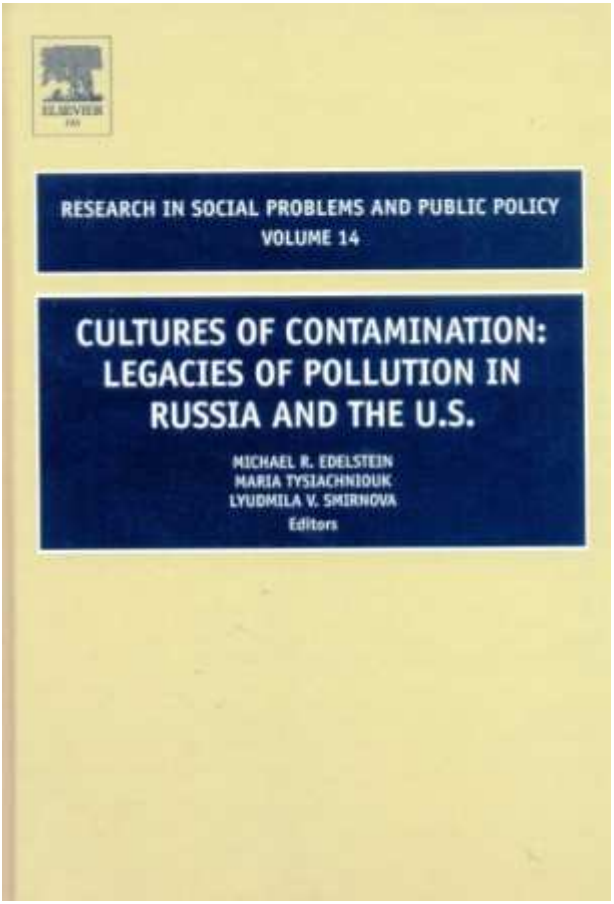
Kulyasova A.A., Kulyasov I.P. Sokol: Seeing the forests for the trees // Cultures of contamination: legacies of pollution in Russia and the United States. Research in social problems and public policy. Eds. M. Edelstein, M. Tysiachniouk, L. Smirnova. Amsterdam - Boston - Heidelberg - London - New York - Oxford - Paris - San Diego - San Francisco - Singapore - Sydney - Tokyo: Oxford Elsevier Ltd. 2007. Vol. 14. p. 47-72.



SOKOL: SEEING THE FORESTS FOR THE TREES

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INTRODUCTION

This chapter analyses conditions under which residents of a small Russian town accept the concepts "pollution" and "ecological risk". The town in question is Sokol in the Vologda oblast of the Russian Federation, where there are two pulp and paper mills and other forest industries. Sokol is a typical small town with a population of about 40,000. The pulp and paper mills are locally run. The issues surrounding Sokol's pulp and paper mills generally present a typical Russian picture (Kulyasova & Kulyasov, 2002a, 2002b) with one major exception. Industrialization in Sokol goes back more than a century and thus reflects the broader history of the 20th century.

The authors conducted qualitative sociological research in Sokol from 2000 to 2003. This article is based upon 15 expert key informant interviews with representatives of various sectors of society in the cities of Vologda and Sokol, as well as 62 local resident interviews taken in Sokol and its immediate suburbs and reflecting differences in gender, age, social status, and employment.

In pulp and paper mill communities, residents need not rely upon technical equipment to record the extent of pollution of air, water, and soil. They can directly detect such pollution on a daily basis by means of their sense organs. However, given the industrial history of the community, signs of pollution are so normal that we wanted to learn if they are actually perceived by people, and if so, whether they are defined under the concepts of "pollution" and "ecological risk". Related questions of importance were the impact on perception of pollution due to the source of contamination being the waste products of a Central Construction Bureau and whether residents connect their state of health with ecological risk.

During the period in which industrial production developed in the USSR and Russia, ecological pollution was not publicly discussed. The concept of "ecology" and "ecological risk" was virtually absent from people's daily discourse. At that time the priority in cities was the development of the economy, the growth of industrial production and the construction and broadening of manufacturing. In the 1980s, the situation started to change and the concepts of "ecology", "ecological pollution" and "ecological risk" became widely used. At the end of the 1980s and beginning of the 1990s, with glasnost and perestroika, there began an active

struggle for a clean environment in Russia. These years were characterized by a mass ecological movement and protest campaigns. However, later in the 1990s, Russia entered a period of economic decline, and once again ecological problems faded into the background.

The beginning of the 21st century in Russia has been characterized by ongoing restructuring of the state agencies concerned with natural conservation and a weakening of ecological legislation, which have in turn led to a weakening of state ecological control (Kuliasova & Kuliasov 2002a, 2002b).

THE DESIGN OF THE CONCEPT OF "POLLUTION" AS A REFLECTION OF ECOLOGICAL RISK

The modem concept of risk has been explored in the writings of several Western social theorists, most notably Anthony Giddens, Ulrich Beck, and S. Lash (Beck, Giddens, & Lash, 1994; Giddens, 1999). According to their analysis, the development of science and technology has not only raised the level of social risk and risk in nature, but has also limited our ability to meaningfully evaluate the consequences. In a condition they term "reflexive modernization", the concerns of modern people increasingly encompass the very consequences of modernization itself. Future alternatives are interpreted so as to reflect present realities and thus become all the less predictable in their consequences.

In conceptualizing ours as "the risk society", Beck writes about the ubiquity and invisibility of risk. The industrial destruction of life's ecological and natural foundations has released a social and political dynamic without historical analogy, the development of which compels us to rethink the independent relationship of nature and society. Nature can no longer be understood without society or society without nature. A side effect of the socialization of nature has been the socialization of nature's destruction. The damage suffered by nature and the destruction of natural habitats are now becoming medical, social, and economic threats to humankind globally. It is specifically this conversion of threats to n-ature into threats to social, economic, and political systems that represents a challenge to the present and future (Beck, 1998, 2000).

Oleg Yanitsky (1998, 1999) has applied the theories of the risk society and reflexive modernization to Russia's conditions of an economy transitioning between communism and capitalism. He argues that such transitional societies experience "the paradox of modernization", simultaneously advancing into high modernization and regressing backward into a phase of "de-modernization".

Such paradoxical development is the fundamental pattern in creating a modern. Western technological society. It entails intensified risk production on both ends. Accordingly, Yanitsky has characterized Russia as a society of general, widespread risk. This risk is magnified culturally by the absence of institutionalized reflection on risk in both the professional sphere and in scientific knowledge, as well as an absence of any regular analysis of the social and natural costs of personal activity. Meanwhile, there is a need to spend an ever-increasing proportion of society's material and intellectual resources on the creation of procedures capable of regulating the level of risk built into the process of social manufacturing. It follows that the acceptance of risk comes to be viewed as an inescapable condition of human existence. To Yanitsky, such risk acceptance must be viewed as a form of pathology.

