The impact of tengiz sulfur on the environment as a result of open storage

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Воздействие тенгизской серы на окружающую среду в результате открытого хранения

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Abstract: *this article describes about the processing of the waste oil, including harm Tengiz sulfur on the environment which openly stored in the open air. TengizChevrOil which is on oil the North – Caspian area, together with the foreign companies carry out several promising and large-scale projects. In Tengiz and other regions of deposits of crude oil are highly sulfuric, i.e. there is a large difference between oil-associated gas in the amount of sulphide is important. For the recovery of crude oil for an item, it is cleaned and this will result in elemental sulfur. With the growth of release of oil and the accumulation of sulfur increases. Elemental sulfur processed of Kazakh oil is valuable for the industrial chemical industry raw materials. In actual practice, however, the bulk of the chemical remain near the sites of oil. In Tengiz, there is still sulfur in the form of three-dimensional solid blocks on specially equipped sites, in other words, in real terms – as the map of «sulfur». The preservation of sulfur in the winch as well the methods used in countries such as Canada, Mexico, the Netherlands, Poland, and the United States.*
TCO specialists together with representatives of the Ministry of the Republic of Kazakhstan participated in several international conferences on the theme: the remnants of oil, including about sulfur. Sulphur international experts noted that Kazakhstan is among the 10 largest exporters of sulphur. It should be noted that employees of the Department of marketing and market research at TCO have done a really great job on the successful implementation of the transportation of sulfur.
Аннотация: *в данной работе рассматривается проблемы переработки отходов добычи нефти, в том числе влияние Тенгизской серы на окружающую среду, которая хранится под открытым небом. ТенгизШеврОйл которая расположена на Нефтяном Севере – в зоне Каспийского региона, совместно с зарубежными компаниями осуществляют несколько перспективных и масштабных проектов. Особенностью Тенгизского месторождения нефти является высокое содержание серы и ее соединений, а также высокое содержание сероводорода в попутном газе. Для транспортировки сырой нефти она очищается и в результате образуется много элементарной серы. Рост добычи нефти и накопление серы. В Тенгизе сера хранится в виде объемных твердых блоков на специально оборудованных площадках. Под действием солнечных лучей, атмосферы и других климатических факторов сера переходит во вредные соединения, отрицательно воздействующие на окружающую среду региона и здоровье человека. В связи с этим, в данной работе показаны возможности использования серы в резиновой промышленности с целью утилизации серных отходов.*

Keywords: *mercaptan, sulfur, tengiz sulfur, sulfide, phosphate fertilizer, rubber, asphalt, plastic, polluted area, flare gas, oxidation of sulfur.*
Ключевые слова: *меркаптан, сера, тенгизская сера, сероводород, резина, загазованная зона,факельный газ, окисления серы, вулканизующий агент.*

High levels of mercaptan in the Tengiz crude oil is the most serious problem, although sulfur is one of the permanent parts of oil and is contained mainly in the form of organic sulfur compounds and total sulfur content is relatively high from 0.51 to 0.8 wt. %. In the process of cleaning crude oil from TCO of hydrogen sulfide produces elemental sulfur, which is in Tengiz to the results of the processing of «sour» oil and gas, indicating the content of hydrogen sulfide. From year to year, growing artificial «mountains» sulfur arrays, about 69 kg of sulphur per 1 ton

of produced oil. Huge volumes of waste oil sulfur («sulfur maps" holds more than 8 million tons of product») a serious concern of environmentalists and the local population, since local climatic conditions sulfur can go into many sulfur compounds. At room temperature sulfur is poorly oxidized, but under the strong influence of ultraviolet rays on the Tengiz process of oxidation is quite rapid, probably with the formation of sulfuric acid in addition to various oxides of sulfur. Moreover, the arrays of sulfur are located in the sanitary protection zone of the Tengiz gas processing plant, a polluted area under the influence of the flare exhaust gases, containing carbon, hydrogen, various metals and many more. Their effect is enhanced when the winds are directed toward the area of storage of sulfur. For the oxidation of sulfur, especially in the summer time created «ideal conditions»: the open surface array of sulfur, free oxygen, presence of natural catalyst from strong UV rays. At the contact of the atmosphere – sulfur may cause micro-zones of weathering varying intensity across the surface of the arrays of sulphur, and with constant strong wind of the sulfur particles can spread by air basin for considerable distances. However, they can settle on the surface of the earth, water or react with other chemical compounds in pass new harmful substances. Therefore, the main problems arising in oil production at Tengiz is a risk of contamination of soil and groundwater, spread sulfur dust, as well as the supply of sulphide sulphur in the atmosphere. In this regard, the government of Kazakhstan has set TCO task to liquidate the accumulated stocks. It is obvious that with increasing of oil production (projected production of oil will increase from 12 to 20 million tonnes per year) sulphur recovery will be all the more acute [1].

