Microcrystalline quartzite deposit "Sopka-248", a relatively highly- pure deposit, is characterized by the calculated crystallinity index values within 1.90 ... 2.28. Quartzites change their chemical composition and color, while their crystallinity index increases up to 3.16 ….4.40 relative to depth increase and from the central zones to the periphery of the ore bodies. It is assumed that quartzite crystallinity degree increase is associated with superimposed metamorphic processes, resulting in the formation of crystalline -quartz phase. In local areas, especially in increased crushed zones, initial chemically pure quartzites under the impact of supergene processes degrade, while their crystallinity degree increase up to 5.6 in some areas.

These values reflect some relative crystallinity index values representing the degree of quartzite conversion. The crystallinity index estimates in accordance to Murata & Norman method [4] applying the multiplet peak of $2\theta = 67{,}74^{O}$ verify the results obtained by IR spectroscopy [5].

It should be noted that the calculated values of quartzite crystallinity index according to proposed method are quite relative and can be used in the comparative analysis within one ore deposit. The bond between quartz micro-grain sizes and crystallinity index has not been established yet. This estimation could be a genetic feature and used further in metallurgical sampling in view of the fact that most samples indicated the lowest crystallinity index values.

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ABILITY OF PEAT SORBENT TO REMOVE OIL SPILLS FROM THE WATER SURFACE

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The increase of global energy demand has stimulated the construction of new pipeline systems, and the Russian Federation is no exception to this. That’s why the issues of pipeline reliable operation have become a matter of a great concern. It is a well-known fact that pipeline reliability is determined not only by the quality of the pipeline material, but also by a trouble-free operation and thorough oil-spill prevention. The environmental impacts of pipeline operation depend both on pipe installation methods and such an important factor as timely and effective responses to environmental emergencies, including leak detection and oil spill elimination.

Tomsk region has significant peat fields. Due to its incomparable properties, peat is frequently used in manufacturing an affective sorbent to clean up hydrocarbon spills spread over a water surface. Development of peat-based sorbents for the removal of oil and petroleum products from water surface could become effective technology in saving marine environment and ecosystem. Therefore, the research aimed at studying peat sorbent properties within different deposits is of great importance.

Thus, the purpose of our research is to deploy an effective pollution prevention strategy that leads to successful oil leak prevention and efficient oil spill cleaning up at sea, even at low temperatures.

In order to achieve this purpose, it is necessary to figure out the following objectives:

- to conduct oil spill risk analysis and provide corresponding oil spill responses;
- to propose the ways of collaboration between oil and peat industries;
- to carry out an experimental investigation of peat sorbent.

Many ecologists state that oil production inevitably lead to ecological disaster. To reduce the risk of possible oil spills, it is necessary to develop a set of actions on the prevention and elimination of oil spills.

However, it is rather difficult to estimate actual volume and extent of oil spill and its further consequences, because it is necessary to consider a number of such environmental conditions as tidal stream and direction of near-water wind, sea temperature, salinity and etc. which directly influence the velocity of oil spill propagation.

Spill response procedures in ice and open water are fundamentally different. Oil spill prevention and response capabilities in ice-covered waters pose additional problems to be solved. It’s obvious that such conditions significantly complicate spill response, at the same time, it seems reasonable to admit that oil spill will occupy much smaller area in ice-infested water.

Anyway, under ice condition, it’s necessary to use special equipment such as arctic skimmers and special materials, which efficiently absorb oil even at low temperature. In accordance with recent scientific research, spill propagation area as well as the mixture of light hydrocarbons in air will move to the shoreline in the case of disaster. Thus, oil spill technologies should be used not only in the open sea and in coastal water, but in offshore line as well.

Nowadays, all oil spill clean-up methods can be divided into physical, biological, mechanical and chemical. However, mechanical method (skimmers) is proved to be effective only when used within first several hours of the initial spill, i.e. oil spill thickness is more than 2 mm. However, it should be noted that oil film which remains after using skimmers can produce more harmful effects on flora and fauna, because it prevents air-water gas exchange. Thus, to remove final traces of oil, sorption materials should be used as a final stage.

Today, sorption material market is overflowed with international syntactic sorbents. However, it's quite difficult to predict the behavior of such sorbents in water at low temperatures. That's why, the present research is focused on the analysis of natural sorption material application, i.e. sorbent produced from peat extracted in Tomsk region. This material is not only eco-friendly and rather available, but it effectively sorbs various types of pollutants at wide range of temperatures.

Tomsk region takes the second place among other Russian peat deposits. Most oil companies use Spillsorb as a sorbent. This sorbent is more expensive than that proposed in this research, while oil sorbing capacity is approximately the same. The main advantage of peat sorbent is that it is manufactured in Russia, in contrast to the Canadian Spillsorb (Table 1).

Table 1

Comparison of sorption materials

Sorbent	Base of sorbent	Oil sorbing capacity, g/g	Coast, rub/kg
SpillSorb	Peat moss	4-8	169
TomskSorbent	Upper-layer peat	3-8	100

In order to estimate oil sorbing capacity, a number of the experiments were carried out in specialized laboratory (Table 2).

The graph below illustrates that the upper-layer peat with less degree of decomposition is characterized by higher oil sorbing capacity (Fig. 1).