Collectively, these risk theorists give special attention to the growing isolation of experts from the public. This isolation is of concern because experts are in a position to provide institutionalized calculation of and reflection on risk and guide decision making accordingly. As experts have lost contact with the values and wisdom of the larger society, expert knowledge itself has acquired a specialized and fragmented character. As a result, abstract systems that are global in their influence become fully accessible to an increasingly small minority of experts. Crossing so many political and social boundaries, moreover, experts are even isolated from their peers and find that they are unable to coordinate and compare their evaluations and recommendations.

This isolation of expertise has important consequences for understanding how risk is perceived. The concepts "pollution" and "ecological risk" as a whole are understood differently by experts and by local residents lacking expert knowledge. Edelstein has observed that risk is an abstraction to experts who can view it in relative terms. The American public, in contrast, responds to contamination when it is a personal threat, not an abstraction, and they consider it to be an absolute rather than relative issue Edelstein (2004).

Perhaps the only condition that puts both lay people and experts on the same footing is when pollution can be directly perceived by the senses. Using the case of Sokol, we seek to explore the extent to which risk-reflection, in the form of the construction of the concepts of "pollution" and "ecological risk", is characteristic of the residents of a typical Russian city with locally run industries.

The Setting

The town of Sokol is situated in the Vologda Region, in the northwest of Russia. Sokol and its countryside are very beautiful, the scenery dominated by both coniferous and pine forest. Sokol is situated on the banks of the river Sukhona, a stream of striking beauty. The Sukhona is a navigable river belonging to the White Sea watershed and is the largest river in the Vologda Region. The Sukhona flows from Kubensk Lake, one of the largest lakes in the Vologda Region, and then runs into the Northern Dvina and on to the White Sea. The entire Sukhona Region has been populated since time immemorial, as evidenced by ancient, picturesque villages and the cities of Tot'ma and Velikiy Ustiug, whose histories go back almost 1,000 years. Because Sokol is situated in the upper reaches of the Sukhona, its manufacturing activities affect the river as a whole. Due to ice floes, in spring the river flows in the opposite direction. Thus, its source, Kubensk Lake, is also impacted by industrial activities in Sokol.

THE ECO-HISTORY OF SOKOL

The history of Sokol is very closely connected with the history of its pulp and paper mills. As the largest forest industry enterprise in the Vologda Region, the Sokol pulp and paper mill is vital to the economy of Sokol and the whole region. The history of pulp and paper production in Sokol dates back to the late 19th century. At that time, there were about 20 small villages along the banks of the Sukhona, surrounded by forest, swamps, and flood plains. In 1896, a forest industrialist and timber merchant named A.Yu. Surkov cofounded the "Sokol Northern Pulp and Writing Paper Production Company", headquartered in Arkhangelsk. By the next year, Belgian experts were overseeing construction of a pulp mill on the bank of the Sukhona. The location offered excellent transport connections: the road between Moscow, Vologda and Arkhangelsk ran nearby, as did rail connections from Vologda to Yaroslavl and Arkhangelsk. The first paper machine was established in 1899 and the second one in 1903. Workers came from the 17 villages surrounding the mill. The mill gradually grew, and by 1912 it had 1,030 workers. By that time workers and specialists were already coming to the combine from all over Russia and abroad. Very early in the 20th century, hostels, workers' barracks, offices and houses for the engineers were built around the mill. At the turn of the century, other industries also began to develop rapidly in this area of the upper reaches of the Sukhona. In 1911, businessmen from St. Petersburg began to construct a second pulp mill, the Pechatkinsk pulp mill (today the Sukhona Pulp and Paper mill). A sawmill opened next door.

Over time, the settlements around the Pechatkinsk and Sokol mills grew together to form the town of Sokol, officially recognized in 1932 as the administrative, cultural and industrial center of the Sokol district (Loshchilov, 1999). From the beginning, a portion of the population acknowledged the ecological dangers of Sokol's industrial combines. Thus, opposition from peasants who refused to sell their lands forced the second combine to be relocated from its original proposed site in the upper reaches of the Sukhona. These peasants took their advice from "knowing people" (i.e., experts) who convinced them that the future production plant was too dangerous.

In the pre-revolutionary period prior to 1917, working and living conditions at the combine were difficult. Work occurred all day long in two shifts of 12 hours each. There was not enough accommodation for the workers, and therefore temporary barracks and apartments for specialists were constructed. After the revolution, the integrated combine continued to develop to meet the paper needs of the young Republic. The town accordingly expanded rapidly as well. By the 1930s, it brimmed with peasants relocating from villages throughout the entire district. The attraction to the town also reflected an escape from changes occurring in the rural Soviet Union. In the villages at that time collective farms were being built, animals and the means of production were collectivized, and the government demanded high taxes for natural products. As a result there was famine.

Factory workers were given a food ration. Because so many workers came to escape famine and collectivization, it is unlikely that people thought about the risks and dangers that awaited them in the town.

The ecological problems of this period are indicative of fast growing industrial towns. A rapid expansion of production resulted in discharge of substantial factory wastes directly into the Sukhona. Meanwhile, the growing number of houses discharged sewage directly to the river. A crisis ensued in which many lacked potable water. While the integrated combine provided running water and some wealthier residents had private wells, most transported water for drinking directly from the river. As a result of the lack of clean drinking water, enteric infections, dysentery, and abdominal typhoid spread, killing many. An interviewee recalled this period: ... *before 1934 we lived in a village. My father died that year. Mother could not feed six children in the collective farm, and we moved to the town because they gave out food rations there. Mother got herself work at the factory as a cleaner. After a few months two of my sisters and my brother died in hospital of dysentery* (female, 84 years old).

During the 1950s the level of waterborne infectious diseases in Sokol was the highest of all the Vologda Region districts (Loshchilov, 1999). However, this negative legacy for environmental health was overshadowed by the positive contributions of Sokol for industrial growth, as reflected in the books and newspapers chronicling Sokol's development from the 1930s. By 1936, the Sokol mill was a leading forest industry plant, second in Soviet production (Loshchilov, 1999). In the 1930s, a thermal power station was built close to the Sokol Pulp and Paper Mill and produced enough surplus power to supply the regional city of Vologda. Soviet propaganda emphasized these successes of the 1930s and 1940s, recalled by many middle-aged interviewees with pride in their combine, their town and their contribution to the development of industry.

