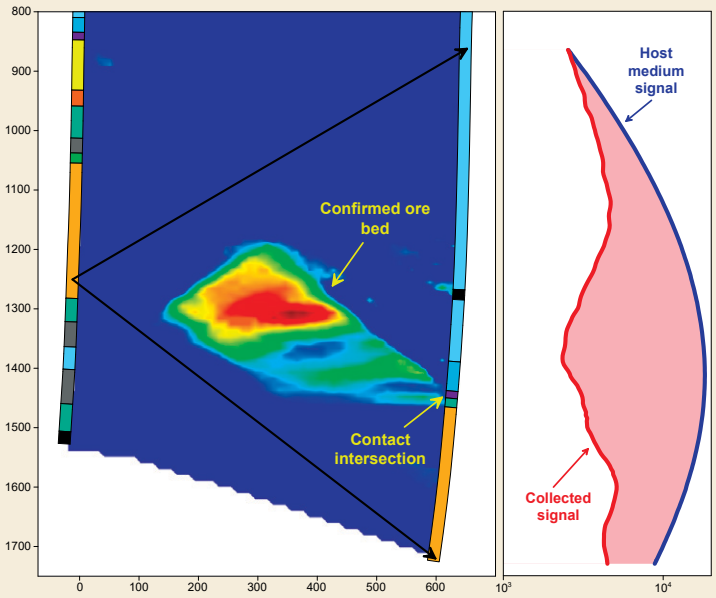
Measurements are repeated at different transmitter depths, which allows you to accurately locate the position of the object in the cross-hole space.



WHAT DO WE OFFER?

FARA allows you to carry out a full autonomous cycle of downhole geophysical surveys using unique hardware and software solutions. The result is a visual image of the cross-hole space in the form of tomographic sections.

The FARA system is not only about hardware, software, methodological support, fieldwork, and presentation of the result. FARA is a holistic organism, the main purpose of which is to help you in solving your problems. Choosing FARA you can be sure of the reliability of the result and maximum efficiency of your investment!

