

## West Siberian Oil and Gas Field – Metal Content of Oil and Processed Products

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### ABSTRACT

The paper aims to figure out the West Siberian oil and gas field- metal content of oil and processed products.

By using the descriptive method for primary model, synthesis methods and process analysis and analysis of difficulties and discussion. The study of this problem point that, to assess the environmental impact of hydrocarbons on the biosphere, an accurate knowledge of the physical properties and chemical composition of oil and gas. Numerous tragic examples of accidents, such as those associated with a leak of hydrogen sulfide gases. Hydrogen sulfide, due to its higher density relative to air settles in the lowlands of the relief, accumulating in calm weather in concentrations up to lethal. This leads to the death of animals and the death of people. The latter could be avoided by going to elevated windward areas, i.e., knowing the physical properties of this toxic gas.

**Keywords:** Problems, Environment, Biotoxic activity, Hydrocarbon raw materials, Composition.

### 1. Introduction

Oil deposits of the southern territories of the same regions are less certain in terms of toxicological characteristics, their upper deposits are often enriched in PTE. Example -R-S deposit of the Usinskoye field.

In a special toxicological characteristic of oil from the deposits of the central and southern parts of the province do not need - they are moderately toxic, but their reserves are largely worked out.

Anomalous contents of vanadium and several other metals are known in the Pudozhgorsk area (Karelia) and Kachkanar (Urals). On the Onega Peninsula in the Medvezhyegorsk region in the 80s the largest vanadium-uranium deposit was discovered in the basement rocks, relating to uranium reserves (but not standards) to the 5th largest deposits in the world.

The results of the studies carried out were published earlier, but we present the main conclusions are somewhat more detail since when using secondary methods developments, which is almost inevitable for heavy oil, one cannot rely on the constancy of the metal content in the produced oil, namely, this is important for their geochemical and environmental performance.

The paper presents related studies and **analysis of the West Siberian oil and gas field- metal content of oil and processed products.**

#### 1.1. Research questions

**Question 1:** What are related researches and What are West Siberian oil and gas fields - metal content of oil and processed products?

### 2. Methodology

The authors have used qualitative and analytical methods, a descriptive method for the primary model, synthesis and discussion methods in this paper.

We also used the historical materialism method.

### 3. Main findings

#### *Analysis of the problem*

#### **Estimation of the volumes of vanadium and nickel extracted from the bowels along with oil since the beginning of development**

**Fig.1.** Usinskoye and Yaregskoye fields as of 01.01.1999

Parameter	Yarega	Mustache		
		layers		
		R + C	D	Total
Cumulative oil production, thousand tons	18688	40040	96010	136050
Average content in oil, g/t				
vanadium	56.6	77	fifty	-
nickel	33	68	fifty	-
The volume extracted from the bowels together with oil, t:				
vanadium	1058	3083	4800	7883
nickel	617	2722	4800	7522

Oil deposits of the southern territories of the same regions are less certain in terms of toxicological characteristics, their upper deposits are often enriched in PTE. Example -R-S deposit of the Usinskoye field.

In a special toxicological characteristic of oil from the deposits of the central and southern parts of the province do not need - they are moderately toxic, but their reserves are largely worked out.

Exception - Yaregskoye field with relatively insignificant production volumes of heavy oil enriched in V and Ni.

Extremely unfavorable for development in terms of toxicological characteristics is the oil of the upper productive strata of the fields of the Varandey-Adzvin'skaya OGO - one of the important future oil production regions in the Chamber of Commerce and Industry.

#### ***West Siberian oil and gas field***

This is the main oil and gas province in Russia in terms of resources, reserves, and production volumes, including for the future. Absolutely predominant in terms of reserves here are light and medium in density-0.82–0.88 g/cm<sup>3</sup> of oil. Weak and sulphurous - 0.8–1.8% with a low content of resin-asphaltenes, mainly 8–12% and, accordingly, V and Ni, the amount of which for most deposits in the central part of the province varies in the range of 40–60 and 6–12 g/h, respectively, slightly decreasing towards the north along vanadium.