Further development of the integrated combine occurred from the 1950s to the 1970s. Modern papermaking machinery was introduced. At the same time, chlorine bleach washing started to be used at the Sukhona Central Construction Bureau. In 1976, the Sokol and Sukhonsk mills joined to form one combine. Labor was divided equally. The Sokol mill specialized in producing different sorts of unbleached paper, fiberboard, and technical spirit. The Sukhonsk mill specialized mainly in producing bleached paper and fiberboard. In the early 1980s the annual production of the two mills totaled 132,000 tons of paper and 171,700 tons of pulp. This industrial output and modernization was matched with a rapid increase in pollution levels, forcing the crisis of air and water pollution to become acute.

This industrial expansion continued into the 1980s. Of most importance was the opening of a new hydrolytic factory for producing yeast fodder. This industry made the ecological situation in the town intolerable. As a result, the period of the late 1970s and early 1980s marks a turning point toward serious ecological improvement.

During the post-Soviet privatization process, the Sokol and Sukhonsk enterprises became independent companies once again. At that time the entire forest industry sector in Russia was in crisis. This situation caused trouble in Sokol as well, and the combined production volumes of the two mills were reduced by 8,000-10,000 tons per year during the 1990s (Krasnyy Sever, February 2, 1999). But in 1998 the Moscow investment group "fox" bought the Sokol mill. It started to develop once again, and new, modern paper production lines were opened.

This resurgence of the industry lacked the same social benefit as had prior economic development. Early in the 21st century, the Sokol pulp and paper mills had ceased to be locally operated. As a result, the mills

abdicated various social responsibilities that they had historically undertaken. The town's water intake station, its cleaning facilities, kindergarten, technical institute, and other social objectives were no longer provided by the industry. Similarly, the mills stopped building housing for the residents of the town. And then downsizing hit; the number of workers was reduced at the enterprise to less than 1,000.

ENVIRONMENTAL PERFORMANCE IN SOKOL DURING 1970-1990

The topics of ecological problems and pollution received widespread discussion in the 1970s in the Soviet Union, much as they did in the US. These concepts began to be constructed at the level of social discourse. This trend fit the worldwide goal of that time to realize the conservation of nature. In the USSR, this period of awareness corresponded to heightened pollution, reflecting the primitive state of the majority of old industries, lacking as they were in pollution controls of any types. If anything was to be done about these circumstances, it was clear that the central state had to take the lead. Accordingly, in the 1970s, the government of the USSR accepted a raft of resolutions on the construction of pollution control facilities in many cities and enterprises. The impacts for Sokol were typical of the nation as a whole.

Technological Fixes

The first environmental improvements were carried out in the 1970s, when the Sokol mill built a wastewater treatment plant that also served other enterprises and households in the town. This plant was not part of any local initiative. Rather, it was responsive to a government decree from the Ministry for the Pulp and Paper Industry issued specifically for this particular pulp and paper combine. Illustrated was how an attempt to solve local water pollution problems was initiated at the highest level of the Soviet Union. The workers of Sokol and Sukhonsk mills participated in the construction of the purification plant. The construction was rapid and was carried out in very difficult conditions on marshy grounds. The last part of the purification plant began operating in 1980 (Loshchilov, 1999).

The purification plant has had a great influence on the Sokol mill and the development of the town of Sokol during the last 20 years. Of greatest importance, it has also improved the ecology of the river Sukhona. Before the construction of the purification plant, local systems with cesspools and septic tanks were used and a large amount of wastewater was not cleaned at all. The drains from the Sokol mill flowed into the river Sukhona and the

sewage from the Sukhonsk mill was released into the river Pelshma, which flows into the Sukhona downstream from Sokol. The absence of any purification plant, water cleaning station or sewerage system constrained house building in certain areas and the development of the town overall. In many interviews interviewees spoke of how, before the construction of the purification plant, masses of cellulose fibers would flow along the river. In addition, acid was being continually poured into the river. One of the interviewees said of this that: *I didn't work on the combine full-time, but we were part of a student construction group, and in the summer we worked on repairing the combine, I myself saw then how tanks of acid were simply thrown straight into the river* (male, 47 years old).

The second investment in the environment also concerned water purification. In 1990 an integrated wastewater purification system was inaugurated at the Sokol plant to recover lost material. In the first application, 35% of fiber waste was recovered and returned to the production process. This fiber was reused as raw material for 720,000 square meters of soft wood fiber-board in 1990. Since then the process has become even more efficient and about 90% of fiber waste returns to the production process. This system has dramatically reduced the consumption of fresh water at the mill. It is interesting that this ecological improvement did not result from pollution reduction efforts. Rather, it resulted from an initiative announced in the mid-1980s by Mikhail Gorbachev to promote economic efficiency through resource conservation. The third environmental improvement involved the local thermal power station. As has been the rule for single-industry towns in the Soviet Union and Russia, the Sokol mill took responsibility for developing and operating municipal services and utilities. For example, the integrated combine built much of the housing in Sokol, as well as recreation and sports facilities. And it also actively participated in constructing the town's infrastructure. The district heating system was and is one of the most important public services provided by the mill[1]. The power station was originally built in the 1930s and renovated in 1978 in order to provide heating and hot water to the residents of the town center. The integrated Sokol and Sukhona combine has since provided heating for the majority of houses in the town.

Pollution benefits accrued from ongoing improvements. In the beginning of the 1990s, the thermal power station was rebuilt. At the time. 24% of total emissions in the air were produced by boiler houses, including those produced by the Sokol and Sukhona pulp and paper mills (17% and 7%, correspondingly). The reduction of emissions has been promoted by the conversion of the boiler houses to gas (instead of using coal and mazut).

This improvement was noted by practically all our interviewees: *Earlier in the town there was so much soot that it was impossible to hang washing outside since it would be covered in soot. Between the double-windows there would always be a black coating, and now there isn't any longer* (female, 58 years old). After the boiler houses' conversion to gas, all industries in the town improved. As one interviewee said: *The smoke that comes out of the chimneys is now white, not black, without any soot* (male, 19 years old. 2002).

Thus we see that in the Soviet era there were attempts to solve problems related to the local environmental conditions in Sokol. From a certain perspective these could be categorized as early attempts toward ecological modernization and the reduction of environmental risks. In the 1970s there was a more general tendency in Soviet industry to build water purification systems in industrial localities. This was a reflection of a new social and environmental protection policy by the Soviet state in the 1970s (Ziegler, 1987). This modernization was connected to a new discourse about environment and social health in Soviet state institutions (Kelley, Stunkel, & Wescott, 1976). These technological improvements and attempts to make environmental investments were very significant for improving environmental conditions in industrial localities. However, as in many other cases, these attempts were not sufficient to clean the surroundings of the industrial plant in Sokol. Today, the purification system is only partially operative, and it cannot ensure the cleaning of the polluted sewage waters. The ecology of the rivers Pelshma and Sukhona has suffered greatly from this problem.

