

# R&D Outsourcing

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## Kamchatka burn



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What caused the environmental disaster in Avacha Bay  
Discommunication, hype and the human factor - RBC visited Kamchatka and talked with victims, activists and scientists to assess the scale of the environmental incident and the version of the case, which no one can figure out yet

Photo: Dmitry Sharomov / Greenpeace

"I propose to everyone who does not believe to chip in money, send delegates to the [river] Nalychev and drink water - I will allocate a mug! Do you understand what GOST is? It's not a matter of faith! This is scientific data! " - Alexey Ozerov, a leading researcher at the Laboratory of Active Volcanism and Eruption Dynamics at the Institute of Volcanology and Seismology of the Far Eastern Branch of the Russian Academy of Sciences, shouts to the RBC correspondent.

Emotions and the human factor accompany the story of an ecological incident off the coast of Kamchatka from the very beginning. "There is a war going on," Ozerov explains why he didn't have time to answer the journalist's questions for three days.

Hype and controversy

The story of the environmental disaster in Kamchatka shocked many and quickly spread across the RuNet and the media, largely thanks to social networks. During the first week of October, all of Russia heard about Khalaktyr Beach, dead sea animals washed up on the shore, and frightening symptoms of people plunging into the water of Avacha Bay in the Pacific Ocean.

The staff of the Snowave surf school on Khalaktyrsky Beach had their first reaction to the water on September 8. "Many had a fever up to 38, there was a wild weakness, vomiting, many slept all day, time was lost," says the base administrator Katya Dyba. Accustomed to rest in harsh conditions, surfers did not pay attention to the feeling of dryness and pain in their eyes. They did not dare to tell someone outside the camp about the strange symptoms, fearing that the SanPiN checks would begin, they continued to ride and teach.

Subsequently, it turned out that two other surf camps on Khalaktyrsky beach faced the same problems: Quick silver and Surfway. The condition of the inhabitants of the camps worsened by the 20th of September, several Snowave employees recall in a conversation with RBC. "Those who are most in contact with water vomited - mainly school staff. But everyone had problems with their eyes, even the students who once went into the water," says instructor Rasul Hajiyev. Among the most common sensations are pain in the eyes, as if sand had got into them, and a veil, as if looking through gauze.

"Personally, my eyesight dropped sharply. In five more, doctors confirmed a chemical burn of the cornea of the eye of the first and second degree," says the founder of Snowave Anton Morozov.

Employees of the Snowave surf camp at a meeting with officials at Khalaktyrsky Beach, October 8  
(Photo: Elizaveta Antonova / RBC)

According to his calculations, a total of about 400 people could have suffered from the environmental incident - approximately the same number of people, according to the school's logbook and data from the other two camps, entered the water on Khalaktyr Beach during this time.

"We ask all victims to go to the UK and record the harm they have for their health with doctors. Otherwise, no one perceives this information," says Morozov. Members of the Russian national surfing team Mai Rudik and Dmitry Ilyasov, who received chemical eye burns, were among those who submitted an application to the Investigative Committee for recognition of them as victims in a criminal case. According to Morozov, the authorities are trying to accuse surfers of exaggerating the scale of the incident. But Rudik has already been recognized as a victim.

## SOCIETY

Investigative Committee recognized the surfer victim in the case of water pollution in Kamchatka

Morozov and other camp employees are accused of dishonest treatment of clients. "Surfers have been feeling unwell for most of September, why did they say so only at the end of the month? - asks Olga Chernyagina, senior researcher of the Kamchatka branch of the Pacific Institute of Geography, eco-activist. "They didn't leave camp because they were in a disaster — their season ends in October."

There has been a lot of information discommunication in history, admits the director of the Kronotsky nature reserve in Kamchatka, Peter Shpilenok. The video, which, among others, was shown on Instagram by Yuri Dud and thanks to which many in Russia learned about the problem, was filmed not on Khalaktyrsky beach, but much further north, he notes.

The video was shot on October 1 by Dmitry Zadirey, pilot of the local airline Vityaz-Aero. He noticed a spot in the area of the Kalygir and Malaya Medvezhka bays during a flight from Petropavlovsk to the Commander Islands, about 80 km north of Khalaktyrsky beach. According to him, then he "did not even know what kind of hysteria was going on about the Khalaktyr beach." "There were spots in the ocean, but it was something gigantic, dirty yellow-brown with yellow foam along the coast. I've been flying in Kamchatka for 30 years and have never seen anything like this," he recalls.

