UNRAVELING THE SECRETS OF THE PAST:

Contested Versions of Nuclear Testing in the Soviet Republic of Kazakhstan

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Executive Summary

The people of Kazakhstan have been grappling with the legacy of nuclear testing for over a decade. The different versions of the past are hotly contested when it comes to issues of the Soviet government's culpability: Did the government take proper precautions to limit radiation dose exposures, or did it knowingly expose its own citizens to harmful levels of radiation? If the tests exposed people to dangerous levels, did the government do this intentionally in order to test the effects of radiation on human health? And did it do so covertly in a way that limited people's knowledge of nuclear testing and the risk of radiation?

In this paper, we plan to address these questions from three different perspectives. First, we describe the perspective of nuclear scientists who designed and executed these nuclear tests in Kazakhstan. In recent publications and personal interviews, these scientists have defended their actions in the name of national security and claimed that the certain precautions accompanied the tests to limit impacts to the health and environment. Second, we present the arguments made by medical researchers in Kazakhstan who stress the harmful health impacts of nuclear testing. Finally, we describe the perspective of Kazakh and Russian villagers who lived near the test site. Although the individual stories vary, most villagers do not feel that the government adequately protected them, and many believe that it used them as guinea pigs.

Introduction

> *"The military team never once asked the opinion of the population, did not let them know of the possibility of expected dangers, kept secret and still keep secret the actual situation. Undoubtedly, the population in the region are [sic] worried, disturbed and are demanding, but people can only be calmed by the truth, and not half-truths and unfounded confirmations…"* (Saim Balmukhanov, Radiologist-Oncologist, 2002:36).

> *"We can now state for certain that our society is quite familiar with the word 'radiation.' However, this term usually has negative, fearful association. Radiophobia, which has been overdramatized in the mass media since the declassification of the Semipalatinsk Test Site, has gotten into everyone's flesh and blood."* (Saule Ryskulova, Biologist, cited in Shkolnik 2002:346)

The people of Kazakhstan have been grappling with the legacy of nuclear testing for over a decade. Until Gorbachev's *glasnost'* policy emerged in the late 1980s, the Soviet government kept all information concerning the Soviet nuclear testing program highly classified. Given the freedom of expression, political activists introduced new "truths" about the evils of nuclear testing and unleashed a wave of opposition that eventually led to the closure of the Semipalatinsk test site in 1991.

In an attempt to dispel the influence of these emotional narratives and to vindicate their careers, nuclear scientists have countered with their own versions of the "truth," which they claim are based on scientific objectivity. The different versions of the past are hotly contested when it comes to issues of the Soviet government's culpability: Did the government take proper precautions to limit radiation dose exposures, or did it knowingly expose its own citizens to harmful levels of radiation? If the tests exposed people to dangerous levels, did the government do this intentionally in order to test the effects of radiation on human health? And did it do so covertly in a way that limited people's knowledge of nuclear testing and the risk of radiation?

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their actions in the name of national security and claimed that certain precautions accompanied the tests to limit impacts to the health and environment. Second, we present the arguments made by medical researchers in Kazakhstan who stress the harmful health impacts of nuclear testing. Finally, we describe the perspective of Kazakh and Russian villagers who lived near the test site. Although the individual stories vary, most villagers do not feel that the government adequately protected them, and many believe that it used them as guinea pigs.

These different perspectives of the past coexist in a highly politicized present where the victims are struggling to receive greater compensation for their suffering and nuclear scientists are striving to redefine their jobs in a post-testing context. Though their efforts are limited by weak organization and limited funding, the victims use their own experiences and the scientific data of medical researchers to make their case to the government as well as to international organizations. In a similar vein, the scientists present their version of the past to the international scientific community in an effort to demonstrate their willingness to cooperate in exchange for funding.[1]

The Semipalatinsk Nuclear Test Site

For nearly half a century (1945-1991), the United States and the Union of Soviet Socialist Republics waged a Cold War of an unprecedented nature. Justified by the mutual incompatibility of capitalist and Marxist ideologies and the perceived likelihood of a third world war, the two superpowers engaged in an intensive arms race. Although commentators often characterize the Cold War as a war without direct conflict, it was certainly not a war without victims. In addition to those who perished in the proxy wars fought in Korea, Vietnam, Afghanistan and elsewhere, hundreds of thousands of American and Soviet citizens suffered exposure to dangerous levels of

radiation as their governments produced and tested nuclear weapons that could be used if international tensions escalated into a "hot" war. In both countries, the majority of the radiation victims lived in relatively remote areas and belonged to economically and politically disadvantaged social groups. Among the victims were the Kazakh pastoralists and the Russian peasants who lived dangerously close to the Semipalatinsk Nuclear Test Site in what is now northeastern Kazakhstan.[2]

In August 1947, just two years after the United States tested the infamous Trinity bomb in Alamogordo, the leaders of the Soviet Union passed a special resolution to build a secret military city in the Kazakh Republic. They designed the new city, named Semipalatinsk-21, to be the headquarters for the Soviet nuclear testing program (Nazarbaev 2001). Because they lived in a "special city," all residents had to have security clearances. All of the city's entrances were carefully guarded with barbed wire and three checkpoints, and all stores offered consumer goods that could not be found in most Soviet cities. Like other special cities in the Soviet Union's military-industrial complex, Semipalatinsk-21 did not appear on maps until it was renamed as Kurchatov in the 1990s in honor of the nuclear physicist Igor Kurchatov.[3] The government instructed the 40,000 residents of Semipalatinsk-21 to tell people that they lived in Semipalatinsk, a larger city 140 kilometers to the east. The Soviet military censored all letters leaving or entering the city. Just as the state hid the residents' real existence from the outside world, the state concealed their deaths: those who died in the secret city were buried elsewhere (Shkolnik 2002: 14; Balmukhanov et. al 2002: 10-11). Health and mortality statistics for residents of Kurchatov are still difficult to obtain making it difficult to assess the impact of nuclear testing on these citizens.[4]

Between 1949 and 1989, the Soviet military conducted 456 nuclear tests, including 30 surface tests and 86 atmospheric tests at the Semipalatinsk Nuclear Test Site.[5]

The city of Kurchatov is located on the northeastern corner of the 18,000 square kilometer test site, also known as "the Polygon." The Ministry of Armed Forces, in collaboration with the USSR Cabinet of Ministers and the Central Committee of the Communist Party of the Soviet Union, chose the test site location for several practical reasons. The nearby city of Semipalatinsk had a functional airport, which was important for ferrying supplies, military personnel, and scientists to the new testing facility. The military constructed an additional airport in Kurchatov for cargo planes. Supplies could also be shipped to Kurchatov along the Irtysh River from Russia or Semipalatinsk, except when the river was frozen over during the long Siberian winter. And, finally, the military built a special railway from Semipalatinsk to Kurchatov. Geologically, the land in this area was stable enough to withstand many nuclear blasts, and the varied topography included the Degelen mountain range in the south and a flat steppe zone in the north. These variations would enable the military to test the weapons under different geological conditions and to investigate the impact of nuclear blasts in different environmental conditions (Balmukhanov 2002; Shkolnik 2000:6-8).