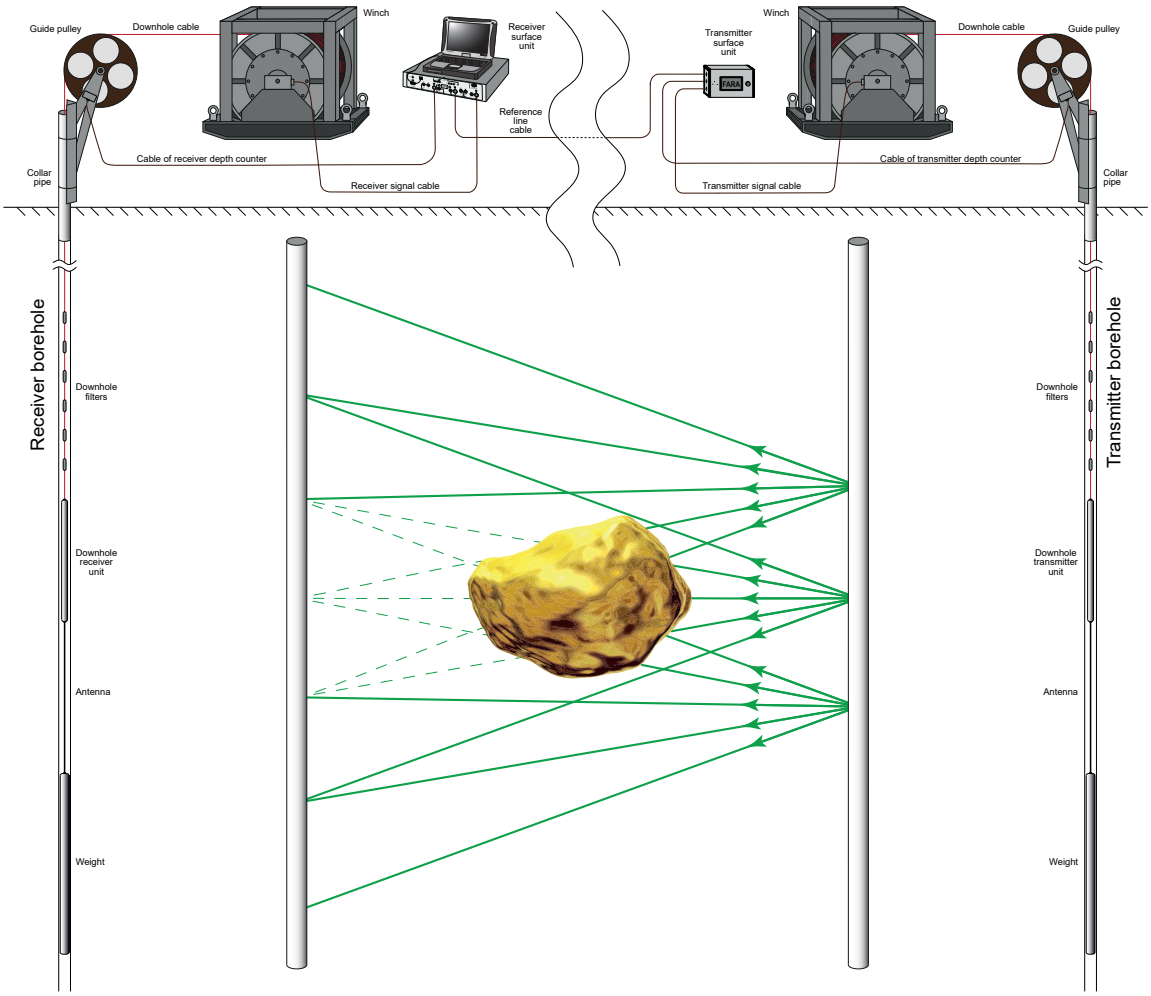


SEARCH FOR UNKNOWN OBJECTS

With a network of boreholes, the FARA system becomes a powerful exploration tool. The system is used when searching for ore bodies, ore-controlling structures, or other objects with contrasting conductivity.

In this example, FARA made it possible to identify a conductive zone in the space between boreholes without ore intersections. The zone corresponds to a copper-nickel bed.

The graph on the right shows the difference between the calculated host medium signal (blue) and the received signal (red). Their difference is a consequence of the absorption of energy by a conductive object - an ore body.

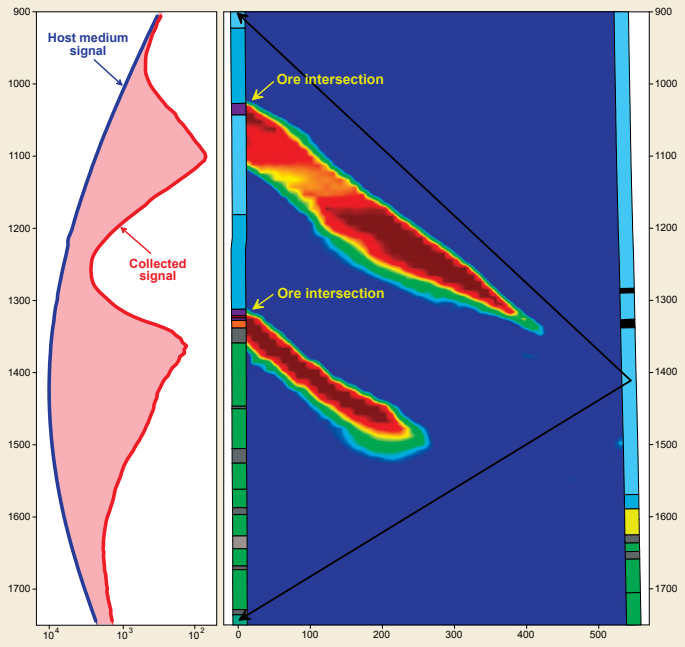


LOCALIZATION OF KNOWN OBJECTS

A situation often arises when only one borehole intersects an object of interest, while the nearby boreholes do not. In this case, FARA allows you to characterize the object without the use of additional drilling.

