

2022

The Chernobyl Nuclear Meltdown and Health Complications Among the Citizens of Pripyat

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Recommended Citation

Tarter, Elizabeth A. (2022) "The Chernobyl Nuclear Meltdown and Health Complications Among the Citizens of Pripyat," *PANDION: The Osprey Journal of Research and Ideas*: Vol. 3: No. 1, Article 16. Available at: https://digitalcommons.unf.edu/pandion_unf/vol3/iss1/16

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Cover Page Footnote

I would like to thank my faculty mentor, Dr. Chau Kelly, for her nomination and endorsement of this paper to the Pandion. As well as her assistance and motivation throughout the research and writing process.

The Chernobyl Nuclear Meltdown and Health Complications Among the Citizens of Prip'yat

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Abstract

On April 25, 1986, reactor number 4 in the Chernobyl Nuclear Power Plant near the city Prip'yat went into a catastrophic meltdown. In the aftermath of the atomic disaster, the Soviet government misrepresented the severity of the danger to those who lived in the immediate area near the plant. This paper uses medical studies and firsthand accounts to argue that the meltdown at the Chernobyl Nuclear Power Plant and the delay of government involvement resulted in lifelong negative impacts on the lives and health of Prip'yat citizens and neighboring towns.

Introduction

“Our children are dying. Help!” This plea was heard from many mothers after the deadly meltdown that occurred at Chernobyl reactor-4 in Prip'yat, Ukraine.¹ Once a symbol of power and advancement in energy, the Chernobyl Nuclear Power Plant (CNPP), quickly became the site of lifelong devastating tragedy and a stark reminder of what can occur when scientific discovery meets human error and miscalculations. Additionally, while most tyrannical governments have track records of lying to their people to save face, the Soviet government’s misrepresentation of health complications became egregious, even on the world stage.² As a result, dozens of lives were lost in the early weeks following the meltdown, and many

more were chronically affected, despite reassurance from the Soviets that health risks were minimal to the community. Health has been misreported and ignored by the government before, what is stopping it from happening again? I argue that the meltdown at Chernobyl reactor-4 and the delay of government involvement brought forth lifelong negative impacts on the lives and health of Prip'yat citizens and neighboring towns.

To develop this argument, I will analyze an array of primary and secondary sources pertaining to mental and physical health and the association with Acute Radiation Syndrome (ARS). This information is derived from peer-reviewed journals, personal accounts and interviews, photography and videography, and medical data that dates from the night of the meltdown at the CNPP to the present day. These scientific and personal accounts directly conflict with the reports from the Soviets and show

1 Alla Yaroshinskaya, *Chernobyl: the Forbidden Truth*, trans. Julia Sallabank (Lincoln: University of Nebraska Press, 1995).

2 International Atomic Energy Agency. 1988. *Medical Aspects of the Chernobyl Accident*. (IAEA-TECDOC-516). Austria: INIS Clearinghouse. http://inis.iaea.org/collection/NCLCollectionStore/_Public/20/075/20075974.pdf. 9.

both a decline in health after the meltdown and an increase of general distrust towards the government.³

Historical Background

The rise of nuclear power in the Soviet Union did not reach the level we associate it with today until around the late 1950s. Until this time, the Soviet government predicted that “the country faced no imminent energy crisis, [as] existing hydropower, coal, gas, and oil-fueled plants produced electricity and the ample energy resources available didn’t necessitate a shift to nuclear power.”⁴ This was not just seen in the Soviet Union, but all over the world, energy demand rose and nuclear power became one of the leading contenders to fill the energy gap. Unlike the rest of the world, however, the Soviets handled their nuclear energy in a very bureaucratic way. While

many Western countries used the “free market” as a way to promote nuclear energy, the Soviet bureaucrats made decisions, committed resources, and oversaw the implementation of economic plans concerning the plants.⁵ There is heavy debate over whether Chernobyl was the result of human error, Soviet mismanagement, or reactor design flaw, but a definitive cause has yet to be determined.⁶ To further understand why this question cannot be answered simply, one must look at the events leading up to the meltdown.

The construction of CNPP began in 1977, with all four reactors completed in 1983, only three years prior to the meltdown. It is important to note that this plant’s reactors (and many others throughout the Soviet Union) did not have containment structures. These structures were common in Western power plants as they were “designed to be strong enough to not only survive a serious accident but to also prevent the release of radioactive material during a mishap.”⁷

The Soviets opted to bypass the construction of a concrete containment structure due to the cost and “because the [Soviets] did not think it was essential.” On the evening of April 25, 1986, plant operators entered the control room to run a routine test.⁸ This test proved to be anything but routine. The operators were instructed to test the plant’s power supply in the event that the turbines shut off and the generators