Social Fixes

The other measure for the environmental study in Sokol was residents' reflections on pollution. As was noted, a hydrolytic factory for the production of yeast fodder was built in Sokol in 1986. This enterprise became the symbol of ecological problems in Sokol because of its noxious impacts. Yeast was discharged into pond sedimentation tanks. During warm weather, the albumen protein would start to decay, producing, in the words of local residents interviewed, an unbearable, putrid smell. *On this side of the town there used to be a terrible stench. Because they made some sort of yeast for cattle feed there. I saw a dark blue, stinking, foaming liquid flowing straight from the hydrolytic plant into the Sukhona - it was simply impossible even to go near it* (male, 48 years old).

These visible effects prompted widespread discussions about the ecology of the town. A protest movement formed. It was against the

background of the battle with the hydrolytic plant that the ecological discourse of the people developed, as they actively constructed their own understandings of "pollution", "ecological problems" and "ecological risk". Mass protests by the population of Sokol took place in the form of a large number of both spontaneous and organized meetings and demonstrations, critical newspaper articles and radio broadcasts, and telephone calls and letters to those responsible for the ecology in the town, as well as to the head of the local self-government organization. As a result of the protests, the factory was closed at the beginning of the 1990s. *And thus we came to the conclusion that, in the already complex ecological situation that we had. it was impossible for us to support yet another new project which would have aggravated our situation with respect to ecology. This is why the authorities applied every effort for this not to be the case for us. It was proposed, that the orientation of the production plant to be changed to woodworking* (member of the Sokol administration responsible for the social-economic programs in health and ecology).

This event with the hydrolytic factory is very interesting. Despite the longstanding pollution of water and air, residents of Sokol had previously given little attention to the ever-present pollution and environmental risk. What was different now? First, the mobilization of protest strongly reflected the milieu. This was a time in the USSR, at the end of the 1980s and start of the 1990s, characterized by the democratization of society and a mass ecological movement that took the form of protests across all of Russia.

A second factor, in our view, was more important. The hydrolytic factory was a new source of highly visible pollution. It directly affected the sense organs with its strong and disgusting smell. An interesting consequences of this noxious invasion was that everyone in the town was placed on a par - whether town administration, specialists or simple residents. However, authorities brought their power to the task.

A third factor also helped. The hydrolytic factory was new. It represented a novel phenomenon to which people had not yet had time to adjust. It was not connected to the hallowed past, in which people took pride. And it was not vital to the town's functioning as were the pulp and paper mills. All these reasons made this factory vulnerable to being viewed as an ecological risk in ways that the pulp and paper industry was comparatively buffered from.

Contemporary Environmental Problems in Sokol as Defined by Experts

Specialists have identified the quality of air and water to be the main ecological problems in the town of Sokol. Official statistics for the sanitary zone of the Sokol mill, which encompasses most of the town, report levels of sulfur dioxide in the air eight times higher than the maximum level allowed by federal law and standards. One of the neighborhoods located near the Sokol mill was abandoned in 1970 because unfavorable winds carried toxic compounds to it. There was a smell of acid in the town for years, but during the early 1990s the situation improved because of the decline in production. Recently the air quality has been getting worse again. Today ecological problems are severe and affect residents' health. According to an official of the environmental administration, among the residents of Sokol there are, for example, increased levels of allergic diseases, diseases of the respiratory tract, and cancer.

It is very difficult to reduce air pollution at a Russian industrial facility. An expert at the Sokol Sanitary and Epidemiological Inspectorate (SEI) explained: *We work by usually imposing tines in emergency conditions. We cannot act as far as the air in the atmosphere is concerned, because what are needed are radical measures, such as the construction of a new acidity regulating unit. Only in these circumstances can we achieve any positive results* (female, 49 years old).

In most cases, industries chose to pay modest fines rather than do the costly needed upgrades. For this reason, the only major force for pollution reduction in Russia has been the fact that economic crisis has produced a downturn in industrial production. Closed or largely quiet factories produce less pollution.

Thus, the principal improvements in Sokol occurred in 2003 when the Sukhona mill was virtually closed. According to specialists of the Vologda Regional Centre of Hydrometeorology, pollutant emissions from stationary sources were reduced 4.7 times (in 1990 they totaled 34,700 tons, while in 2001 this figure was 7,400). The level of sulfur dioxide emitted in the pulping process also decreased. However, the location of boiler houses in the immediate proximity to living quarters makes it difficult to ensure that air quality corresponds to standards (Sokol’skaya Pravda, March 10, 2002). The aforementioned interviewee confirms this point in her interview: *In fact, the town was built in such a way that almost the entire residential zone fell within the buffer area of the pulp-and-paper and wood industrial enterprises. So it is meaningless to speak of any 'safe distance'. People live here and polluted emissions affect them negatively. That is why the*

ecological situation here is very poor. As far as I know, we hold second position in this respect after Tcherepovets [the biggest town in the Vologda region, with even larger paper mills and chemical processing plants] (female, 49 years old).

The other big problem is the quality of the water. In addition to the two pulp and paper mills, there are many other enterprises located along the river Sukhona, including ceramic handicraft and woodworking enterprises. Other smaller streams in Sokol that flow into river Sukhona are also heavily polluted by the solid and liquid effluents of settlements and industries. There are three main reasons for this pollution. Firstly, the capacity of the purification system is insufficient. The purification plant of the town and mill was designed to process 29,000 cubic meters of wastewater per day, but in practice the effluents reach 35,000-36,000 cubic meters. Secondly, there are sewers from municipal services that flow directly into the river. Thirdly, accidents are quite commonplace, and industrial waste also flows directly into the rivers. For example, in 1999 entire tanks of acid leaked directly into the river (Sokol'skaya Pravda, July 18, 1999). Lastly, there are many small rivers in the town. All of them are polluted to a great extent, particularly the Makhrenga, which flows in the neighborhood of the Sokol Pulp and Paper Mill. All wastewaters also accumulate in the small river Pelshma, which flows near the town of Kadnikov, outside Sokol.