In this example, during drilling operations the borehole intersected two ore intervals. With the use of FARA, it was found that the mineralized zones corresponding to the intersections were elongated, but pinched out without reaching another borehole.

The graph on the left of the image shows the difference between the calculated host medium signal (blue) and the received signal (red). Their difference is a consequence of the absorption of energy by electrically conductive objects - mineralized zones.

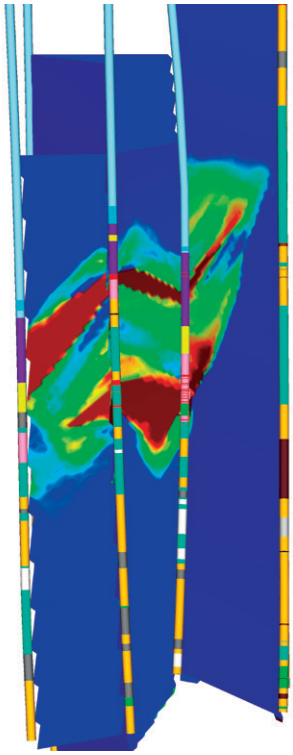


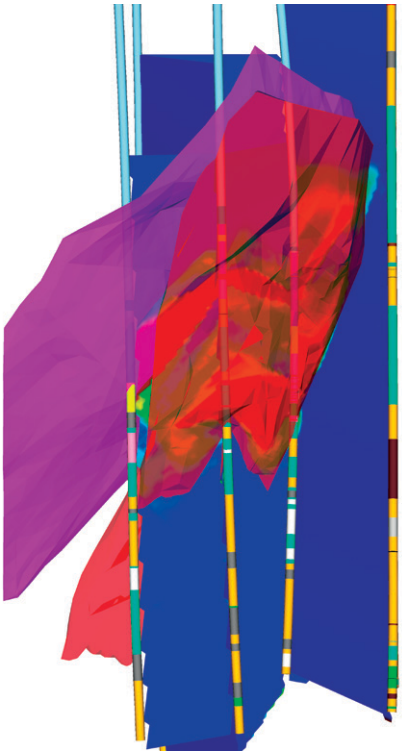
DETERMINATION OF THE SPATIAL EXTENT OF OBJECTS

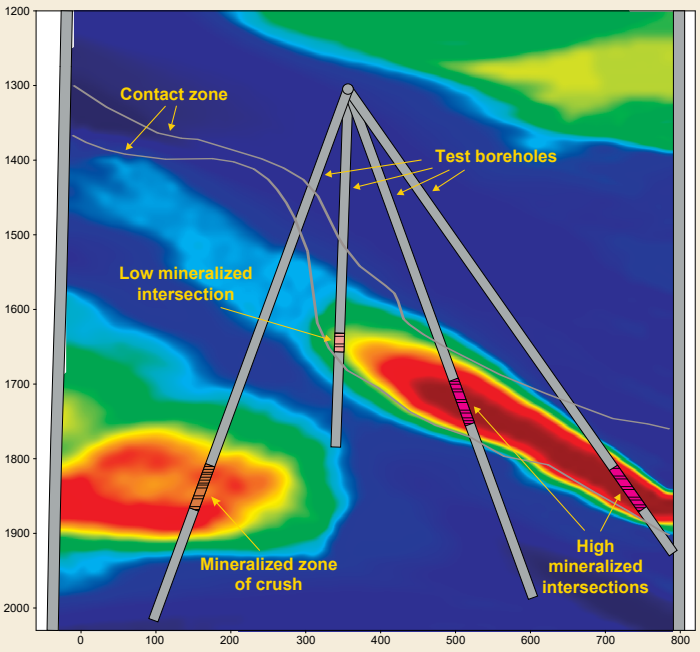
If there is a network of boreholes, FARA allows you to determine the location and spatial extent of the target these results can be used to build a 3D model of the deposit.