Table 2

Features of research objects

Field	Peat type	R, %	Technical analysis		
			W^A	A^D	V^{DAF}
Temnoye	Upper-layer fuscum peat (UF-5)	5	7,9	2,1	76,0
Semiozerye	Upper-layer sphagnum peat (US-25)	25	8,2	2,9	73,5

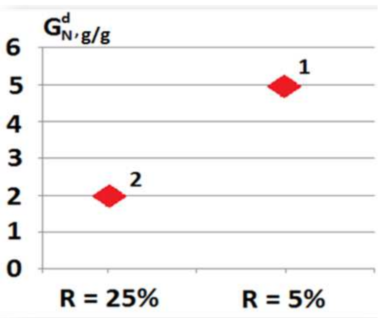
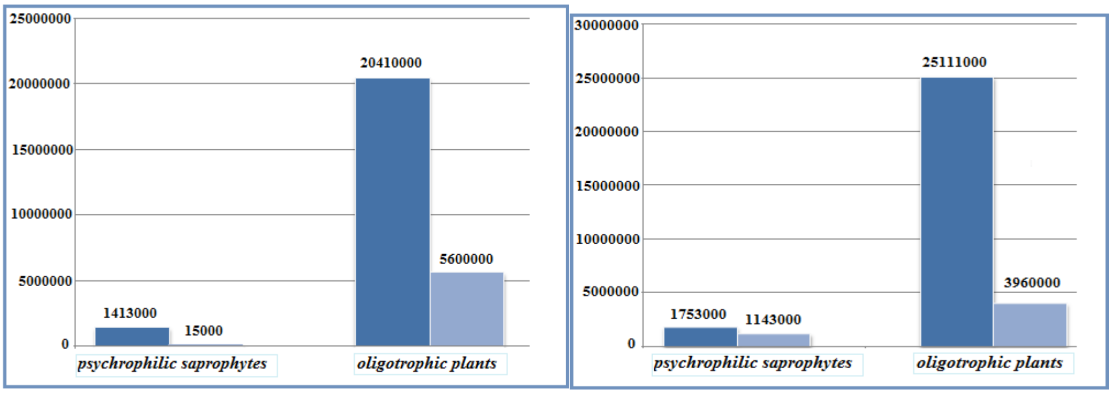


Fig. 1 Dependence of Decomposition Degree on Oil Peat Capacity: 1 – UF-5, 2 – US-25

To estimate the efficiency of peat as a sorbent in cleaning up hydrocarbon spills spread over a water surface, fluorimetric and microbiological analysis were conducted (Fig. 2). The experiments were being carried out during 2 and 4 months. The graph below shows that the longer the experiment the lower oil content in water is. It means that the sorbent is constantly working.



a) b)

2 months after spill
4 months after spill

Fig. 2 Microbiological Analysis of Peat with Sorbed Oil: a – UF-5, b – US-25

According to the results of fluorimetric analysis, oil destructive bacteria appeared in the samples two months after the initial spill and, furthermore, their number was increasing during the next two months. It should be noted that no microorganisms were added into mixture of peat and oil before the experiments. Besides, low temperature is known to be a stress factor for bacterium, which stimulates its reproduction activity.

Therefore, the most obvious findings to emerge from this study are as follows:

- the circumstances and conditions of accidental oil spill should be thoroughly considered before cleaning up procedures;
- peat sorption materials is proved to be an effective method for cleaning up the water surface and shoreline.

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DIE DIAGNOSTIK DER SPANNUNGSKORROSION AN DEN ERDGASFERNLEITUNGEN IM LAUFE DES DAUERBETRIEBS

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Das Problem der Spannungsrißkorrosion des Rohrmetalls an den Erdgasfernleitungen ist seit 80er Jahren des vorigen Jahrhunderts aktuell. In dieser Periode wurde die Einwirkung verschiedener Faktoren auf die Entwicklung der Spannungskorrosion untersucht und die folgenden Gruppen von Schlüselfaktoren ausgewählt, die für ihre Entstehung verantwortlich sind.[3]: die Parameter des Spannungsdehnungsverhaltens der Rohrmetallen, die Spezifität des Korrosionsmediums und metallurgische Faktoren, die die Empfindlichkeit der Rohrmetalle zur Rissbildung bestimmen. Die Spezifität des Korrosionsmediums hängt von mehreren Kriterien ab, aber den größten Einfluss auf die Unfallhäufigkeit an der Gasleitung wegen der Spannungskorrosion üben die Bodenart, der Grundwasserspiegel, die Werte der Schutzpotentiale, ph-Werte und die Mineralisation des Bodens laut der Analyse, die in [1] angeführt ist. Von den angegebenen Parametern ist der Wert des Schutzpotentials regelbar, der im Bereich von GOST-R 51164-98 reglementierten Werte aufrechterhalten wird. Aber die Havariezerstörungen entstehen in den Abschnitten mit dem Potential der Pipeline, die im normativen Wertebereich [2] liegen, was sich durch den Unterschied der Mechanismen der «klassischen» Korrosion und der Spannungskorrosion erklären lässt.

In [2] wird gezeigt, dass die Anzahl der Fehler der Spannungskorrosion von der Entfernung bis zum Dränagepunkt der Kathodenschutzanlage abhängt: in der Nähe des Dränagepunktes ist die Wahrscheinlichkeit der Entwicklung von Korrosionsdefekten hoch, weiter reduziert sie mit zunehmender Entfernung von der Kathodenschutzanlage (siehe Abbildung). Das zeugt von der direkten Einwirkung der Parameter des elektrochemischen Schutzes (ECHS) auf die Entstehung der Spannungskorrosion.