According to the statistics of the Vologda Regional Centre of Hydrometeorology, the main water pollutants are as follows: copper, iron, zinc, manganese, oil products, phenols, nitrites, and nitrates. The water a kilometer downstream, which is where there is waste discharge, is rated 7 on the pollution classification scale; 5 falls within the range "extremely polluted water" (Sokol'skaya Pravda, October 23, 2001). The reduction in water draw off and waste discharge seen from 1990 to 1998 was connected with a setback in production. Since 1999 these indices have been gradually increasing. The main polluter of water is Sokol's pulp and paper mills, which produce 41,500 tons of contaminants. The remaining enterprises in the region together produce 41,800 tons. Treatment plants function inefficiently (Sokol'skaya Pravda, July 10, 2002).

According to the State SEI, the overflow of contaminants in sewers at output is as follows: the amount of phenol exceeds permissible norms 62^50 times, formaldehyde exceeds permissible norms 2-36 times; methanol exceeds permissible norms 18-164 times; and lignosulfonic acid and oil products exceed permissible norms 17--34 and 8-36 times, respectively (Vologodskaya Nedelya, March 21, 2002).

We must note that the situation with drinking water is also critical for residents of Sokol who live in houses with running water. An employee of the Sokol Sanitary and Epidemiological Inspectorate (SEI), who is in charge of community facilities in Sokol and the Sokol Region, described the causes of this problem as follows: *In the town of Sokol the quality of water is bad because our river has a reverse current. In these conditions, adjacent waste discharges affect water intake. That is, water at inlets contains harmful impurities typical of discharges. I have in mind our water inlet, which we use for the supply of drinking water* (female, 49 years old).

It is notable that the official state agency statistics clearly show the very high levels of air and water pollution in the town. Agency reports of pollution are covered regularly by newspapers and thus have the potential to make some impression on the public. Nevertheless, there is little documentation of any public awareness on these issues. And, given the frequency of pollution reports, people may have become numb to the statistics. They may know that there is pollution in the abstract, but at the same time, they may not consider how polluting substances affect their lives and health. While there are many experts reporting the pollution results, none seek to explain their significance to the public. Nevertheless, experts have made a direct connection between pollution in the town and a high level of morbidity among Sokol residents with regard to certain diseases. According to the statistics of SEI, the Sokol Region in the Vologodskaya oblast ranks first in the average annual rate of congenital malformations. Sokol suffered 1,922 cases per 100.000 population while the corresponding average regional level is 823 cases (State Report on the Sanitary and Epidemiological Situation in Vologda, 2000, 2001). Cited is the opinion of an official at the Sokol administration responsible for social programs, including health and ecology issues: *We are among those towns where cancer morbidity is the highest in the oblast. Even higher than in Tcherepovets and Vologda. This is also linked, to a great extent, with the appearance of other diseases caused by the ecological problems and directly connected to the industrialized nature of the area. There were times when the maximum permissible concentration [of toxins] in the air was exceeded in more than 50 indices* (Vice Mayor of Sokol).

Likewise, an employee of the Sokol SEI responsible for community facilities in Sokol and the Sokol Region stressed the connection between the mortality rate and ecological problems: *It's clear that the people living in my town have been very badly affected by the environmental problems. Among all the other regions of the Vologodskaya oblast. our region ranks first in the statistics for cancer diseases. Looking at oncological morbidity*

at the federal level, here too, our situation is very dire. Respiratory disease ranks highly with respect to causes of morbidity and is prevalent. This gives a clear indication of the excessive amount of harmful substances in the air. Diseases of the digestive tract also rank highly, and this is connected to the quality of the water (female, 49 years old).

Scientific experts are increasingly concerned by their findings, which are based on their own reflections, hypotheses and investigations, as well as specialist information on pollution. An ecologist respondent expounded on the problems of complexity in water pollution, how reliability of results is affected, and the extent to which much remains unknown: *If you do an SEI (Sanitary and Epidemiological Inspection) or the Hydro me teen the (Hydro meteorological center water and air monitoring inspection), they can provide up to 40 indices, but amongst them are substances which we are often not even aware of, substances that react with one another causing chemical reactions which then react with each other and cause further chemical reactions. The results from the analyses are themselves very varied depending on the time at which the tests are carried out. be that in the morning, afternoon or evening. Substances tend to react most when they first come into contact with the water and at this point their toxicity also increases.*

Secondly, they begin to precipitate; the precipitation either accumulates or is absorbed by various algae, organisms or fish. So what we actually see are the residual concentrations, which remained in the water and not the whole chain of chemically reactive events. Water pollution and the level of pollution are two different things. In order to give an indication of the true level of pollution, therefore, we should investigate not only the water, but the riverbed, zooplankton, zoobentos, algae, macrophites and also the tish. Only after taking all of these into account can we begin to speak about the level of pollution. As things stand, our observations arc inadequate (Professor of the Vologda State Pedagogical University).

Scientific research has shown that the negative effects of the pollution from the town of Sokol on the ecology of the Sukhona River extend over long distances. Between 1989 and 1991, more than 60 tributaries of the Sukhona were investigated, including those that cross Sokol (situated at a river outlet) and those that flow through the town of Velikiy Ustiug at the border with the Arkangel'skaya oblast' at the mouth of the river. Concentrations of poisonous substances - typically sulfonates - from the chemical waste and polluted emissions from Sokol were found as far away as the town of Tot'ma, midway along the Sukhona River.

The results are summarized by a professor from the Vologda State Pedagogical University: *Fish is an upper level, a terminus. All one would need to do to be able to draw conclusions about the state of the water is to monitor the conditions of its existence. One can't estimate whether the maximum permissible concentration levels are better or worse than expected. The fish are sick. They have toxicosis, large liver mass, renal-calculus, and various pathologies including mutation of cranial bones. We have even come across fish without scales, just bare-skinned with articulated fins and backbones. Our fish acquire various diseases and the diseases are themselves an indication that the situation is very dire: that conditions in this natural environment are such that it cannot support natural life, normal functioning. We could yet find ourselves in exactly the same situation as the fish* (female, 40 years old).

Accounts and expert opinions concerning the connection between illness and the pollution are, on the whole, not readily available to the local residents and information is not released in the media. As such, the local community has little or no idea about what is happening.