In 2006 a lot of talk was sulphur, that it has an impact on the environment. At this time on the initiative of the Ministry of energy and mineral resources of Kazakhstan together with the Ministry of environmental protection (now the Ministry of energy of the Republic of Kazakhstan) in 2006 established a Coordination Council for the study of the impact of open storage of sulfur on the environment. To explore this issue were involved in 5 Kazakh research institutes and one international is the only Institute of sulphur in the world, located in Canada, Calgary.The results showed that the storage of sulfur at Tengiz is carried out in accordance with the requirements of Kazakhstan and international practice, as well as any impact on the environment or the health of the population is not detected. At the time, and now many are confused and cannot distinguish sulfur from hydrogen sulfide. This conclusion was made during the discussions, hearings, conducting various meetings with the population. It should be noted that sulfur is the mineral raw materials and is an inert, non-toxic mineral, the sulfide is a gas. While studying the issue of open storage, the members of city Council which included representatives of the ministries, administration of Atyrau oblast and TCO, visited Canada, as this country produces large amounts of sulfur and practicing open storage of sulfur from the 60-ies of the last century and climatic conditions close to Kazakhstan. There too cold in winter, there is wind. In relation to the storage of sulfur in an open way, the provincial government and interestingly, when our representatives of the Ministry of health asked the question about the influence of sulfuric card on the health of the population. They shrugged their shoulders and in reply they said that such a question never arose, and there is no question, there is no reason to study it. Where at a distance of 7 to 10 kilometers from the sulfur pads are agricultural farms, and their cattle grazing near sulfur maps (for comparison, the nearest village is situated in 60-70 km from Tengiz), and the largest port for transshipment of sulfur is in Vancouver, and the closest town is 200 metres from the boundary of the laydown area and Vancouver is considered one of the cleanest cities in the world [2].

TCO's specialists jointly with the representatives of several ministries of the Republic of Kazakhstan participated in several international conferences on sulphur, and the sulphur experts noted that Kazakhstan is one of the 10 largest exporters of sulphur. Under Kazakhstan they mean TCO. And it should be noted that employees of the Department of marketing and transportation, TCO has done a really great job in terms of market research and the successful implementation of the management plan gray.

Sulfur is used in the production of 30 thousand names of production. This phosphate fertilizer, paper, rubber, asphalt, paint, textiles, plastic and even cosmetics. It is also used in the nuclear industry, through the production of sulfuric acid, which is used for leaching of uranium ore. Earlier Kazakhstan imported sulphuric acid. However, JSC «Kazatomprom» has started the production of sulfuric acid, where sulfur comes and our. It should also be noted that one of the indicators of industrialization of any country is the production of sulphuric acid.

The TCO sulfur buy many countries, mainly the Mediterranean basin and Central Asia, including Kazakhstan, Russia, Ukraine and China. The sulfur market is really small. And fluctuations of this market are cyclical, rise and fall of prices. Despite market fluctuations, TCO sells sulfur steadily, and sometimes even at a loss in order to remove the sulfur from sulfuric cards.

Tengiz sulfur is recognized as one of the most high-quality products, its purity ranges from 99.99 to 99.97. In the world there is a great demand for granular sulphur. In this regard, the TCO includes the systems that produce granular sulfur. And basically all of the produced sulfur is produced in the form of granules [3].

State expertise of the Ministry of environmental protection of the Republic of Kazakhstan have agreed on the results of studies that confirm the safety working methods and Tengiz sulphur storage. This conclusion was made based on the results of a series of studies conducted with the participation of leading Kazakhstan and international independent research organizations that have been recommended by the Interagency coordinating Council.

Annotations on the submitted reports confirm that the impact on the environment resulting from open storage of sulphur in the Tengiz slightly. Among the key findings are the following:

- Storage Tengiz sulfur is carried out with observance of requirements of normative legal acts and in accordance with international practice.
- Any impact on the nearest settlements are not found.
- Tengiz sulfur maps characterized by a high degree of purity, and conforms to product standards (GOST 127.1).

• No measurable impact on groundwater, air or soil is not marked.
• Samples of water and soil do not differ from background levels.
• Sulfur dust levels are well below regulatory limits.

Chemical compounds of sulfur as reagents, and reagents are widely used in research laboratories of Universities, institutes and in secondary schools in conducting classes in chemistry. Currently RK all the reagents and reactants buys from near and far abroad, and foreign currency therefore became necessary to develop new technologies of obtaining of chemical reagents on the basis of sewage sulfur is energy saving and with low cost of the final target products. With the purpose of receiving products from sulphur, we have conducted research and development of new methods and techniques for obtaining a number of chemical compounds are sulfur - thiosulfate and sulfate salts.

Pre-us was installed in the chemical composition of sulphur - waste. It is established that Tengiz sulfur has the following chemical composition, mole %: S -98,61; Mg - 0,001; Al-0,001; Cu-0,0005; Fe-0,005.

The IR spectrum of this sample while scanning does not give a specific range, i.e. at 20 scans of 20 different spectra. Example 5 scans below.

Device: Fourier transform infrared spectrometer ShimadzuIRPrestige-21 with the prefix of frustrated total internal reflection (FTIR) Miracle company PikeTechnologies.

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