Zadirey gave the video to the director of the mountain-sports base "Snow Valley" Alexander Moroz, who is familiar with surfers. They asked to draw attention to the problem, the video was handed over to Dudyu, after which "everything got confused" and the video began to be associated with Khalaktyrka, oh

explains the pilot. The environmental incident has become firmly associated in the media as the incident on the Khalaktyr beach. The fact that the anomaly is also observed in the north has passed

public attention. "There are simply no roads, almost no one lives, you can only get there by helicopter, and no one knows what is happening in the north," the pilot says.

On October 6, the staff of the Kronotsky Nature Reserve explored the coastal water area from Cape Nalychevo to Starichkov Island and came to the conclusion that 90% of the benthic organisms of the Avacha Bay had died. In response, the authorities accused the reserve of incorrect presentation of the facts, since the conclusion was based on just a few dives. Emotional statements are understandable, Shpilenok believes: for the first time in their life, the specialists who faced such a phenomenon were really shocked, and the ocean for them is the meaning of life.

Cape Lopatka, Pacific Coast (Photo: courtesy of KamchatUGMS)

All these contradictions have led to general tension. Some officials said the surfers made it up, prompting backlash and mistrust of the authorities' assessments.

"We do not know what it is, but so far what is happening is more like a mass hype than an environmental disaster," Alexei Kumarkov told RBC on October 8, introducing himself with a bitter smile as "still the Minister of Nature of Kamchatka".

It was he who shot a video with an absolutely clean Khalaktyrsky beach, which appeared on the regional government's page on October 3 and collected a bunch of stinging comments.

"This is some kind of parallel universe, where there is no water pollution, no dead animals, the commentator is a robot without a heart," wrote the user winter4soul.

"The beach was clean. And nobody believed it. The entire Internet is screaming that sea animals are dying en masse here. Now the beach is also clean, and surfers, in the presence of the head of Rosprirodnadzor, confirmed that there was no mass release of aquatic organisms [organisms adapted to living in water]. The release was on other, rocky beaches, and scientists will figure out the causes of the phenomenon," the minister repeated, wandering along the beach after another extraordinary meeting.

On October 8, there really were no aquatic organisms washed up on the shore on Khalaktyrsky beach, and the water did not have an unusual color and smell.

Khalaktyrsky beach, October 8 (Photo: Elizaveta Antonova / RBC)

Surfers who were present on the beach admit that there was no massive release of sea animals and the video filmed by Kumarkov was not staged. "There are few living creatures on Khalaktyrsky beach - only seals (Far Eastern seals - RBK), sea lions, mollusks are not particularly abundant. The bottom here is sandy, and they just don't live here. Basically, they threw out sea animals in Bolshaya Lagernaya, Malaya Lagernaya, Bezymyannaya bay, where they live," explains Anton Morozov.

On Khalaktyrsky beach, three seals were thrown out, and in some places surfers watched how these mammals behaved atypically - "they got out of the water and did not seem to know where to go," he recalls.

Landfill version

Over the course of two weeks, many versions have been expressed, and none of them has yet found scientific confirmation.

At first, the hypothesis became a priority that the cause of the disaster could be poisonous substances that got into the ocean along the Nalycheva River and then spread southward along the

current, including towards Khalaktyrsky beach. There are two landfills not far from the Nalycheva River: the operating facility of the Ministry of Defense, the Radygino landfill and the unguarded burial of pesticides (pesticides), the Kozelsky landfill.

The Kozelsky training ground has nothing to do with military training grounds, it is a civilian facility where herbicides and pesticides prohibited for use were buried, explains Chernyagina. It was created in 1979-1981 by the regional "Kamchatselhozsnab" without a corresponding project and in violation of the Temporary Instructions for the destruction of pesticides and containers from under them, recognized as unsuitable for use, according to the report of the regional Ministry of Natural Resources of 2015, which was published on the agency's website. In 2002, an inspection of the landfill revealed point pollution of soils, as well as ground and surface waters with organochlorine pesticides in concentrations below and no more than twice the MPC (maximum permissible concentration. - RBK) for drinking water (SanPiN 2.1.4.1074-01). The landfill is located on the lands of the Ministry of Defense, but does not belong to the military department, in fact, being ownerless.

On October 6, the governor of Kamchatka, Vladimir Solodov, named the version of the technogenic factor and the Kozelsky test site as one of the priorities. Eco-activists also took it seriously. On October 6, Greenpeace published satellite images of the Nalycheva River, which flows into Avachinsky Bay: in the photo from September 8, it is noticeable that muddy streaks have formed near the place where the Nalycheva River flows into the bay. Activists speculated that this was evidence of hazardous substances entering the ocean, which would explain the poisoning of surfers, reports of changes in the color and odor of the water and the appearance of foam on the surface.