LOCAL RESIDENTS' PERCEPTIONS OF ENVIRONMENTAL POLLUTION AND ENVIRONMENTAL RISKS

Many of our respondents compare the state of the environment today to that before the environmental reforms. Some noted that the state of the environment has improved (depending on the respondent's age) during the last 10 and 20 years. That is, there was a wide sphere of reference in terms of the answers given and generally people were very optimistic in their understanding of environmental trends. Respondents related improving environmental conditions to the suspension of production in a large number of industrial enterprises. They specifically cited two indices of ecological health. The first was citing the appearance of crayfish in some natural ponds as an indication of the purity of the water. And, second, the prolific growth of mushrooms and berries available for picking in the forests nearby their dwellings. Some respondents also noted an improving social environment, as indicated by the variety of goods and foodstuffs available in numerous stores, new work and training opportunities, chances to travel abroad, computerization, the advent of ecological education in schools, etc. Suggested is that perception of improved ecology reflects a more general perception of an improved quality of life during the period of economic reform; their experiences reflect the fervor with which residents have embraced new opportunities in their lives. These same respondents usually work as "subbotniks", participating in the spring scavenging and clean-up

efforts organized by the town. They are also responsive to requests from the authorities and public organizations for residents to actively preserve the environment in which they live.

These same respondents opposed the closure of the Sokol and Sukhonsk pulp and paper mills and instead supported their rapid modernization (if paid for by the owners). These views suggest a balancing, on one hand, of a concern for a safe environment with a concern to maintain positive advances in social and economic health. They are willing to be active on behalf of these goals.

Other respondents argued that the environmental situation remained as bad as before: *I don't think anything has changed ... something's still not quite right. The air is polluted and there are cases of disease caused by the water ... [Things are] neither better, nor worse, but not in the same ways as before* (an employee of the pulp and paper mills: male, 20 years old).

At the same time, perhaps reflecting their physical and social well-being, such residents acknowledge some improvement. It is as if they are trying to optimize their existence as best as they can in the midst of the present environmental and socioeconomic conditions. Thus, they are keen to discuss, in depth, not only the evidence of deterioration, but of improvement as well. As with the previous group, they are opposed to the closure of the Sokol and Sukhonsk pulp and paper mills and are ready to take part in schemes organized to help improve them on a voluntary basis. While they do not expect any prompt improvements in either the ecological or social situation, they take pains to ensure that these do not deteriorate.

Still a third group of respondents believed that the situation had worsened, citing expert evidence of ecological deterioration: *The situation is worse everywhere. We're doing the best we can and still everything is going downhill!* (female employee of the pulp and paper mills, 49 years old).

These concerns echoed by other respondents are alarmed by what they see as dismal ecological and social conditions in Sokol. Such alarm involves a concern for air quality: *The air has also become worse. It really is impossible to breathe* (male, 55 years old).

Water quality was also a concern: *The water never used to contain so much chlorine. There's no denying how much dirtier the water has become. Up till around 1991, we would swim in the river all the time and did not experience any skin problems. Now swimming is categorically forbidden and people are frightened of it. It seems absurd, but we are forced to tell children to stay away from it and yet here we are living on the river-bank.*

In the summer, you still get that urge to go for a swim, but it's strictly prohibited (female, 57 years old).

Soil was yet another focus of concern: *I don't like the land as it tends to be damp and has a putrid smell. There is filth everywhere* (female, 19 years old). There was an additional concern that conditions were toxic to gardens and houses: *We really felt the effects of the chlorine emitted from the Sukhonsk Pulp and paper mills when we had a dacha on the other side of the river. You could often come into the garden and see leafless cucumbers, squashes and cabbage, because the leaves had just died. In fact all the leaves are dead. All it takes is for a strong wind to blow in from the north and all the chlorine hits the garden plots* (male, 70 years old).

When the garden plots have been drenched in water from the treatment plant, what kind of harvest can one expect to reap? Of course, this doesn't just affect the harvest, but the buildings, foundations of the houses and so on. And here's one thing that happens quite often now - I remember at least, two or three occasions when the waste water from the treatment plant flooded the gardens; as a matter of fact all our suburban streets are in a terrible state. But there's no mistaking the effect it has upon farming. Gardeners suffer losses eternally; the sewage has corroded all the house-footings. And that's not to mention the adverse effect is has upon health and the air we have to breathe. There is also a whole list of economic problems stemming from it (female, 67 years old).

Finally, a pessimism for health was clearly evident: *I've become particularly prone to bronchial and pulmonary diseases since I've lived in this town ... and all the members of my family have a cough. I'm absolutely convinced that this is connected with the town's ecology. I also think this has a negative effect on one's state of mind and mood. One feels constantly depressed from living in such poor, dirty conditions* (female, 57 years old).

Living in Sokol, has made my mother's ulcer worse. She'd be much better if she lived somewhere else. The conditions really took a toli on her health ... (She later died in connection with her ulcer and acute asthma). On the whole, for all the time we spend living in the village we don't gel ill. We only normally get ill in the town (male, 14 years old, a pupil who lives in the region where the air and water are clean).

I don't know, perhaps the environmental institutions are just afraid of spreading panic. You know, the people understand that life in Sokol is bad, that there are so many diseases and that this is mainly oncological or allergic ones. It's highly likely that women will soon start to bear mutant children. The ecological situation really is dreadful. It's just that nobody is shouting about it as they don't want to start a public panic, that's all.

People need to know bow bad the situation is though, how bad it is, is something they must decide for themselves (male, 36 years old).

It is these pessimistic respondents who particularly take an active stand against ecological degradation and poor social conditions, sometimes utilizing destructive means of protest and desperate acts as part of their political and economic struggle. Viewing the situation as hopeless, these respondents believe that it will be practically impossible to live in Sokol in the next one or two decades. By that time, Sokol will be known as an "ecological disaster zone" and "eco-catastrophe". Many of those perceiving active danger try to visit the countryside more often to get fresh air, drink clean water, and grow produce grown on untainted soils. Particularly people younger than 30 years old would like to leave the town of Sokol altogether. But even they are against the idea of closing the Sokol pulp and paper mills and other industrial enterprises in Sokol - despite the consequences for the natural environment and their health - for fear of the social disaster that would occur in the present if this town-shaping enterprise is lost. They are unwilling to trade present well-being for future well-being.

We also noted that people who had recently moved to Sokol perceived the pollution more acutely than those already living there. However, their concerns dampened over time and apathy set in: *I walked along the river bank and could see all this water flowing into it from the sewer. It was just awful. It looked like acid. Now we've become accustomed to it. At first it was a shock to see this acid flowing freely down into the river, it was a horrible sight. But now, no one is surprised at all* (male, 48 years old).

Many respondents shared pollution "tales" and "myths" during their interviews that were in effect "ecological horror stories" (strachilki) based upon observations of ecological change. Here are some examples: *This happened last year. The potato crops had failed and it had been raining, but the rain was not usual rain and left green circles everywhere. It smelt like a blossoming potato plant and the whole vegetable patch looked as if it was covered with clinker (i.e., unburned residues). That's why there was bad harvest of potato. We haven't seen anything as strange as this since then, but this did happen last year. The rain was awful, lots of black clouds gathering and these green stains everywhere* (female, 77 years old).

