- the same with an additive oxidative agent - O_2 and transfer of the admixtures (*Ca, Al* and others, for example) into oxides passing into slag;

- the purification of powdery silicon in solid by halogens, chlorhydric or sulphuric acids, etc.; the ultimate product being the refined silicon powder;

- the silicon treatment in plasma.

The main method of Si_{tech} commercial refining at the CJSC "Kremny" (Shelekhov, Irkutsk Region) – is the oxidizing-flux one performed in scoops by air blowing (with adding siliceous sand as the flux) [4]. We carried out the pilot plant tests on the operating equipment of the enterprise by two refining methods. 1. The refining of Si_{tech} by the oxidating method with the following crystallization was performed at the following parameters: the compressed air flow = 29-34 m^3/h; the melt temperature = 1550-1570^{0}C; the gas- and air mixture supply increase up to ≈0,6 MPa; the blowing time = 16 hours; the silicon crystallization period = 48 hours.

2. The refining of Si_{tech} by the oxidating method by blowing the melt with oxygen-rich air was performed (without adding fluxes) at the following process variables: the pressure in the oxygen and compressed air supply lines ≈0,5 MPa; the melt temperature = 1472-1481^{0}C; the refining time (average) = 1,5 hours; the consumption indices of oxygen, compressed air, m^3/h, accordingly: 4; 19,5. After the carried out tests the degree of Si_{tech} refining from principal impurities made, %, accordingly: on the first method - *Fe* - 97,27; *Al* - 95,5; *Ca* - 99,64; on the second method – *Fe* - 6,7-8,2; *Al* - 70*;* *Ca* - 94,95.

Thus, the silicon refining procedures suggested allow obtaining refined silicon of high chemical purity without significant changes of the process flow sheet existing at the plant.

The work was supported by the program of the Ministry of Education and Science of the Russian Federation «Development of Science Potential in Higher Education (2006-2008)», project no. RNP 2.1.2.2382.

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The work was submitted to international scientific conference «Manufacturing Technology», Italy (Rome, Florence), September, 9-16, 2008, came to the editorial office on 23.07.2008

ADVANCED FEATURES OF OIL-BEARING STRATA VERTICAL AND LATERAL HETEROGENEITY MAPPING AND STUDYING USING INFORMATION MEASURES

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As a rock characteristics heterogeneity measure in a vertical geological cross section the coefficient of relative entropy (Pelto, 1954; Yaglom, Yaglom, 1960; Dementyev, Khitrov, 1966; Ozhgibesov, 1975) was used.

$$K_{\Phi} = \frac{-\sum_{i=1}^{n} p_i \log p_i}{\log N} \quad (1),$$

where $K_Ф$ – is the coefficient of relative probability entropy (coefficient of facial heterogeneity); n – the number of group intervals of the measured parameter; p_i – the probability of the observation result fall within the i-th group interval; N – the number of group intervals of the measured parameter (here N=10, that is why the denominator represented as a common logarithm is equal to 1).

The first extremal case. The petrophysical rock properties parameters' amplitudes have been studied on the bore well logs.

It goes from the formula (1) that at n = 10 and p_i = 0,1 the $K_Ф$ value is equal to 1. In the calculations we used the logarithm to base 10. The considered case conforms to the *maximal heterogeneity* of the vertical section of the isochronal stratigraphic range chosen. The number of facial rock types is equal to 10.

The second extremal case. If the vertical section is homogeneous, all the values of amplitudes in the well log fall within the same grouping class. In this case p_i = 1, and the $K_Ф$ value is equal to zero, as log 1 = 0. The number of facial rock types in the vertical section is equal to 1.

Present-day computer technologies allow getting in the shortest time such vertical section heterogeneity complementary information, which is impossible to get in other ways. This heterogeneity can also be mapped.

For the geological section heterogeneity problem solution on the GC, OGC, SP and RC diagrams we applied the computer programs, which allow analyzing and interpreting the well information quickly using standard petrophysical algorithms and also making the relative section entropy map.

