

## **River pollution in oil production areas in Siberia.**

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The point of view of public ecological organization will be discussed. Our Novosibirsk Regional Social Committee for Water Protection has worked for 16 years in order to prevent irreversible degradation of surface water bodies in the Ob River catchment area. We are in opposition to local and federal governments because we see that the situation is worse and worse with every passing year. We live and work far from the oil and gas productive areas, but we are alarmed at the ecological situation of the waterways there, because there is not any real force which would be able to fight against an ecocatastrophe. At the same time we don't have access to all the ecological data. It is not customary in Russia to publish different ecological data. But we have information from different sources and try to estimate real situation.

The Ob River is the main natural water-way in West Siberia. It's 3650 km long from the source of the Katun river and 5410 km long from the source of Irtysh river. Its catchment basin is about 2990 square kilometers. It's the biggest catchment in Russia. So this river is the source of fresh water for almost 14 million people and several thousands of different enterprises. But it should be noted that the most part of the population is in the southern part of the Ob River basin. The middle Ob River basin and its northern part are not populated too much. And these areas are particularly rich in oil and gas. The climate of the northern parts of West Siberia is not very comfortable for people to live in, so the major part of oil fields are exploited by the so called "shift method"; i.e. workers come to the places of oil production for a short time of their work by helicopters, and their families live far from places of oil production. But, as it is well known, in modern conditions of Global Warming, this area may become the most attractive place, not only in Russia but on our planet in general. Huge unpopulated territory with tremendous natural potential may be populated by future generations. And our task is to keep the original natural status of the territory for future generations.

It is estimated that not more than 7% of available fresh water is used in this area. So the natural reserves of fresh water are huge and these reserves should be kept in their natural status too.

The European part of Russia had more developed oil production and it seems that it's necessary to analyze the ecological situation of water bodies there in order to make conclusions how to prevent river degradation in oil and gas production areas in West Siberia. But such conclusions would be wrong because of specific conditions in West Siberia. The local population is not able to observe any negative changes on such a huge territory, and because of that many companies realize oil production without any thought for the future ecological status of this territory.

West Siberia is the main area of oil production in Russia. 68,5% of total Russian oil production is concentrated in West Siberia, and all oil fields and productive oil wells are situated in the Ob River basin, in the middle and northern parts of it. The most part of this territory is covered by marshes. It is well known that all water bodies are connected with each other in nature. So the oil, which hits every water body as the result of different procedures during oil production, finally comes

into the flow of the main River. In our case all oil washed down from the surface is finally in the water of the Ob River.

The oil and gas production was started in the sixties of the last century, and in modern time it is increased every year. There are about 300 oil fields in Khanty-Mansyisk Autonomous Region (the main oil productive administrative region in West Siberia) and more than 120 productive wells are exploited intensively. The total quantity of oil production in the Ob River basin since 1964 is about 8900mln tons. If one considers that at least 5% of oil is lost (officially estimated and included in normative rules) and returned to environment during oil production, it means that 445mln tons of oil was poured on the surface since sixties. The most part of this oil was washed down by natural waters and collected in numerous rivers of the Ob River catchment. Natural content of oil in surface fresh water was increased in these areas before intensive oil production comparing with the regions without hydrocarbons in the Earth interior. But when it is changed under the pressure of oil productive processes, it becomes much more increased and the natural ecological balance is in danger.

According to official data, the situation with natural surface water quality in oil productive areas is normal. Official government ecological inspections publish their reports every year. There is a short estimation of the natural water status. As usual it is expressed in such words as: "nothing has changed"... "quality of water became worse" or "quality of water became better". These conclusions are made on the basis of official monitoring of natural water quality and not more than 15 indicators of pollution are taken into consideration. For example, the general indicator of oil pollution is total oil content in natural surface water. It means that official government laboratories should extract oil homothetic substances by carbon tetrachloride, or by another organic solvent and then determine the total quantity of oil-like products in water. And they never investigate what is the source of the oil in water, if it is natural or a technogenic one. None of the government inspecting organizations pays attention to special investigation of water sediments and the extent of their contamination by heavy oil products. The samples of natural waters are collected from the middle part of water flow. It means that there are not available data on the real status of ecological balance in water bodies in oil productive regions. Contamination of the river bottom by heavy hydrocarbons leads to a decrease of the most valuable fish populations because of their inability to reproduce the same quantity of cubs; places of fish reproduction are covered by the film of heavy hydrocarbons. From the other side heavy hydrocarbons of oil, such as aromatic compounds, are famous toxicants and they can induce irreversible degradation of fish populations up to full disappearance.

Oil-like products are the main pollutants of natural fresh water in the area of oil production. The concentration of all kinds of oil (light and heavy hydrocarbons together) is about 0,5mg/l according to official available data. But it should be mentioned that such concentrations as 2,5mg/l of oil are registered sometimes. And these figures are official. But from one side there are serious reasons to have some doubts of the accuracy of such quality indicators; from the other side almost all data are closed from the community.

There are special governmental inspections, which are responsible for controlling all oil production enterprises in their ecological legislation compliance. For example, the special Government Water Inspection in Khanty-Mansyisk Autonomous Region consists of 5 employees. They are responsible for controlling the status of more than 30 thousand of big and small rivers in this region and the activity of 394

water consuming enterprises. The most part of these enterprises are oil productive companies and their different plants, wells and oil pipes. Can you imagine that such control may be effective? Of course, it is absolutely formal and nobody ever tries to investigate the problem of natural water contamination in detail because it is impossible practically.