The Ministry of Armed Forces also selected the location because of its relatively low population density. However, over 20,000 residents lived in more than a dozen villages situated along the border of the test site, and the Polygon displaced several more villages.[6] The population in the affected area quadrupled between 1949 and 1989 (Nazarbaev 2001). Some researchers estimate that as many as one million people living in nearby villages and cities may have received significant doses of radiation from Polygon tests.[7] The test site encompassed land in three different provinces (*oblasts*) of the Kazakh Republic: Semipalatinsk, Pavlodar, and

Karaganda.[8] The highest levels of radioactive fallout have been found in Semipalatinsk Oblast. Radioactive fallout has also affected people living north of the test site in the Altai Oblast of Russia. Table 1 shows 1960 population figures for key villages and cities affected by nuclear testing.

TABLE 1. VILLAGES AND CITIES LOCATED NEAR THE SEMIPALATINSK NUCLEAR TEST SITE AND THEIR POPULATIONS AS OF 1960 (BOUVILLE 2000:149).

Village/City	Population
Dolon	906
Kara-Aul	2335
Kanonerka	1227
Mostik	637
Sarzhal	832
Semipalatinsk	163,000

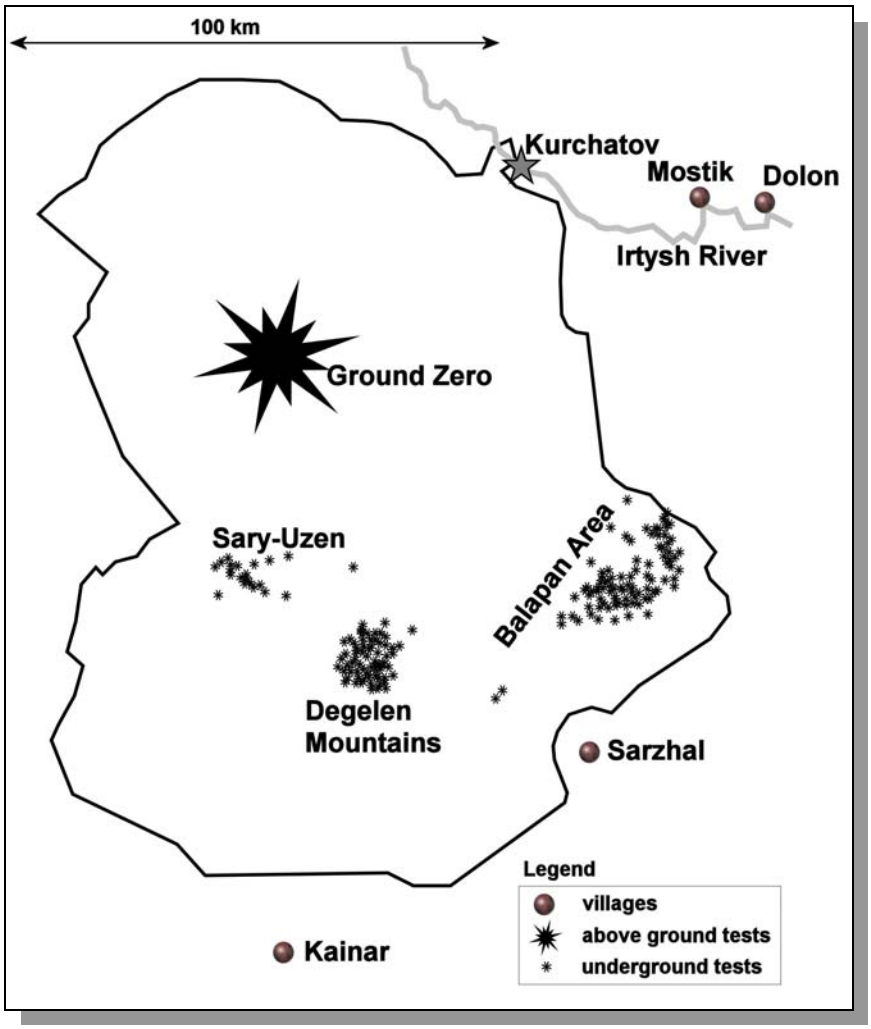
Most of the people who live in villages surrounding the test site are ethnically Kazakh or Russian. There are also smaller populations of Germans and Ukrainians. The Kazakhs have been indigenous to this region for centuries. Traditionally, their livelihood was based on nomadic pastoralism, with mixed flocks of sheep, goats, horses and camels. Russian peasant migrations (1865-1900), World War One (1914-1918), the Russian Revolution and Civil War (1917-1921), and Soviet collectivization efforts (1928-1938) disrupted this nomadic lifestyle. Russian and Ukrainian peasants migrated to this region in the 19th century after the Russian tsar liberated serfs and encouraged them to settle in the less populated regions of Siberia and northern Central Asia. The ethnic Germans in the region are the descendents of those that Stalin deported from Russia during the Second World War. Geographically, the Russians, Ukrainians and Germans

live in the villages north of the Polygon, and the Kazakhs are concentrated in the villages on the southern, western and eastern sides of the Polygon. At the time of the first nuclear test, the majority of rural adults either worked on a collective farm or worked in service jobs that supported the collective farm system.

The Semipalatinsk Nuclear Test Site has four regions for testing three different types of nuclear explosions (see Figure 1). The initial testing took place on the "Experimental Field" or Ground Zero, located in the northern part of the test site, approximately 70 kilometers from Semipalatinsk-21. Underground testing was conducted in the other three regions: Balapan, Degelen, and Sary-Uzen. All of the tests conducted at the Experimental Field were above ground, meaning they offered the maximum potential exposure to the populations surrounding the Polygon. Between 1949 and 1962, the military detonated 30 surface and 86 atmospheric tests (Shkolnik 2002).