Photo: Greenpeace

On October 7, the Investigative Committee announced the initiation of a criminal case over pollution and death of sea

animals in the water area of Avacha Bay (part 2 of article 247 of the Criminal Code (violation of the rules for the circulation of environmentally hazardous substances and waste) and part 2 of article 252 of the Criminal Code (pollution of the marine environment).

Criticism of the version of the landfill

Olga Chernyagina is sure that the image from the satellite contains river suspension. They and colleagues from the Pacific Institute of Geography designed the Nalychevo natural park back in 1995, and then made a scheme for the development of specially protected natural areas in the Kamchatka Territory (the river belongs to the territory of the Nalychevo natural park, which is included in the list of UNESCO World Natural Heritage Sites ).

The Nalycheva River is large, in its middle course there is the Nalychevskaya Valley. There are many outlets of thermal springs of complex mineral composition, including those with a high arsenic content, the scientist explains. "The banks of the brooks are made of red travertines containing arsenic. The valley of the Nalycheva River is surrounded by active volcanoes. One of these volcanoes, Zhupanovsky, erupted quite recently (in 2013-2015), after the eruption a large mudflow came down from its southern slope, which reached the river. All this creates a huge amount of finely dispersed materials that are washed away, merge into the river, and the river takes it out to the sea, it is never transparent, "explains Chernyagina.

Together with her colleagues, she worked on Lake Nalychevo from September 2 to 8 - walked along the coast, crossed the Nalycheva River twice. "We were treated to fish caught in the river. There was nothing unusual, the people living in the house by the river mouth did not complain about anything, they were healthy and cheerful, the dogs too, "she recalls.

Nalycheva River, September 2 (Photo: Olga Chernyagina)

"If there were leaks from landfills, it would certainly have been noticed or somehow affected the vegetation, which also had nothing unusual," the eco-activist is convinced. During the picking season for mushrooms and berries, no one complained about something unusual and no one was poisoned. In addition, a large number of fish go to the Nalycheva River for spawning, Chernyagina reminds, therefore, specialists of the Kamchatka branch of the All-Russian Research Institute of Fisheries and Oceanography (VNIRO) conduct regular observations there. But they did not reveal anything unusual either.

The version with the landfill is also refuted by the fact that the color of the water and the state of the inhabitants of the seabed to the north of the Nalycheva River have changed, says the director of the Kronotsky Reserve, Peter Shpilenok, who notes that it is necessary to check all versions.

Mouth of the Nalycheva River, October 10 (Photo: Elena Nenasheva)

If the release were from the Kozelsk test site, then, given the movement of the current to the south, the question arises of how the substance would get there (into the Kalygir Bay), the biologist explains. "Judging by the points from which eyewitness reports come, this is an area from the Kalygir Bay to Cape Lopatka with a length of more than 350 km," Shpilenok continues. Subsequently, it turned out that the affected area is much wider than Avacha Bay - on October 13, scientists recorded a similar problem on the Okhotsk coast.

In addition, he notes, the defeat of animals is selective. On October 9, the staff of the reserve organized an expedition to Krashennikov Island, which is located north of the Nalychev River: fish swims near its banks, crustaceans run, but anemones, molluscs, sea worms and hedgehogs, if not dead, are in a very depressed state - for example, in the latter needles fall off.

"The task of the expedition to the north was to check the version with the release of substances from the Nalycheva River, that is, from the Kozelsky test site, and now, in my opinion, this version is ruled out, since it does not explain the oppressed benthos recorded much to the north (organisms living on the bottom and in its thickness. - RBK)", - concludes Shpilenok. In addition, it does not fit in my head what a potent poisonous substance should be in order to disturb the ecosystem on such an area.

Since the end of September, water and soil samples have been taken in Avacha Bay, Avacha Bay and on the peninsula in the vicinity of landfills. In particular, the Center for Laboratory Analysis and Technical Measurements in the Far Eastern Federal District took samples on October 1, Greenpeace activists also took a series of samples (water, suspension, foam, bottom sediments, bottom organisms from different bays, mainly Avacha Bay, including on the embankment in the center of Petropavlovsk), which were sent to several independent laboratories in Moscow and St. Petersburg. The first results of the analyzes revealed the excess of the MPC for several substances. In particular, an excess of phosphate ions was found by 10.8 times, total iron (6.7 times) and total phenol (2.9 times). These data were first interpreted in favor of the version with the technogenic nature of pollution. The head of Rosprirodnadzor Svetlana Radionova, who arrived in Kamchatka, said that no significant excess of harmful substances was found. (By the time of publication, no more significant violations of the MPCs for these substances were found in subsequently taken samples from other laboratories.)

