## APPLYING "3D+VSP THE LOCAL PROJECT" AND "2D+VSP THE LOCAL PROJECT" TECHNIQUES IN CONDITIONS OF THE WESTERN SIBERIA

### Technique of the combined observations



The technique assumes registration of the fluctuations raised on a grid of works 3D (or 2D), a multipoint VSP geophone stay deep in the well.

Also makes VSP from several shot points.

### Experience of a technique applying

<u>The technique "3D+VSP"</u> was applied on one of deposits of Western Siberia to studying productive layer.

The area of works - about  $25 \text{ km}^2$ .

The maximal SP distance from a well about 3 km.

The three-point VSP geophone settled down on depth of 2640 m.

<u>The technique "2D+VSP"</u> was applied in northern area of Novosibirsk area to search of the petrosated sites in a bark of aeration of paleozoic breeds.

Length of a profile - 4 km.

The maximal SP distance - 2600 m.

The three-point VSP geophone settled down on depth of 2420 m.

## Technique of an estimation of static amendments and velocity anomalies of a Weathering model (3D+VSP)



First breaks hodograph of VSP deep geophone records

## Technique of an estimation of static amendments and velocity anomalies of a Weathering model (3D+VSP)



High-frequency static amendments (amendments for point of explosion)

# Technique of an estimation of static amendments and velocity anomalies of a Weathering model (3D+VSP)



Velocity naipdofrequences statluching advocatof a frozen ground

### Technique of correction of the form of a signal



Record from a deep geophone

Record from a deep geophone after correction of the form of a signal

### Technique of correction of the form of a signal



Records of the surface receiver for several points of explosion (on the left - before correction, on the right - after correction of the form of a signal and a statics by records of VSP-geophone)

### Results of processing



(on the left)

### Interpretation of the data



Map of one of seismic attributes at the top of productive layer U1

Object reminding river channel with inflows can be outlined

> - well № 1 (H = 16 м) (inflow of oil of 26 m<sup>3</sup> / day)
> - well № 2 (H = 0 м)
> - well № 3 (H = 5 м)
> - well № 4 (H = 2 м)

H - thickness of a penetratable part

# Technique of an estimation of static amendments and velocity anomalies of a Weathering model (2D+VSP)



Hodograph of first breaks of records of a deep VSP-geophone

## Technique of an estimation of static amendments and velocity anomalies of a Weathering model (2D+VSP)



#### Static amendments

### Results of processing



Comparison of results of data processing 2D+VSP (on the right) and standard 3D (on the left)

### **Conclusion**

Advantages of use of the combined supervision:

✓ compensation of unstable conditions of an excitation due to the control of the form of a signal of each shot;

✓ use of authentic static amendments for an excitation;

✓ use of the exact velocity model on a well according to the VSP taking into account horizontal gradient of velocities in a Weathering model.