For surface tests, the military placed the nuclear weapons on a tower and discharged them. Atmospheric tests involved airplanes dropping the weapons. During the first several years of testing, the military neither had much experience predicting radioactive fallout patterns nor had much concern with protecting local populations from radioactive fallout (Shkolnik 2002: 70-71). As a result, several large explosions occurred at times when the wind was blowing directly toward villages and cities adjacent to the test site. For example, the first atomic test that took place on August 29, 1949 was one of the most devastating for human exposure because the powerful winds blowing at the time thrust the radioactive cloud directly over the villages of Dolon and Mostik (Hille et al. 1998). Several other tests also led to significant levels of radioactive exposure, including the ground tests conducted on September 24, 1951, August 12, 1953, and August 24, 1956 (Shkolnik 2002: 39).

FIGURE 1. MAP OF THE SEMIPALATINSK NUCLEAR TEST SITE AND SURROUNDING ENVIRONS.



Initially, Soviet military leaders did not know how the shockwave and radioactive fallout from a nuclear explosion would affect potential targets. So, in addition to testing the explosive device, they devised experiments to study how nuclear weapons would affect military hardware, man-made structures, and domestic animals. At various distances from Ground Zero, the military positioned airplanes and tanks, and built houses, apartment buildings, railway tracks and bridges, and a subway station. The military also placed different types of animals (rabbits, sheep,

goats, pigs, dogs, guinea pigs, rats and mice) at various distances from the center to study the consequences of radiation exposure. It put some of the animals inside buildings constructed of various materials in order to gauge their protective qualities, whereas it left others outdoors (Shkolnik 2002).

The United States Atomic Energy Commission conducted similar experiments, including some that positioned thousands of military personnel less than three miles from atmospheric explosions at the Nevada Test Site in order to determine whether troops could perform effectively after a nuclear bomb. Further, Air Force pilots flew directly through mushroom clouds in order to take radiation measurements (Welsome 1999: 249-284). Though less information has been published, newspaper accounts suggest that similar experiments were done with Soviet soldiers at the Semipalatinsk Test Site (Walsh cited in Balmukhanov 2004: 135-143).

In 1963, the U.S., the U.K., and the U.S.S.R. signed the Partial Test Ban Treaty, which limited nuclear tests to underground areas. Between 1961 and 1989, Soviet officials conducted 340 underground nuclear tests in the southern part of the Polygon. Many of these tests involved as many as five explosions at the same time, for a total of 500 explosions (Shkolnik 2002). In the Degelen mountain range, the military inserted nuclear explosives into the end of tunnels drilled horizontally into the mountains. In the relatively flat Shagan River basin (also known as the Balapan area), they bored holes into the ground to hold the explosive devices. Finally, the military conducted 21 tests in vertical holes in the Sary-Uzen area in the southwest portion of the test site (Shkolnik 2002). Although the conversion to underground testing did limit human exposure to radiation, 45% of the underground tests leaked small amounts of radioactive gases into the atmosphere, as scientists expected they would. In addition, thirteen of the tests involved accidental leakages of more significant amounts of radiation, and four of the tests involved the

intentional release of radioactive gases and aerosols from "peaceful," "excavating" explosions (Shkolnik 2002: 53). (Several "peaceful" tests were conducted to see if small nuclear explosions could be used for non-military purposes, such as the creation of a lake.)

The Semipalatinsk site saw its final underground test on October 19, 1989. Earlier in the same year, a powerful anti-nuclear social movement had emerged in Kazakhstan. In February, the First Secretary of the Semipalatinsk Regional Committee of the Communist Party, Keshirim Boztayev, sent a telegram to the Central Committee of the Communist Party of the Soviet Union in Moscow requesting a temporary suspension of nuclear explosions because of public concerns. Although Moscow's initial response was negative, another powerful voice of protest was soon heard.

On February 26th, the popular Kazakh poet Olzhas Suleimenov gave an emotional speech on television calling for the end of nuclear testing in Kazakhstan and invited people to a public rally on February 28th. By the end of March, the newly formed Nevada-Semipalatinsk Anti-Nuclear Movement had over a million signatures of support. From the outset, the founders viewed the organization as an international anti-nuclear organization, with co-signatories and protestors from other regions of the world affected by nuclear testing.

The organization's emblem signified the connection between Nevada and Semei by displaying a Native American chief sitting next to a Kazakh elder. As the popular movement gained momentum, Kazakh politicians, including the Chairman of the Kazakh Republic's Central Committee Nursultan Nazarbaev, began to push harder for their demands. Meanwhile, the Nevada-Semipalatinsk movement scheduled a series of public protests. By criticizing the government's nuclear testing program, both the movement and local party leaders were testing the limits of the Gorbachev's *glasnost'* policy. Rather than being punished for such

disobedience, the anti-nuclear movement received several concessions, beginning with a reduction in the scheduled number of tests and promises for socioeconomic development in the region. The 1990 decision to temporarily suspend nuclear testing was followed by the landmark decision to close the test site on August 29, 1991, 42 years to the day of the first nuclear test (Boztayev 1992, Nazarbaev 2001; Shkolnik 2002).

Though closed, the former test site still poses a threat to nearby residents. Unlike before, the test site is unguarded. There is no longer a fence or barrier to keep people out of the Polygon, and there are no signs indicating areas with high concentrations of radiation. Villagers who live in the area sometimes travel through the Polygon to reach other villages and cities in the area. A more serious concern stems from risks associated with collecting and using contaminated materials from the test site. In particular, scrap metal (from discarded military hardware) and copper cables (from the underground test tunnels) have been gathered by people who sell them for profit. Each underground test involved large amounts of cable in order to provide both the electrical charge to detonate the bomb and the ability to take measurements about the device's yield and other characteristics. In addition, residents of local villages have recycled quality cable and wood from the former military bases within the test site. Such activities further increase the dose levels of nearby residents who are already suffering the consequences of radiation exposure.