Some people say that about 30 years ago a green spot appeared on the surface of the river. Apparently, it was to do with the settling mud. Fishermen were the first who noticed it. They were pulling in the fishing-line and saw that it was green. Later on. other green spots began to appear further downstream. And of course all the air coming from these patches

was released into the atmosphere - so we were forced to inhale it. A similar thing happens when it rains. Everywhere yellow puddles appear. And why? Where do they come from? It's the contaminants that settle on the trees. When it pours with rain, these are washed on to the ground leaving these yellow puddles (male, 55 years old).

One winter some time back, if you looked at the snow you would see that it was black -yes, black - covered with soot (male 19 years old).

I've never swum in the river - never had the urge to. Many people, some of them quite close to me, have swum in the river and then ended up in the hospital. That I can do without. I'm not exactly sure what it was, but apparently they'd been poisoned. They didn't tell me exactly what was wrong. They just said that they had a headache or abdominal pains or just felt really ill. It was like a person had a swim one day and had taken ill the next (female, 14 years old).

Again, it must be noted, that despite the fact that many could offer horror stories of their own, all the respondents supported the continued operation of the Sokol plants irrespective of their understandings about pollution.

Social Organizing

Respondents tended to see those connecting pollution and health as unprepared to take an active stand (or rally around others who did) to improve the ecological situation. In fact, respondents identified no one who could take such a stand or organize others to do so. Respondents were only prepared to become involved if someone else rallied them. This willingness to respond to organized protest was clearly evident in 2003. Back then, the management of the pulp processing works unilaterally and illegally sacked a few hundred workers. In the months that followed, Sokol shook with strikes, demonstrations, and picket lines organized by the trade unions. This shows that in high-risk situations, given the presence of an organizer who they trust, people are prepared to fight for their rights.

REFLECTION: WAYS OF DEALING WITH POLLUTION SUGGESTED BY THE RESIDENTS

As a result of our analyses, we can distinguish four approaches to addressing pollution evident among Sokol residents, varying between those that address the problem and those that address how people respond to the ecological threat. The list is of interest for the approaches identified, as well as for what is not found.

1. *Disregarders:* Residents evidencing disregard ignored information about pollution and continued to adhere to their former way of life. Often middle aged or approaching retirement, they tended to be people unable to envision opportunities to change their lives or the situation. They saw no choice but to continue their involvement in the existing system of relations. They continued to work for the enterprises regardless of occupational health hazards and the consequences for nature. They also continued to catch and eat poisoned fish from the river Sukhona and to grow and consume poisonous green-stuff grown in the buffer zone of the pulp and paper mills. Teenagers who did not believe the hazards also ignored the negative information and proceeded to swim in the Sukhona in summer despite all the bans of SEI.

This disbelief and disregard entailed distrusting officials such as the head of the Regional Fishing Inspectorate, who observed: *You can eat fish caught in the Sukhona if you desire to depart this life, but don't give this fish to children* (Sokol'skaya Pravda, May 4, 2002).

Because of bacterial contamination, the Sanitary Epidemiological Service has forbidden bathing and fishing in the rivers in Sokol. Irregardless, local inhabitants continued to bathe in these rivers. The clear contradiction between the experts[1] findings and residents' behavior suggests a deep distrust of authorities and scientists by residents who preferred to trust their own senses and ignore the risks.

For example, although water quality conditions remained very poor according to local and regional environmental authorities, a perceived improvement was cited as a basis for risking consumption of local food. Local and regional environmental authorities question the water quality, citing accidents at the Sukhonsk mill that dumped acids into the river, effluents released into the river Pelshma that contain lignosulfonate and lignin and chemical reactions between phenol and chlorine dioxin. Nevertheless, inhabitants have noticed an improvement in the quality of fish consumed from the river. Earlier, according to the residents, the fish had such a strong taste of acid that it was impossible to eat. Now they have learned to tolerate a less overwhelming acid taste.

2. *Risk Reducers through Personal Behavior Change:* This group of respondents became actively aware of environmental deterioration and the importance of preserving environmental conditions favorable to their lives through conversations with neighbors, colleagues, and schoolmates, and through exposure to the mass media, ecologists, and public institutions concerned with the environment. And they also understand that only they can help themselves. They either cannot or do not wish to move away from

the area. Therefore, they take it upon themselves to develop ways to reduce the ecological risks they are faced with and the effect that pollution has on them. But the scope of their action is to largely change their own behaviors and lifestyle in order to reduce risk to themselves and their families.

Risk reducers refuse to use Sokol water for drinking and cooking. Most cannot afford to buy bottled water. Many carry in water drawn from springs on the outskirts of the town. Others use domestic filters, believing that once the water is filtered it improves so much that it does not need to be boiled before drinking.

Risk reducers seek to reduce the effect of polluted air on their health. Because much of the toxic-smelling air pollution occurs from a mixture of chemicals released at nighttime, these residents close their window shutters at night. However, none of the respondents owned an air ionizer, air conditioner or any other kind of air purification device as, in their estimation, such appliances were too expensive.

Risk reducers are certain to have a *dacha* (a summer weekend home) to which they can travel to at the weekends or on holiday that is sufficiently far away from the town. Some even stay there all summer, emphasizing the goal of avoiding toxic fumes and preserving their health. Residents suffering from asthma or allergies noted that they felt fine when they stayed at the dacha. Food was grown for consumption at the dacha rather than in urban gardens to avoid eating contaminated vegetables and fruits. Gardeners who associated pollution from the pulp and paper mills with their plants' health now grow sensitive plants under plastic film.

Such practical steps were viewed as helping to reduce the risks from pollution. Risk reducers, however, then ignored the prospect of remaining risks. They did what they could to reduce their exposures to hazards and made peace with the consequences of exposure to conditions over which they have no control.

3. *Outside Activists:* Unlike the personal activism of the risk reducers, another much smaller group of residents evidenced environmental activism. They sought to change the polluting conditions rather than adjust to them. However, these activists tended to have a very partial "backyard" view of the scope of the problem. Furthermore, environmental activists tended not to be permanent residents of Sokol, but rather visited Sokol because their dachas were located there. The lack of drinking water in the suburban part of the town where dachas were located forced a few thousand people to take and use untreated water straight from the river Sukhona downstream from Sokol and the pulp and paper mills.

The outside activists focused on the problem that there was no safe water source for this suburban region of Sokol.