The use of the relative entropy coefficient for the evaluation of vertical section lateral variability has an advantage of other ways of mapping of facies reflecting the geological system heterogeneity. This advantage consists in the fact that the number of facial rock types, which are taken into consideration, when lateral variability of the facies evaluated by information measures theoretically unlimitedly (as distinct from the traditional method of drawing facial maps on the basis of lithological triangles).

The $K_Ф$ value allows coming to the conclusion about facial heterogeneity of the vertical geological section in every well, and also studying the heterogeneity index variability in the studied area on the parameter value, which changes from 0 to 1. When using this extremely formalized information parameter, the lithology on the direct core sample observations should be taken into account, as $K_Ф = 1$ for *any* homogeneous stratum. For example, for homogeneous porous sandstone and homogeneous dense argillite the $K_Ф$ value will be the same. Rocks are indistinguishable on this formalized characteristic.

With the appearance of special computer programs allowing representing a well log automatically in the form of a discrete series of points and composing a histogram on the basis of these data in the preset number of grouping classes the possibilities of studying vertical and lateral heterogeneity of a geological section by information measures have increased.

The source material presentation and its further computer treatment procedure described here allow solving the problems, which couldn't be solved earlier because of the labour intensity and duration of measuring and computation operations (Ozhgibesov, 1975).

However, it should be borne in mind that the beginning of the problem solution and the problem definition itself consist in the substantiation and choice of a concrete stratigraphic interval with isochronal (or relative isochronal) boundaries of its bottom and roof. The analysis and final conclusions about the multivariable lithologic-petrophysical heterogeneity of the vertical section and its lateral variability should be made only with due account for (probably, simplified) the three-dimensional lithlogic-petrophysical model of the studied territory.

Gratitude. The authors thank the Geological Department of the Perm University for the support of the participation of creative collective of students and teachers in the projects of the Russian and European Academies of natural History.

The work is submitted to the International scientific conference "Modern science technology", Tenerife, Spain, November, 20-27, 2008, came to the editorial office on 06.09.2008.

BASIC RESULTS OF WORKING OUT AND INTRODUCTION OF TECHNOLOGIES OF DESTRUCTION OF FRAGILE MATERIALS WITH APPLICATION OF PLASTIC SUBSTANCES IN MINING AND BUILDING

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Plastic substances for the purpose of destruction of natural or artificial brittle materials came into use comparatively not long ago. Despite of this fact there are concrete results briefly expressed in the following in this area.

The working out and realization of the brittle materials destruction technologies using plastic substances in industry should be connected with the initial definition and subsequent regard for a complex of factors reflecting the specificity of objective and subjective operative conditions.

The projecting of technologies of crushing firm formation lumps with drop-weight using plastic substances in conditions of mineral deposits exploitation open-cut mining method will be connected with: the necessity to use mining engineering able to produce high impact energies; the provision of destruction directivity elements absence by means of using smooth wading rods, the lack of the necessity to use estuarine parts and shot hole walls sealing; the use of maximally possible hole depth filled up with a plastic substance. Thereat, because of weight dropping height limitations there will be restrictions on maximum dimensions of the lump, the destruction of which takes place along the whole length of the hole drilled in it and filled up with a plastic substance practically simultaneously.

The projecting of technologies of crushing average and low strength formation lumps with a hydraulically and pneumatically operated hammer using plastic substances in conditions of mineral deposits exploitation open-cut mining method will be connected with: the possibility to use mining engineering producing lesser impact energies; the provision of destruction directivity elements absence by means of using smooth wading rods; the lack of the necessity to use estuarine parts and shot hole walls sealing; the use of maximally possible hole depth filled up with a plastic substance. Thereat, because of the tractor chasses-mounted hydraulically and pneumatically operated hammer raising possibilities limitations there will be restrictions on maximum dimensions of the lump, the destruction of which will take place in the contact point of the hydraulically and pneumatically operated hammer rod (lance) and plastic substance in the shot hole at its gradual moving from the estuarine part to the face one.

The projecting of technologies of crystalline rocks mining using plastic substances in conditions of