The Semipalatinsk Nuclear Test Site is not the only place where people were knowingly exposed to radioactive material in the U.S.S.R. during the Cold War. For example, the Mayak Facility in the Southern Ural Mountains of Russia was once home to a radiochemical processing facility for the production of plutonium for nuclear weapons. From 1949-1956, radioactive waste was dumped into the Techna River, which is used as a source of water for many villages, and potentially exposed at least 30,000 people (Kossenko et al. 1997). The people living in the

villages used the water primarily for drinking and washing, which provides both internal and external doses (Degteva et al. 2000). Now a perfect dose-response curve can be seen when analyzing the number of deaths and illnesses due to radiation exposure versus the proximity of the village to the processing facility. The closer to the Mayak processing facility one lived, the greater the chance of obtaining a radiation related illness.

Such human rights abuses were not limited to the former Soviet Union. In *Plutonium Files*, Eileen Welsome (1999) details the experiments that the United States government did on both soldiers and civilians to better understand how radiation affects human health. Many times soldiers performed military exercises on the Nevada Test Site directly after an above ground nuclear test, in the guise of practicing maneuvers in the midst of a nuclear war (Welsome 1999:261-269). Air Force pilots also flew directly through mushroom clouds to take radiation measurements (Welsome 1999:272-284). The worst experiments were performed on prisoners (Welsome 1999:362-383) and pregnant mothers (Welsome 1999:219-228), when these two populations were exposed directly to radiation without their knowledge of potential health impacts.

Native American groups, such as the Western Shoshone, were exposed to radiation during nuclear tests done at the Nevada Test Site, similar to the villagers in Kazakhstan who lived adjacent to the SNTS. The dose calculations they received were greatly miscalculated, due to the negligence of scientists to understand the culture and eating habits of these people (Frohmberg et al. 2000). For example, the Western Shoshone diet relies heavily upon rabbit, especially the thyroid, which concentrates radioactive iodine after the nuclear tests. One of the worst calamities of United States nuclear testing during the Cold War is chronicled in Bravo for the Marshallese: Regaining Control in a Post-Nuclear, Post-Colonial World (Barker 2004). The

story is told of residents of the Marshall Islands who were exposed to radioactive contamination both during and after nuclear tests. Some of these people were resettled on islands contaminated with radioactive material, even though the U.S. government knew that living there was harmful to their health.

Nuclear Scientists Defend Their Actions

In response to the popular reaction against nuclear testing, nuclear scientists from Kurchatov and elsewhere have attempted to defend their actions during the years of nuclear testing. Throughout the Cold War, physicists dominated the research institutes at Kurchatov, as they were required to design the nuclear bombs, carry out the test explosions, and analyze data from the tests to design better weapons. Most were Russian scientists trained in Moscow. While only a fraction of these scientists have remained in Kurchatov since 1991, those who remain are rarely apologetic about the impact of their tests on local populations. On the contrary, they maintain that the nuclear tests were vital for national security interests and that adequate precautions were taken to limit radiation exposure to innocent populations.

One of the best sources for understanding these scientists' perspective is a book entitled The Semipalatinsk Test Site: Creation, Operation, and Conversion. This book was jointly prepared and published by the Cooperative Monitoring Center of Sandia National Laboratories and the Republic of Kazakhstan Institute of Nonproliferation in 2002. While the lead editor is Vladimir Shkolnik, Kazakhstan's Minister of Energy and Material Resources, the editorial board includes the leading directors and deputy directors of the various research institutes associated with the National Nuclear Centre in Kurchatov. Most of these researchers were associated with

the nuclear test site during its operative phase, and have been employed by the National Nuclear Centre of Kazakhstan since its formation in 1993.

Although individual views vary among scientists, the general ideas presented in this book echo the stories we collected during interviews with several scientists in Kurchatov. The book strives to provide what the authors consider to be an objective and scientific account of "the Test Site's military and scientific activities from the cold-war period through the present day." (Shkolnik 2002: iii). Distancing themselves from "emotional assessments of various events, which usually entail classification of these events as 'right' or 'wrong,'" the authors of the book claim to rely on "*unbiased witnesses* – official documents, research reports, and the assessments of professionals" (Shkolnik 2002: iii).

The scientists frame the issue of nuclear testing as a national security issue, rather than a human rights issue. From their perspective, the primary goal was to design effective and powerful nuclear weapons, not to protect the environment or human health. As the authors state, "[f]or the USSR, nuclear weapons were a military technological guarantee of the country's national security. Their power could practically rule out the possibility of foreign aggression both against the USSR and against its former allies" (Shkolnik 2002: 25). The scientists acknowledge that the first nuclear test in 1949 was "considered such an important military and political event at the time that the testers were permitted to disregard unfavorable weather conditions and conduct the test on a rainy day with strong wind gusts" (Shkolnik 2002: 70).

With such an urgent task at hand, it was easy to discount the needs of the local population. The authors refer to the surrounding areas as "poorly developed" with "small agricultural villages along the Irtysh and Shagan River valleys" and "practically barren steppe" with "temporary summer and winter camps" of Kazakh nomads (Shkolnik 2002: 7) The authors

continue to describe how construction workers arrived on the "uninhabited steppe" to build the test site (Shkolnik 2002: 8). This depiction overlooks the fact that small settlements of pastoralists were forced to resettle by the government.

The scientists explain that national security interests ensured that the public could not be informed of any details associated with nuclear testing:

> "The secrecy of all construction and equipping of the test site, nuclear weapon development, and reports containing the test results was protected by the USSR Ministry of Internal Affairs (MVD)…. Secrecy was imposed on the results of exposure to harmful effects of nuclear explosions with various yields or the physical characteristics of nuclear physics packages, the degree of radioactive contamination of environmental systems and the terrain outside the grounds of the test site, possible outdoor and indoor public exposure doses, and the effect of radiation and other factors, such as seismic ones, on the health of residents of areas adjacent to the test site" (Shkolnik 2002: 32-33).

One way to ensure secrecy was to limit public access to the test site. According to the scientists, the Experimental Field was fenced off with barbed wire and heavily guarded with military personnel at twelve different outposts (Shkolnik 2002: 20).

Although secrecy was imperative, the scientists portray a picture in which the Soviet military, in cooperation with the test site scientists, treated the surrounding population in a paternalistic rather than an indifferent manner. After acknowledging that national security was the dominant concern during the first test, the scientists stress that various safety precautions were taken during subsequent tests, especially as more information became available about the harmful impacts of radiation exposure. As early as 1951, the Radiation Safety Service had been created to predict radiation levels in the plumes of nuclear explosions, determine allowable dose levels, and create evacuation plans when necessary (Shkolnik 2002: 74). In order to limit public exposure to radiation, the scientists argue that wind conditions were carefully monitored such that new radioactive plumes were unlikely to overlap with previous plumes (Shkolnik 2002: 41). For each nuclear test, the military included a representative from the Ministry of Health and the

highest-ranking officials from the regional Communist Party in discussions related to public safety (Shkolnik 2002: 32, 39). Though privy to some knowledge regarding the tests, these government officials were also sworn to secrecy.