Several of these out-of-town activists pursued the problem through to solution. They achieved acclaim in the press, were the subject of radio programs and were even able to convene a meeting of the Ecological Commission of the Vologda regional authority. In the end, they acquired the resources to build two deep wells to serve the suburban section nearby their dachas. Instead of garnering support from Sokol residents, however, this successful activism was discounted. First, the activists were distrusted as "strangers". Officials fearing for their jobs abetted this distrust by discrediting the activists. And activists' success may have solved the immediate problem that affected them, but it did so at a larger cost of drawing attention to the pollution caused by Sokol enterprises upon which most city residents depended for jobs.

4. *Aesthetic Activists:* Yet another group of locals espoused aesthetic ecological causes irrelevant to the big issues. Their strategy was to ignore the major pollution risks by shifting attention to comparatively insignificant ecological problems, as illustrated by the following statement: *In my opinion, our ecology, the ecology of our town, is far from ranking first, but in some other places the situation is even worse. I just don't like to go along the street and see the broken trees with broken limbs, and piles of garbage here and there. It is rather unpleasant, and you begin to feel uncomfortable. I just arrive at a wish to clean it all. Yes, it is a shame for my native town! However, when we celebrated the 70th anniversary of our town, everything was tidied up, painted, and put to rights beforehand. Finns who visited our town at that time were very pleased to be there. But if they only had seen what was here before their visit, 1 don't know whether they would be so pleased* (female, 15 years old).

People who share this young lady's opinion turn their attention to such issues as the litter in the streets, parks, and on the banks of the river, to the uprooting of trees in alleys and side streets, and to the noise pollution from traffic reaching their flats. These aesthetic problems are their highest priority. While their focus serves to distract from the major ecological risks, these targets are solvable "small" problems. Many "aesthetic activists" are thus able to be successful in making a difference in achieving such goals. They were empowered to successfully participate in the collection of litter, planting trees and plants by homes, and keeping their own yard clean and tidy. This strategy gave people moral satisfaction and the sense that they can make positive changes on behalf of their beloved town and Mother Nature.

CONCLUSION

It should be noticeable from the above list of roles that what is missing in Sokol are people who actively target the principle ecological risk to the local environment and population, namely pollution stemming from the major economic backbone of the region, the local paper and pulp enterprises. Thus, while groups acknowledging environmental issues attended to smaller aesthetic issues, solving local backyard threats, or changing personal behaviors to reduce exposures, it was as if the source of the most significant ecological threat to the region was given a "pass".

We have seen that a concept of ecological pollution did not really develop in the minds of the inhabitants of Sokol before the 1970s. Without the broader ecological awareness advanced during that milieu, people were not really aware of the risks and dangers associated with local industry. This can be explained by the fact that basic ecological knowledge, materials and information was previously absent from the social sphere.

But what is notable is the effect of local adaptation to the polluted conditions caused by long functioning enterprises, particularly the Sokol and Sukhona paper and pulp mills. As these polluters have expanded gradually toward their full capacity, it is striking that they continue to escape local awareness. There are now many generations associated with these companies. And so there has been acceptance of the pollution, of poor air and water quality and of noxious conditions associated with the plants. These source conditions are effectively ignored even by those who are sufficiently aware to try to modify their lifestyle to minimize exposure to the direct pollutants.

We have shown that a new enterprise causing noxious conditions but ecologically benign is not given this same deference. Rather, it can become the focus for activism and action without shaking up the foundation of the community, what is sacred and protected by silent consensus.

The significance of the pulp and paper enterprise to the region and country, supported alike by authorities and townsfolk, has given rise to a sense of complete dependence of the town on the continued functioning of the plant. One could even say that there is an almost paternalistic construct in place, whereby the enterprise is essentially conceived of as the "father of the town".

This merging of the identity of the town and the plant is further reflected in the fact that the town and the plant shared a prestigious award for the plant's work. People are proud of this accomplishment. The plant became a symbol of the town, an important part of the history of the country and a reflection of residents' own lives and entrepreneurial

successes. The life of the town has been intricately woven into that of the plant. It is looked upon as more than an employer, but as a source of social good.

The negative construct of pollution that for a time clouded people's minds about the paper and pulp enterprise has been refashioned in a positive light. Discourse about the ecological pollution and risks, stemming from the activity of the Sokol works, was connected with the general theme of ecological problems that swept the Soviet Union as a whole in the 1970s. That time has passed, and with it the attention to these issues as "problems".

We note that a considerably stronger impression of the pollution today is to be found among those traveling through the town and among young specialists from other towns. These were the first people to notice the polluted environment. They were more acutely aware of the ecological problems even though after some time they too got accustomed to it. In the public sphere, the formulation of a notion of ecological degradation and of public discourse on the ecological risks and dangers coincided with the years of perestroika and with the beginning of reform. This was also due to a rise in the rate of production at the time. An active, fervent protest movement was supported by the authorities and organized by new public leaders, who earned themselves political capital on the wave of protests. Some of them even became regional deputies.

Further along the line, economic collapse led to a lull in pollution, which in the minds of the townsfolk was conceived as an ecological upturn. However, this "upturn" had a negative impact on people's lives. And so lower ecological risk became associated with higher societal risk in the minds of Sokol's inhabitants.

In the 1990s, what Yanitsky called "de-modernization" occurred, along with the "socialization of societal risk". A public concept of "ecological pollution" had been formed in the earlier decade; but it was not matched with a public concept of "ecological risk". The idea of ecological risk continues to be portrayed by specialists via the media, but there is a great deal of indifference and distrust of such specialist information in the general populous. As a result, people are very guarded in their reactions. They do not believe that it is possible to improve the ecological situation. They feel that any improvements, in any case, are not in any way dependent on their efforts. People have once again become accustomed to ecological pollution. Conditions of pollution are seen as being in the same vein as the other "givens" of everyday life. People either ignore ecological risks

altogether or they change their everyday practices to accommodate to the reality of these risks by lessening their personal exposure in some ways.

On the whole, contemporary reflections on ecological pollution are centered on personal or individual strategies and distrust toward the authorities and owners of the Sokol plant. Reflections on the ecological and social risks, even considering the negative consequences, have brought the townsfolk to the conclusion that they must be prepared to reconcile themselves with a poor ecology. There is a consensual recognition and agreement that the town is dependent on the paper and pulp plant. People can live with pollution but not with a town in which there is no work.

NOTE

1. Editor's Note: U.S. readers are likely to be unaware of District Heating, employed throughout Russia. A regional heat source is distributed through pipes to interconnected buildings. As a result, there is no need for boilers or furnaces in individual buildings and the energy distribution system that such individual building units demand.

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