The FARA team was actively involved in the discovery and exploration of one of the richest copper-nickel sulfide deposits of recent decades - Nickel Rim in Canada in the Sudbury region in 2002-2004.

The figure shows a set of tomographic sections in 3D space (left), which made it possible to make an initial assessment of the extent and reserves of the deposit, as well as final model of the deposit, obtained lat-er from the results of drilling numerous verification boreholes (right).





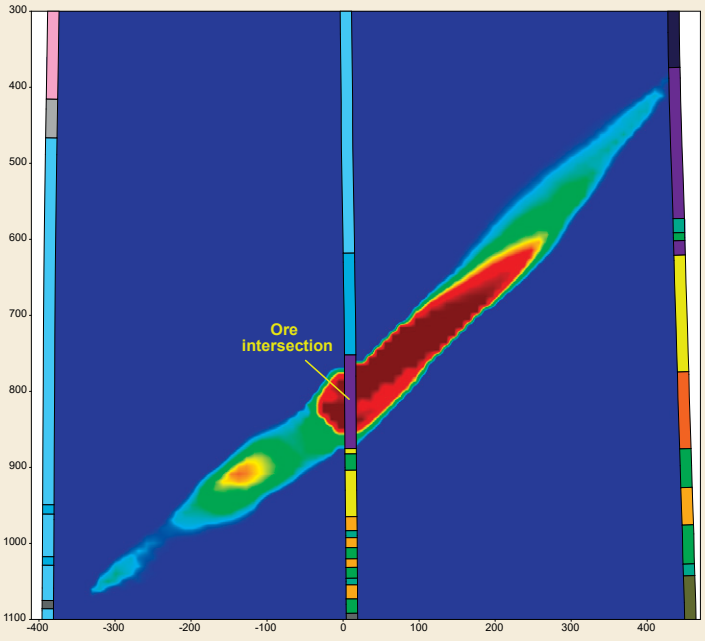


OUTLINING KNOWN OBJECTS

FARA is used to obtain additional information on the outlining of explored ore deposits in order to clarify their volume at the stage of calculating deposit reserves.

This example shows that with the help of the system, the position, extent, angle of inclination, and the outer boundaries of the sulfide mineralization zone identified by drilling (the near vertical borehole in the right part of the section) were determined. All information received was confirmed by four verification boreholes drilled as a result of work with FARA.

Also, one of the verification boreholes confirmed the presence of a conductive object corresponding to an unknown conductive zone in the lower left part of the section. The boreholes intersected a crushing zone saturated with saline water, which was taken into account when planning mining operations in this area.



IDENTIFYING THE FEATURES OF KNOWN OBJECTS

FARA allows you to identify previously unknown features of detected objects. In particular, the thickness, the boundaries, the pattern of pinching out, the angles of incidence, etc.

In this example ore mineralization was found in the central borehole. Mineralization had not been discovered in nearby boreholes. With the help of FARA, it was found that the ore zone was local in nature and broke off without reaching adjacent boreholes. However, the nature of the distribution of mineralization up dip and down dip of the central borehole is different. The position of pinching out, thickness, inclination, and other parameters were determined, which made it possible to comprehensively characterize the zone.