In some special circumstances, local populations were temporarily evacuated before a test was conducted. Further, the military was often prepared to evacuate certain areas in case of unexpected events. The largest series of evacuations took place before the 1953 explosion of the first thermonuclear device. Approximately 2,250 villagers and nearly 450,000 heads of livestock were evacuated to temporary campsites that were situated at least 120 km from Ground Zero. The villagers were compensated for their inconvenience with 500 rubles per person, and they were allowed to return home 10-14 days after the explosion (Shkolnik 2002: 76). The scientists fail to mention that not all villagers were allowed to evacuate and they fail to describe what these villagers witnessed upon their return home.

During tests that did not require evacuation, military officials instructed local populations to stay outside of their homes. The scientists suggest that the shock waves associated with atmospheric testing created more of a risk than the exposure to radioactive fallout. They note that structural damage from these shock waves (including broken windows, broken door frames and collapsed structures) occurred in 59 villages and towns around the test site, resulting in numerous injuries and several deaths (Shkolnik 2002: 48). The scientists, however, fail to discuss whether radiation exposure rates might have been lower if the villagers had stayed inside their homes during the periods of radioactive fallout.

Although the Kurchatov scientists attempt to portray the government as a benevolent protector of the public, they hint that preferential treatment was given to the residents of Kurchatov. For example, when radioactive plumes were heading towards Kurchatov, residents

were "completely sheltered in specially equipped hard rooms in accordance with safety instructions" while villagers were "evacuated to open areas" (Shkolnik 2002: 46). In addition, the military provided test personnel (but not ordinary citizens) with "individual protective devices" and performed "dosimetric monitoring" (Shkolnik 2002: 84).

Preferential treatment also extended to diets. Our interviews suggest that the diet of Kurchatov residents was based on a higher percentage of foods imported from other regions. Despite these privileges, one of the scientists we interviewed suggested that radiation is just a small factor affecting public health. From his perspective, local health patterns in the villages are best explained by poor diets and psychological stress associated with radiophobia. He added that he himself had been exposed to more radiation than most villagers without any harmful impacts on his health. Since it is still impossible to acquire health data for the residents of Kurchatov, it is difficult to state whether this population has also experienced health problems associated with radiation exposure.

The Kurchatov scientists are even more ambivalent as they describe how the Soviet government carefully monitored the health of local residents. In 1957, the Soviet government opened Dispensary No. 4 in Semipalatinsk for the "continuous observation of the health status of residents of contaminated districts" (Shkolnik 2002: 78). In order to protect the secret mission of the clinic, the building was disguised with a sign identifying it as "Anti-Brucellosis Dispensary No. 4."[9] The research conducted at Dispensary No. 4 was supervised by the Institute of Biophysics within the USSR Ministry of Health. Recruited from the military hospital in Semipalatinsk, the clinic staff had access to top quality equipment and laboratories. Over the course of several decades, they studied the long-term impacts of radiation on approximately 20,000 people from three districts in the Semipalatinsk region (Abay, Beskaragay and Zhana-

Semey). Researchers studied blood, urine and stool samples for traces of radiation, and prepared reports based on their findings. Their "patients" were divided into a test group (who had received doses ranging from 20-150 cSv) and a control group (who lived in the same towns but moved there later in life). Approximately 2,000 children were included in the study. Dispensary No. 4 was also charged with taking environmental samples. Air, soil, food, and water samples from the villages were collected and analyzed before, during, and after the nuclear blasts (Shkolnik 2002: 100-114; Grosche et al. 2002).

In addition to Dispensary No. 4, the USSR Ministry of Health collected data through a series of medical expeditions to the villages surrounding the test site (Shkolnik 2002: 100-114). With all of this data, doctors and scientists investigated the correlation between radiation exposure and certain health problems, including cancer and birth defects. Due to the need for secrecy, however, patients could not actually be told that their doctors were studying the impacts of radiation exposure. The scientists who prepared the Shkolnik volume indicate that the Soviet government was very interested in monitoring the health of the local population, but they fail to indicate the extent to which the government provided effective treatments for these populations.

From the scientists' perspective, the health impacts on local populations were minimal. In response to data that suggests local populations have experienced changes in their cardiovascular and gastrointestinal systems, the scientists often attribute these changes to non-radiation-related factors, such as vitamin deficiency, industrial pollution and poor sanitation (Shkolnik 2002: 115-119). In general, the scientists support their arguments with data presented in a 1990 medical report submitted by Dispensary No. 4. According to this report, "[t]he health status of people exposed to ionizing radiation in the past in doses up to 100 rems over the entire 30-year observation period does not differ from that of control groups" (Shkolnik 2002: 328).

The report also found that there were no significant differences in the morbidity of children exposed to radiation and of children in the control group. The report, however, does suggest that radiation exposure has negatively affected the health of a "small group of the population" exposed to doses up to 150 rem. Among this population, there are "[p]oorly marked disturbances of natural immunity, cytogenetic effects, accelerated aging processes and excess cancer mortality…" (Shkolnik 2002: 328). Similar attempts to use scientific studies in a way that limits the number of radiation victims have been described in other settings, such as the U.S. Marshall Islands (Barker 2004).

Today, now that the test site is closed, many of these same scientists (and their successors) are applying their knowledge in ways that help the people who live around the test site. For instance, the Institute of Radiation, Safety, and Ecology, an institute affiliated with the National Nuclear Center in Kurchatov, is working to identify contaminated sites on the test site and restore them to their natural conditions. In addition, the Institute for Radiation, Medicine, and Ecology, formerly Dispensary #4, is using its knowledge to develop better treatments for radiation related illnesses. Researchers at the institute the institute is closely affiliated with a neighboring institution, the Semipalatinsk Oncological Hospital.