The nickel content to the north remains approximately in the same ranges of 4–14 g/t as in the center of the province.



Fig.2. West Siberian OGP

Even the deposits of heavy oil in the region, whose reserves are sometimes among the largest -Russian, Severo-Komsomolskoye, Novo-Aganskoye, Fedorovskoye, and others contain, according to single analyzes, relatively small amounts of sulfur 1.0–1.5%, resins and asphaltenes 13–17% and only 30–35 g/t of vanadium and 10–20 g/t of nickel. They also contain little zinc - 0.1–3.0 g/t and Cu - 0.1–1.3 g/t.

In general, the bulk of the oil reserves in the region, are confined to the Khanty-Mansi Autonomous Okrug according to vanadium content, on average - 30–50 g/t, slightly inferior to the main deposits of Timano Pechora province. But unlike the latter, in Western Siberia, there are no large accumulations of high-metal heavy oil and natural bitumen. This is related to our point of view, with the prevailing mode of lowering the productive strata of the Mesozoic in Western Siberia, while in the Chamber of Commerce and Industry repeated periods of inversions brought out many oil deposits into zones of hypergenesis and even completely destroyed them, preserving their remains in the form of large accumulations of bitumen – Ust-Voisky, Izhemsky, Kozhe-Kamensky, etc.

This can be confirmed by the data on the content of vanadium in the resins of oil from Western Siberia. As can be seen from it, the content of vanadium in them in no way is not inferior to its content in the bitumen of the Chamber of Commerce and Industry. In addition to V and Ni, many other microcomponents, including Zn, Cu, Co, Mo, Cr, As, Hg, etc. Especially noteworthy is the unusually high content of As – 37 g/t in the export brand mixture oil - "Urals". Its basis is West Siberian oils with the addition of Volga-Urals. Should control these data in the future, since arsenic is not only toxic but also volatile, i.e. its quantities in the fields can be significantly higher than those noted.

Special geological and mineragenic prerequisites for the forecast of increased there is no metal content of oil in Western Siberia. There are no evaporites in the section; accordingly, there is minimum sulfur. In the early Triassic, throughout the vast territory occupied in the Paleozoic, the Ural geosyncline, and the modern epihercynian plate - Western Siberia, actively manifested themselves basaltoid magmatism, having formed based on Paleozoic sediments heterogeneous in age and the composition of the foundation. Heavy basements enriched with basalts in the subsequent Mz-Kz epoch steadily caved in, contributing to the accumulation of alternating marine and continental terrigenous deposits.

Only in zones enriched in volcanic material and deep faults can expect elevated concentrations of As, Hg, and possibly other PTEs, but they will also be associated with local anomalies rather than regional manifestations. The possibility of a change in the generally calm metallogenic appearance is also not ruled out. oil in the zone of the Yenisei monocline, but so far its commercial oil and gas potential has not been evident due to the lack of regional tires. The predominantly sandy section in the east of the province does not contribute to either the generation or the conservation of hydrocarbons.

The main removal of material from the Ural hercynides, including those enriched in ore components, went west, to the Russian platform. East of the Urals, in Western Siberia, in relatively calm sea conditions on the Paleozoic basement, there was an accumulation of terrigenous, mostly clayey material with a clarke metallogenic appearance, which did not contribute to the secondary enrichment of sediments and oil of Western Siberia with metals.

#### **4. Discussion and conclusion**

In general, with the current low level of exploration, the oil fields of the south Siberian platform within the Nepa-Botuoba antecline can be considered environmentally friendly for development. Now they have not yet

begun to be developed, but their development is being planned in the coming years, so a more detailed study of oil compositions. The level of knowledge of impurity components in oil is also insufficient, within even explored deposits.

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#### ***Consent for publication***

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#### ***Availability of data and material***

*The authors are willing to share the data and material according to relevant needs.*

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