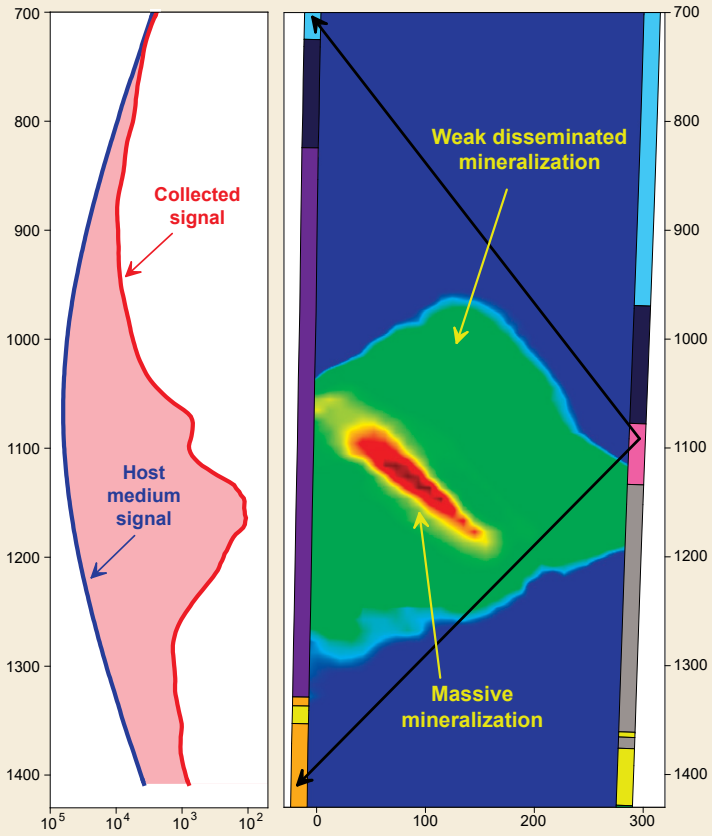
The image was obtained by combining of two independent FARA surveys.

IDENTIFYING THE INTERNAL STRUCTURE OF THE OBJECTS

The use of FARA makes it possible to detect conductive inhomogeneities inside large low-contrast objects.

This example shows that low-mineralized zones were exposed in the drilled boreholes. The use of the system made it possible not only to determine the shape, size, and boundaries of the zone but also to identify a local area of increased mineralization within the zone.

The graph on the left shows the difference between the calculated host medium signal (blue) and the received signal (red). Their difference is a consequence of the absorption of energy by conductive objects - mineralized zones.

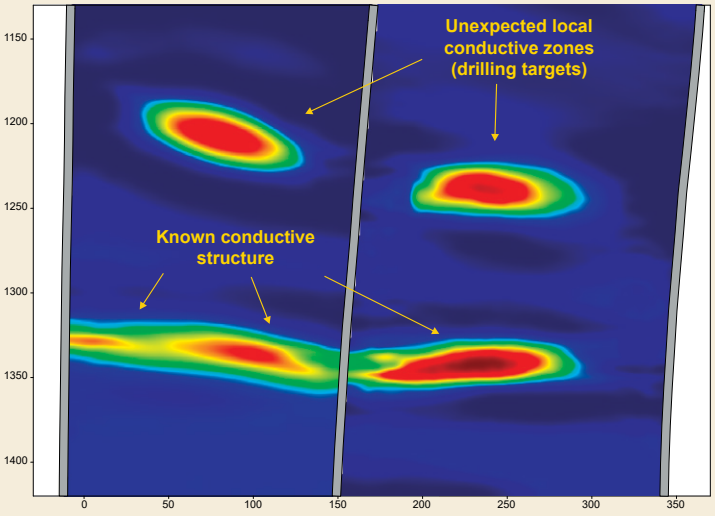


CROSSHOLE SPACE STERILIZATION

With a network of boreholes, FARA solves the problem of missing important search targets. The system unambiguously recognizes the presence or absence of an object in the cross-hole space, which can significantly save time and resources in geological exploration.

In this example at the top of the submitted cross-sections, the FARA system identified conductive zones that do not have corresponding intersections in the boreholes drilled through the network. As a result of using the system, targets for additional drilling are set. Potentially, zones can correspond to cost-effective development objects that would have been missed without it.

The image was obtained by combining of two independent FARA surveys.



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