Medical Researchers Offer a Different Perspective

Not all scientists in Kazakhstan have defended the Soviet nuclear testing program in the name of national security. Several medical researchers, in particular, have taken an active role in providing alternative scientific interpretations of existing data. One noteworthy medical researcher, Saim Balmukhanov, has been collecting medical data in the Semipalatinsk region since the 1950s. He first became interested in the region's health during casual conversations

with doctors in Semipalatinsk in 1952 and 1953. He realized that the symptoms they were describing seemed identical to the symptoms found among the Japanese populations in Hiroshima and Nagasaki.

Initially, test site officials refused contact with Balmukhanov who proceeded to collect data in the Semipalatinsk region for two summers with just a handful of colleagues. By the late 1950s, Balmukhanov received more funding and support for his research from his home institution, and he was included on joint expeditions with the Institute of Biophysics of the Ministry of Health. His research took him to several key villages surrounding the test site, including Kainar, Dolon, and Sarzhal. He listened to local doctors as they described patients who were suffering from blotchy bald spots, skin with unusual burns, and extremely high blood pressure. Women were suffering from vulval bleeding and extremely long menstrual periods (Easterman cited in Balmukhanov et al. 2002:133). Balmukhanov also discovered that the food and soil in these regions was heavily contaminated with strontium-90, a radioactive element that is known to have adverse effects on biological organisms (Balmukhanov et al. 2002: 19). He had little doubt that the medical findings were linked to radiation exposure, especially since the disease rates were more than two to three times higher in areas close to the test site.

Although it was a risky move, Balmukhanov and his colleagues shared these disturbing findings with test site officials. In his recent memoirs, Balmukhanov describes how Colonel S.L. Turapin, the military official in charge of radiation surveys, reacted to this news:

> "…Turapin did not agree with the results of our radiological investigation, and simply paid no attention at all to the data concerning the health of the population. Most important was the radiation dose! At first the possibility of irradiation with high doses was completely repudiated. He argued for a long time about the level of radiation contamination in the village of Sarzhal…. when we showed the results of our radioactivity measurements and a correspondingly high level of illness which was confirmed by several measurements, Turapin brought out another map of regional pollution with other dose rates. We haggled as one does at the bazaar, and we did not agree with each other's figures. So, we fought over each population point: Kainar, Karaul." (Balmukhanov et al. 2002: 20).

Balmukhanov was pressured to sign agreements stating that radiation doses did not exceed permitted levels. And, test site officials repeatedly tried to convince him that the health problems he witnessed were due to other factors, such as vitamin deficiency, protein deficiency, tuberculosis and brucellosis. After these heated discussions, Balmukhanov received several warnings from leading officials in the Ministry of Health, the Ministry of Defense, and the KGB. Even friends warned him to be careful, or he might lose not only his career, but also his life (Balmukhanov et al. 2002: 21, 25). Like so many Soviet citizens, he practiced self-censorship until the late 1980s, when it became safe to talk about these issues. In 1989, he was finally allowed to return to the test site to continue his research (Walsh cited in Balmukhanov et al. 2002: 140).

Although the test site is now closed, nuclear scientists and medical scientists are continuing to have intense debates over the extent to which radiation levels exceeded safe levels and the extent to which radiation can be blamed for local health problems. On the one hand, Balmukhanov and others argue that acceptable dose levels were regularly and knowingly exceeded (Balmukhanov et al. 2002: 12-15). On the other hand, scientists from Kurchatov attempt to discredit medical scientists such as Balmukhanov by arguing that their research is methodologically weak and emotionally biased. For example, in the introduction to the volume *The Semipalatinsk Test Site: Creation, Operation, and Conversion*, the authors start off by stating:

> "Various publications have appeared in recent years on the history of the development of Soviet nuclear weapons, the possible scale of environmental radiation contamination, and the effect of nuclear testing on human health. Unfortunately, most of these publications, in addition to truth and a scientific presentation of information on the problem, contain many conjectures, inaccuracies, and uneducated guesses. These are especially common in publications containing information on the extent of radiation's effects on the health of residents of the inhabited areas that were contaminated by radioactive substances during atmospheric nuclear testing (Shkolnik 2002: 1)."

There is no doubt that these comments are directed towards Balmukhanov whose status has reached heroic proportions among the populations surrounding the test site.

Villagers Describe Their Memories of Nuclear Testing

The subjects of these scientific debates are real human beings who have their own stories to tell. Since 1989, the Kazakhs and Russians who live in the villages surrounding the test site have been able to speak openly about their experiences with nuclear testing. Many of these villagers have participated in political protests organized by the Nevada-Semipalatinsk Movement, and others have had their stories told in local newspapers. In this section, we will describe some of the information we have gathered about nuclear testing from those who lived near the test site.

All of the villagers who were alive during the tests have vivid memories of military personnel showing up in the village by helicopter the day before a test to warn them of upcoming "military exercises." The military personnel would communicate with the village leaders, who then communicated all necessary information to the village residents. The explosions were never described as "nuclear tests" or "atomic bombs." After each test, military personnel would return to the village to monitor the situation and to gather samples with their equipment. Before each test, the military provided specific instructions. Mothers remember being told to close the windows to their homes, to cover their water sources, and to leave their homes during the tests. Herders remember being told not to drink the water at certain places. And, those who were children remember the days that the soldiers told them to leave the school building so they would not be harmed by the earthquake-like shaking. They also remember being told to lie down on the

ground and to avoid looking at the bright clouds in the sky. In Dolon, soldiers instructed people to lie down in low lying areas.

As they retell their experiences, many villagers note that when they were young they thought the tests were fun and exciting, and they rarely listened to these instructions. One middle-aged Kazakh man we talked to wonders whether he would have eye problems now had he followed their instructions. He and others found it very exciting to watch the emergence, development and passing of a mushroom cloud. It was similar to watching a fireworks display. The colors and the shape were constantly changing. As children, villagers remember having contests to be the first one to spot the emergence of a mushroom cloud. They also remember the excitement of having soldiers arriving in helicopters. One Kazakh woman also recalls how she used to feel lucky to live in this secret military zone. Although she did not exactly understand the purpose of these exercises, she knew that they were significant and she thought that it was very exciting to live in a place where such important things were happening. Today, the villagers admit that they did not realize that these explosions were poisoning their bodies and endangering their health. One Kazakh woman in Dolon remembers soldiers telling them that the tests were good for their health. Officials may have warned them to take certain precautions, but they never explained the health consequences of not following these directions. And, it is unclear that it would have made a difference if they had listened.