Phosphate ions are an indicator of anthropogenic pollution, which is promoted by

The use of phosphorus fertilizers and polyphosphates, such as detergents, notes Chernyagina: phosphorus compounds enter the reservoir during biological wastewater treatment. The revealed excess of maximum permissible concentration of phenol and oil products is really not critical, they only indicate that there are some emissions, Shpilenok believes: "This does not confirm the version

with the landfill. This only indicates that there are questions about the environmental situation as a whole. "

The revealed excess of power is explained by the polluted bay and the discharge of oil products from ships. "We have pollution of the Avacha Bay water area, because there is a really old wastewater treatment system here. And here ships do periodically drain the water, "Governor of Kamchatka Vladimir Solodov explained to RBC. The trail from the spacecraft on the satellite image of the IKI RAS dated September 23 explains the temporary insignificant excess of values for oil products and phenol, he believes.

The laboratory at the Institute of Volcanology and Seismology of the Far Eastern Branch of the Russian Academy of Sciences, which took and studied water samples from the Mutnovka, Mutnaya and Nalycheva rivers, did not find a significant excess of the MPC for phenols, oil products and styrenes.

"At first, the version with the test site seemed clear to me, because it is located in the north of Avacha Bay, and the current is south - that would be logical. But we didn't find anything. The head of the laboratory said that according to GOST, the liquid from these rivers belongs to drinking water. Therefore, in any case, the Kozelsky test site is being swept aside, "says Aleksey Ozerov.

Kozelsky test site (Photo: leks\_85\_kamchatka / Instagram)

In early October, a working group from Kamchatka State Technical University visited Malaya and Bolshaya Lagernaya bays - once again they took samples of algae for work that has been going on for many years, says Tatyana Klochkova, professor of the Department of Ecology and Nature Management of Kamchatka State Technical University, Doctor of Biological Sciences. Scientists monitor the same coastal areas, take samples of algae for study, including determining the presence and concentration of heavy metals and other pollutants in them. The collected algae are kept in Klochkova's laboratory. "We found no anomalies on them. If there were toxic chemicals in the water, algae would also suffer. In this case, we would be collecting a bad-smelling semi-decomposed mass. But the emissions were normal, beautiful plants, "she says.

Even if the reason is not in the landfill, the situation in which an ownerless landfill with unexplored pesticides is located near the ocean coast is abnormal, believes the founder of the surf school Anton Morozov. "I understand that we have to defend our borders, etc. But such things cannot be near water bodies. Nature is so arranged that all this descends from the mountains and falls into the ocean. You don't need to have a special education to understand that if the burial ground is located near a volcano, then sooner or later all this will fall into the groundwater, "he said indignantly. The governor has already promised to reclaim the landfill.

The Red Tide Version

There were fewer and fewer arguments in favor of the version of technogenic pollution, and the scientific community began to seriously discuss the likelihood that toxic algae were the cause of the emergency.

Initially, the version of the "red tides" looked like the most fantastic and looked like the authorities' attempts to absolve themselves of responsibility for possible man-made accidents. There is still no direct evidence for this version.

BUSINESS

The closed borders did not justify the plans of the Kamchatka authorities for tourists

Vice-President of the Russian Academy of Sciences Andrei Adrianov was the first to suggest this version.

What are "red tides"

"Red tides" are described in a 1995 book by Galina Konovalova, a leading researcher at the Kamchatka Institute of Ecology and Nature Management, FEB RAS, planktonologist. It provides information about this phenomenon in Japan and deaths due to human contact with water off the northeastern shores of Kamchatka during the period of extensive red water bloom in 1945, as well as in Petropavlovsk-Kamchatsky in 1973. Toxins produced by several types of microscopic planktonic algae directly affect humans and animals, the author notes. She points out that this phenomenon is accompanied by mass death of aquatic organisms due to clogged gills, lack or lack of oxygen, as well as the death of benthos and infection of people through eaten fish.

An article on the English-language portal Surflife from 2018 talks about this phenomenon and the possible consequences of human contact with water, in particular, such as diarrhea and pain in the eyes. "Large patches of blooming phytoplankton eventually die and sink to the bottom, where they are decomposed by bacteria; a process that can reduce the amount of dissolved oxygen in the marine environment, resulting in fish death and temporary dead zones," the article says.