Almost all oil production enterprises make annual official reports on their compliance to ecological standards and different natural resource consumption limits. If they know that real governmental control is impossible, they try to reduce all indicators of real nature contamination. There is not any special law which would make an enterprise really responsible for the accuracy of all officially reported data. These private enterprises publish numerous reports about their investments in ecological projects. It seems that the ecological situation should be improved, but in fact even official annual reports of governmental inspecting organizations are full of data which prove the negative changes every year. The problem is in the standard which is adopted for all governmental inspecting organizations: they compare the ecological situation of any region with the same one of the last year only. So as usual they declare that there are not significant changes. But they never try to compare the real situation with the same one, for example, ten or more years ago. Sometimes there is not any ecological data available. But more often it is not demanded of official governmental organizations to make such comparisons. It means that if, for example, an average content of oil in natural water has been increased by 50% during one year (it is the usual situation and it is considered as insignificant because there is not big difference when you have 0.1mg/l of oil in water or 0.15mg/l of oil, it is reported as insignificant increase of contamination) it may change 10 times during 6 years. And there are not any reasons to compare these concentrations for governmental organizations because they are responsible to conserve the nature so it's easier for them to report – “nothing significant has happened during the last year”.

As it was mentioned above, there is not a big population in the oil and gas productive areas. So almost all people who live in the northern part of West Siberia feel so that they are temporarily there and are intended to be moved “to the big earth” in future. It means that they don't think much about the future ecological situation in this region. One day I was told by a very experienced oil exploring geologist, who is busy with drilling exploration wells in West Siberia, and lives in the big city of Novosibirsk far from the place of his job, that there is not any reason to worry if big spot of oil appears on the surface even if all flora is covered by this oil and the oil penetrates to the nearest river. As he thinks, nature needs not more than 25-30 years to recover without any help. And, it's the opinion of the most part of chief oil industry workers. They see very huge territory which is not populated so they think that there is not anything to worry about.

But at the same time official data shows that some rivers of the Ob River basin have lost their fish productivity completely during last 15-20 years. There are not big cities and few people living in this territory, but rivers became lifeless ones because of the oil and gas production only. They are such rivers as Nadym, Pur, Sob and some others. And in scale of Europe they are not small rivers; each of them may be compared with, for example, Thames or even Danube. Their bottoms are contaminated with heavy hydrocarbons so that the reproduction of fish is not possible.

As it is well known, oil production is accompanied by extraction of big volumes of brines. These brines have very big mineralization (up to 450g/l for West Siberian oil wells brines) and contain such elements as zinc, copper, lithium, cadmium, lead

and many other elements. Some part of these brines is wasted into surface water bodies. And because of that almost all rivers of the Ob River basin are extremely contaminated by heavy metals and other inorganic toxicants. It was proved many times that fresh water fish concentrate heavy metals in their living tissues and such fish becomes toxic for humans.

All oil industry workers, who live in the area of oil production, know that fresh surface water has taste and smell of oil-like products and it is noticeable even without any analysis. Special technologies are used for drinking water purification in oil and gas productive areas. There are different companies which offer suitable mini-plants for water purification in oil industry areas. It's much easier to buy such mini-plant for local oil industry workers than to think about problems of natural water contamination.

Federal and regional legislation is unable to stop natural water contamination. There is not a definite system of ecological legislation in this region. From one side we have numerous laws and standards which restrict technogenic pollution during oil and gas production. But at the same time not one law demands full observance of ecological rules. It's much more profitable for all enterprises to pay an ecological penalty than to prevent increasing pollution of the environment. Russian Government is in the phase of its reconstruction during last 20 years. Ecological legislation has been changed many times. And sometimes it's impossible to understand who is responsible for this or that ecological problem even if you are involved in this process of nature protection as the member of public movement. But it's absolutely impossible to understand this ecological legislation and ecological standards for ordinary people.

The Russian Government agrees that the territory of West Siberia, and particularly Ob River basin in KMAR, is one of the most oil polluted areas in Russia. The main reason of high contamination is the absence of a proper regulating base. There are very large territories, which are not populated now. Because of that almost all oil-producing companies declare an environmental oriented policy but act the wrong way. But, there is a big probability that in future these areas will be the most attractive places on our planet because of global warming.

The Siberian community tries to prevent fresh water degradation. Our Public Committee applied to Regional Government with special ecological legislation projects for the Ob River conservation in oil-production regions. We offered new technologies for water quality monitoring. We think that there is only one way to organize effective control of surface water quality monitoring: to collect all water samples in one independent governmental laboratory from all points of monitoring. We can't trust the data of oil productive companies, because we know that they think only about their profits at present and not about the future of the territory.

Our Committee applied to Regional Government with a demand to get an access to all ecological data from oil and gas productive territories. But we were told that this data costs much and the community should pay for such information! It is more evidence that there is much being hidden from the community.

The Ob River basin is in real danger. Oil and gas are the main sources of incomes for our country. But oil and gas production should be carried out reasonably because our planet will never forgive us: we take its wealth and we don't think about the results.