Older people living in Kainar village remember the one time when they were evacuated in 1953 during a very large test. The military came to the village a few days before and helped them move their livestock away from the village. Most families left behind smaller animals, including their cats, dogs and poultry. For nearly two weeks, the villagers stayed at a temporary camp location where they rested from work. After nearly two weeks, the military allowed them

to return home. Upon their return, they found unusual things: many of their chickens were dead, some of the baby chicks were deformed, their dogs and cats were losing their fur and some were covered with scabs. Several people described how their dogs and cats died before their eyes in the first few days after their return.

In Kainar village, everybody knows that the dogs and cats were not the only ones left behind in 1953. We were told repeatedly that forty men from the village were forced to stay behind, allegedly to maintain the village infrastructure. We interviewed one of the two survivors, a Kazakh man in his seventies by the name of Nurzhan Mukhanov.[10] At the time of the evacuation, he was in his early twenties and he worked for the local radio station. He did not want to stay behind. As he describes the story, it was clear that people knew it would be dangerous to stay in the village. He wanted to help his widowed mother with the evacuation, but he was told by his supervisor that he had no choice. The memories of Stalin's collectivization drive and his father's disappearance during the subsequent repression were still vivid, so he chose to obey his supervisor.

According to his story, on the day of the explosion, military personnel took all forty men who were left behind to a beautiful area a few kilometers from the village. They gave them food and alcohol, and instructed them to relax and enjoy the day. Before leaving, they provided Mukhanov and his co-worker with some radio equipment, and told them that further instructions regarding the exercise would be sent via radio. He and his friend waited for this news, but before it arrived, there was a massive explosion, followed by a mushroom cloud. The other men were very were worried that something might be terribly wrong, and they were angry that Mukhanov did not provide them with any information. Mukhanov and his friend insisted that he had not received any radio transmissions. A few hours later, military personnel, covered in white

protective clothing from head to toe, returned to the scene to see how they were doing. The men were still angry. They felt that they were in danger, and they demanded to know why they had never been contacted with further instructions. The soldiers responded by saying that the radio operator on the other end was drunk and failed to do his job properly. Mukhanov now feels that he and the others were intentionally used as guinea pigs. He remembers how the soldiers took blood and urine samples from him and the others on a regular basis.

In some villages, such as Dolon and Mostik, residents were never evacuated. One Kazakh man, however, remembers that soldiers came to his natal village, Bodene, in the early 1950s and gave people the opportunity to move to new homes in Kyzyl-Orda province (nearly 1000 kilometers away). The soldiers explained that they were building a new military city (Kurchatov) nearby. He believes that people would have moved if they had known that the military planned to test nuclear weapons nearby and that these tests would endanger their health. Without this information, the villagers chose to stay.

We have asked villagers whether they sensed that these military exercises were dangerous. Their answers vary. Only a few claim they did not know anything until the glasnost' period when it was safe for people to talk about these issues. Most were suspicious that their health problems might be related to the military exercises, but did not really know for sure. Many people remember experiencing headaches, toothaches and nausea shortly after a test. Some women recall awful experiences with childbirth. The government wanted to conceal health problems, so doctors were not allowed to show deformed and stillborn babies to their parents. As one woman who lost a child told us, "I still don't know whether or not I gave birth to a monster." Besides health problems, several people remember a particular experience that made them wonder or made them certain that the tests were harming people's health. For example, one

woman remembers people's horrified reactions when she was at a sports competition in Lithuania, and the other children found out she was from the Semipalatinsk region.

In Kainar, a local schoolteacher by the name of Bolat Zhakishev tried to convince village leaders that these explosions were dangerous in the 1970s. Zhakishev was a physics teacher who told people that these explosions were nuclear tests, and that they would have harmful effects on their health. Zhakishev lost his job for being so vocal, and later died in a car accident in the 1990s.

Villagers today realize that many of the activities they did increased their exposure to radiation. For example, we interviewed many men who herded collective farm livestock on territory within the Polygon. According to several villagers in Kainar, collective farm directors under pressure to fulfill their annual production plans made agreements with the military to allow herders to enter the Polygon to gather hay and to herd their animals. One elderly Kazakh man from Dolon remembers how members of his brigade visited Ground Zero and the Atomic Lake while herding sheep. For them, it was interesting to look at the airplanes and cars that had been used in the tests. The security guards allowed them to go close to these radioactive objects, though they were warned not to touch them.

Although some villagers suspected that the tests were dangerous, they did not have the political freedom to express their concerns until 1989. It was during this time that the villagers' trust in the government was totally shattered, as the Nevada-Semipalatinsk Movement exposed the government secrets about nuclear testing, and called for a ban on all future tests. For many villagers, the media accounts of nuclear testing that emerged in 1989 led them to reinterpret many of their life experiences. They now have an explanation for illnesses that killed their relatives at young ages. They now have an explanation for why they experienced flu-like

symptoms and toothaches on the days of testing. And, they now have an explanation for why the nightingale birds that used to sing during their childhood are now a rare sight.

Conclusion

From 1949 to 1991, the Soviet military conducted over 450 nuclear tests at the Semipalatinsk Nuclear Test Site. Until the late 1980s, the authoritarian nature of the Soviet government prevented any public discussions about the harmful effects of nuclear testing. Things changed radically in 1989 when the Nevada-Semipalatinsk Anti-Nuclear Movement developed in the wake of Gorbachev's *glasnost'* policies. In a matter of months, the issue of nuclear testing became a hotly debated topic in Kazakhstan. The ability to discuss these events publicly led to increasing distrust of the Soviet government and its role in nuclear testing. As the anti-nuclear movement gained momentum and support, leading Kazakh politicians, including the President Nursultan Nazarbaev, joined the struggle and pressured the central government to close the test site. By the end of 1991, the test site was closed and Kazakhstan became an independent nation.

In this paper, we looked at how three different groups are coming to terms with the past in the post-Soviet period. Nuclear scientists, medical researchers and local villagers have different interpretations of the Soviet government's culpability during the forty years of nuclear testing. First, there are the nuclear scientists who believe that "radiophobia" has exaggerated public understandings of the health risks caused by nuclear testing. These scientists argue that the health impacts are minimal and they defend the state's actions in the name of national security. Next, there are the medical researchers like Saim Balmukhanov who told government officials that the tests were having harmful effects on human health. These medical researchers were silenced by the state, and thus powerless to stop the tests. Finally, there are the Kazakh and

Russian villagers who live near the test site. They now have answers to questions about their experiences and their health, yet their answers do not resemble those of the research scientists. Villagers portray themselves as victims of a state that placed national security interests above the health of its people.