Tatyana Klochkova, professor of the Department of Ecology and Nature Management of the Kamchatka State Technical University, Doctor of Biological Sciences, carefully selected expressions in a conversation with RBC. Colleagues from other grew up

Siysk scientific and educational organizations put forward a version that poisoning of animals and molluscs by microalgae could have taken place, she said.

We are talking about unicellular microalgae, the so-called toxic phytoplankton. It is different: some species produce toxins, others do not. When toxic plankton bloom, their toxins enter the sea water, which can lead to the death of marine life - mollusks, hedgehogs, other animals, explains Klochkova.

But in order to prove this version, it is necessary to find cells of toxic plankton, determine them visually and using DNA analysis to a species, then determine the presence of toxins in the preserved tissues and organs of affected animals and mollusks, explains Klochkova. This is an extremely time consuming process and takes a long time. Without detecting toxins in their organs and tissues, all talk about microalgae is speculation, the scientist insists. However, this year was an abnormally warm summer for Kamchatka with a large number of sunny days, which could provoke an outbreak of plankton bloom, Klochkova suggests.

But another scientist involved in the study of the bay told RBC that for two days of going out to sea, he did not notice a trace of this type of microalgae, as well as the possible consequences of their metabolic products.

The version of toxic algae became a priority on the principle of the method of exclusion, after the rest were not confirmed, the RBC interlocutor close to the presidential administration admits. No traces of toxic algae have yet been found, he confirms. "The bottom line is that we have no traces of disaster from the point of view of samples," he says.

The version about military installations

Among others, a version was put forward about the aftermath of military exercises or about the leakage of toxic substances from one of the military facilities in the border region. Historically, a large

number of military facilities (border outposts and air defense companies) were deployed along the coast of Kamchatka, some of which have now been eliminated, and some have remained. On the territory of Avacha Bay near Petropavlovsk, there is the closed city of Vilyuchinsk, a nuclear submarine base, as well as a large number of military facilities, Chernyagina recalls. Among them are the Radygino training ground, where ground troops are trained, and the Kura training ground near the village of Klyuchi. The toxic rocket fuel was in the units that were based near Petropavlovsk in Radygino, but little is known about what became of it, says Chernyagina. In addition, there are many sunken ships in Avacha Bay - and this problem has also been a problem for many years.

In numerous tests, evidence in favor of the version of a rocket fuel leak was not found, and with such a scale of defeat it is hard to believe in it, says Shpilenok. The Ministry of Defense has officially denied the involvement of the fleet in the pollution of Kamchatka: information about the possible involvement of the Pacific Fleet in the pollution of ocean water in the area of Khalaktyr Beach is untrue, said the headquarters of the fleet.

#### The volcano version

The Institute of Volcanology dismissed versions related to the activity of volcanoes and seismic activity, Ozerov said. The volcanoes Klyuchevskoy, Bezmyanny and Shiveluch erupt far and weakly, that is, the ash plume does not stretch far from them, he explains. "Everything that gets into the water from them is within the radius of Ust-Kamchatsk, it is very far away. Regarding the version with seismic activity, we do not have increased seismicity, but we did not observe such things during strong earthquakes," the scientist continues.

"Based on all the information received today, I am more and more inclined to believe that this is some kind of natural phenomenon," Shpilenok suggested. Like many other scientists, he is perplexed and insists that all versions should be checked. "It is already unrealistic to hide anything, a large number of laboratories are involved, WWF and Greenpeace are connected, people are conducting independent investigations," the director of the reserve lists.

Greenpeace still calls what is happening in Kamchatka an ecological disaster, since the massive death of benthic organisms leads to a disruption of the food chain and ecosystem, and all the consequences are difficult to assess, said Vasily Yablokov, head of the Greenpeace climate project in Russia.

#### War for the environment

The results are not enough to create a complete picture of what happened, activists insist. While there is not enough information about heavy metals and laboratory analyzes of tissues and organs of dead animals, the collected materials have not been tested for pesticides, the organization emphasizes.

Local environmentalists blame the accident in the Pacific Ocean on humans and their activities, although they do not attribute it to a one-time leak. "It's easier to believe in disaster. Nobody wants to understand that we are all involved in the pollution," Chernyagina is indignant. The director of the Kronotsky Nature Reserve is of the same opinion.

#### SOCIETY

The head of Kamchatka invited foreign scientists to study the water in the ocean

If the state spent on scientific research, the formation of an ecological culture and environmental protection, a tenth of what goes to law enforcement and supervisory structures, such a situation could have been avoided, he thinks. "We are always preparing for some kind of war, but in fact, the war is now different, in the scientific community, we can see this even in the fight against coronavirus and the development of a vaccine," Shpilenok explains. "A war for the environment is starting all over the world."

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