These three different versions of the past coexist in a post-Soviet setting where the government that is responsible for nuclear testing no longer exists. Further, the Kazakhstani government that inherited this problem has limited resources and numerous other social and economic problems to resolve. As in other contexts, debates about the past are used to achieve political goals in the present. For domestic audiences, the nuclear scientists provide their interpretation of the past as a way to justify their actions and to minimize their blame. It is interesting to note, however, that their message is not targeted to the victims of nuclear testing. Villagers frequently told us that the Soviet government (and the "Kurchatov scientists" whom they associate with the Soviet government) have not offered them any direct or indirect apologies or explanations.

Instead, the scientists are primarily publishing their versions of the past for other scientists, especially international scientists. After the test site closed and the Soviet Union dissolved, these nuclear scientists needed to repackage their talents for new positions. The city of Kurchatov has declined to one-fourth its former size, yet many scientists still work there for the newly constituted National Nuclear Center of Kazakhstan. Although the center is funded by the Kazakhstani government, many of its projects involve international collaboration and international funding. Scientists in Kurchatov often compete for grants from international agencies, such as the International Science and Technology Center (ISTC) which was founded in 1992 to foster collaboration between "weapons scientists" of the Former Soviet Union and

"Western" countries. In this context, the nuclear scientists offer their version of the past to international scientists who are interested in learning as much as they can from the Soviet experience.

Just as the scientists use their knowledge of the past to gain international funding for their research, the villagers use their past experiences in an effort to gain domestic and international funding to alleviate their suffering. The villagers have benefited from media coverage. Throughout the 1990s, Kazakhstani newspapers were filled with stories about the victims of nuclear testing and reports from medical researchers (who confirm that nuclear testing has negatively affected their health). Their stories have also received some international coverage, including several articles in the *New York Times* and *National Geographic*.

Although their stories have been told numerous times, the victims of nuclear testing have yet to receive much in terms of compensation or medical services. After the test site was officially closed, the Nevada-Semipalatinsk Anti-Nuclear Movement attempted to redirect its focus towards compensation for victims. However, the movement lost its momentum in the mid-1990s amidst accusations of corruption. In an alleged attempt to do away with his greatest opposition, the President of Kazakhstan offered Olzhas Suleimenov, the charismatic leader of the movement, a post as the ambassador to Italy. Although a handful of smaller non-governmental organizations are devoted to victims' rights, none have the organization or power that the Nevada-Semipalatinsk Movement once held. Gone are the days when large and effective political protests are organized on behalf of victims.

To date, financial compensation has been given to some but not all of the defined victims, yet the amounts were very small as the rates were established just before a significant increase in inflation. Some victims have received disability pensions, though other worthy victims have not

received anything due to the bureaucracy involved. Villagers who work for the state receive "ecological supplements" to their salaries, but many villagers lost their state jobs when the government liberalized the economy. International organizations, including the United Nations, have studied the problem and have provided some development assistance. A lot of international funding has gone to improve health care facilities, such as the Oncological Hospital, in the city of Semipalatinsk. Most villages provide some medical care, ranging from a single nurse or feldsher to a limited care hospital. In the post-Soviet period, some villages have received funding for local health care, while others have witnessed cutbacks. International attention to the victims of nuclear testing in Kazakhstan, however, has faltered in the wake of 9/11. In a world filled with social and environmental problems, it seems that the victims of nuclear testing in Kazakhstan may soon be forgotten by the international community of donors.

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Endnotes:

[1] This paper is based on approximately six months of fieldwork in northern Kazakhstan during the summers of 2000, 2001, 2003 and 2004. The research includes surveys of over 800 villagers, doctors and research scientists. In-depth and focus group interviews were also conducted with these three populations, with special focus on villagers living in Kainar and Dolon.

[2] Kazakhstan has been an independent nation since the dissolution of the Soviet Union in December 1991. From 1921-1991, the territory of Kazakhstan was part of the Soviet Union, and for most of that time period, the territory was known as the Kazakh Soviet Socialist Republic or the "Kazakh Republic."

In addition to those living near the Semipalatinsk Test Site and the Novaya Zemlya nuclear test site in the Arctic, the Soviet nuclear program has had health impacts on those living near plutonium and uranium production facilities, such as Chelyabinsk-65 in the Urals, Krasnoyarsk-26 in Siberia, and Tomsk-7 in Siberia (Dalton et al. 1999; Donnay et. al 1995).

[3] Occasionally, the city has been referred to by additional names, such as Town M, Konechnaya, Moscow-400 and Atom City (Balmukhanov 2002; Kuidin 1997; Shkolnik 2002). In this paper, the city will be referred to by either Semipalatinsk-21 or Kurchatov.

[4] We gathered current and historical health data for each of the villages where we conducted surveys and interviews. We attempted to gather comparable data for the city of Kurchatov, but we were told that this was impossible.

[5] The total number of nuclear tests vary slightly from one reference to the next. Some of the variation can be explained by the fact that the number of tests does not equal the number of nuclear physics packages that were detonated (Shkolnik 2002: 37). Variation can also be explained by the fact that "unsuccessful" and "non-military" tests are sometimes not included in the figures.

[6] It is difficult to acquire statistics on village populations during the testing period. We do know, however, that 20,000 patients were observed at Dispensary #4 in Semipalatinsk (Shkolnik 2002:324).

[7] Lecture by Saim Balmukhanov, Research Scientist/Professor, Kazakhstan Scientific Institute of Oncology and Radiology, Kazakhstan Academy of Sciences. Estimates vary because that scientists use different methods to calculate dose, and they do not agree on what constitutes a "significant" dose. Some scientists claim that as many as 1.7 million people have been exposed to radiation in Kazakhstan (Shkolnik 2002: 145).

[8] In the mid-1990s, the new government of Kazakhstan decreased the number of provinces (or oblasts) by joining several together. During this time, Semipalatinsk and Ustkamen oblasts were joined together and renamed "East-Kazakhstan Oblast"; Karaganda and Zhezkazgan oblasts were joined together with the name of "Karaganda Oblast."

[9] In 1992, Dispensary No. 4 was reconstituted as the Institute for Radiation Medicine and Ecology. The institute still conducts research on radiation victims, yet their results are no longer classified information.

[10] Pseudonyms are used to protect the identity of our interviewees.