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- 3 Svetlana Alexievich, *Voices from Chernobyl*, trans. Keith Gessen (Ireland: Dalkey Archive, 2005); Serhii Plokhyy, *Chernobyl: the History of a Nuclear Catastrophe*, (United States: Hachette Book Group, 2018); Alla Yaroshinskaya, *Chernobyl: the Forbidden Truth*, trans. Julia Sallabank (United States: University of Nebraska Press, 1995).; Volodymyr G. Bebesko, Alexander N. Kovalenko, David A. Belyi, Dimitry A. Bazyka, Anatoliy A. Chumak, Victor A. Sushko, and Vasyl M. Gayiday. “Medical Monitoring Results of Survivors with Acute Radiation Syndrome after Chernobyl Disaster.” *International Congress series* 1258 (2003): 115–122. Science Direct.; Maureen Hatch and Elisabeth Cardis. “Somatic Health Effects of Chernobyl: 30 Years On.” *European Journal of Epidemiology* 32, no. 12 (2017): 1047–1054. Springer Link. <https://link.springer.com/content/pdf/10.1007/s10654-017-0303-6.pdf>; Johan M. Havenaar, Evelyn J. Bromet, and Semyon Gluzman. “The 30-year Mental Health Legacy of the Chernobyl Disaster.” *World psychiatry* 15, no. 2 (2016): 181–182. PubMed Central. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4911770/>; Evelyn J. Bromet. “Mental Health Consequences of the Chernobyl Disaster.” *Journal of Radiological Protection* 32, no. 1 (2012): N71–N75. IOPScience. <https://iopscience.iop.org/article/10.1088/0952-4746/32/1/N71/pdf>.
 - 4 Sonja D. Schmid, “Envisioning a Nuclear-Powered State,” in *Producing Power: The Pre-Chernobyl History of the Soviet Nuclear Industry*. Inside Technology Series, (Cambridge, Massachusetts: The MIT Press, 2015). <https://search.ebscohost.com/login.aspx?direct=true&AuthType=shib&db=e000xna&AN=959724&site=ehost-live&scope=site>. 26.

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- 5 Schmid, “Nuclear-Powered State,” 26.
 - 6 Schmid, “Nuclear-Powered State,” 26. The nuclear catastrophe at Chernobyl triggered public debate over the authority, credibility, and expertise of government officials, planners, and scientists.
 - 7 Thomas Filburn and Stephan Bullard. “Chernobyl Accident,” in *Three Mile Island, Chernobyl and Fukushima*. SpringerLink, (Stockholm: Springer International, 2016), 58. Note: it is presumed that had the Soviets built a containment structure around the Chernobyl reactor, the contamination would have been greatly reduced. This is assumed because containment structures at Fukushima and Three Mile Island (TMI) helped prevent the release of radioactive material.
 - 8 Filburn, “Chernobyl Accident,” 58.

needed to start up.⁹ At 11:25 p.m., reactor staff began attempting to raise the power level in the reactor, not realizing that the “reactor had already entered the period of xenon poisoning, during which raising the power level is difficult if not impossible.”¹⁰ At 1:23 a.m., a control operator hit the emergency shut-off button and ended the test.¹¹ The operators on duty had removed almost all the control rods from the reactor’s core, leaving the equivalent of eight or nine rods instead of the required fifteen control rods needed in the core at any given time.¹² Because of this mistake, once the operators initiated the automatic shutdown, “more than 200 control rods started inexorably lowering,” causing additional radioactivity to be introduced into the reactor’s core.¹³ By this point, nothing could be done to stop the action, as the system was automated. What followed happened incredibly fast and changed the way the world viewed nuclear power.

Once the control rods were halfway down their path through the reactor’s core, operators in the control room received the first warning of a ten-fold rise in power; the second warning signal came only three seconds later--indicating a one hundred-fold rise in power.¹⁴ The operators on duty claimed to have heard what they described as a sound “resembling a human moan.”¹⁵ This was the sound of the first explosion destroying the reactor, and a second explosion followed, destroying the

reactor building.¹⁶ The result of these explosions was devastating to the biological and environmental aspects of Chernobyl’s satellite city of Pripyat. These explosions caused lethal amounts of graphite to be ejected into the neighboring reactor, reactor-3, and set the rest of the area on fire.¹⁷ At this point, the air, ground, and people around the site of the meltdown were to some degree now contaminated by radiation.

Historiography

It is due to Soviet secrecy and cover-ups that early information on Chernobyl is sparse. However, despite some original worries, I was surprised to find a wealth of information that pertained to the argument: the meltdown at Chernobyl reactor-4 and the delay of government involvement brought forth lifelong negative impacts on the lives and health of Pripyat citizens and neighboring towns. The idea that Chernobyl and its release of radioactivity had negative effects on society is nothing new, and thanks to present-day researchers, one can now evaluate the full impact of the meltdown. One such article, “Clinical Aspects of the Health Disturbances in Chernobyl Nuclear Power Plant Accident Clean-up Workers (liquidators) from Latvia,” published in the journal *Inflammopharmacology*, was written by a group of Ukrainian researchers and functions as an invaluable source for this research, as it looks at data entries of cleanup workers exposed to radiation at the

9 Sonja D. Schmid. “Chernobyl,” in *Producing Power: The Pre-Chernobyl History of the Soviet Nuclear Industry*. Inside Technology Series, (Cambridge, Massachusetts: The MIT Press, 2015). <https://search.ebscohost.com/login.aspx?direct=true&AuthType=shib&db=e000xna&AN=959724&site=ehost-live&scope=site>. 138.

10 Schmid, “Nuclear-Powered State,” 138.

11 Schmid, “Nuclear-Powered State,” 139.

12 Schmid, “Nuclear-Powered State,” 139.

13 Schmid, “Nuclear-Powered State,” 141.

14 Schmid, “Nuclear-Powered State,” 141.

15 Plokhly, *Chernobyl: the History of a Nuclear Catastrophe*, 32.

16 Schmid, “Nuclear-Powered State,” 141. The first explosion was a hydrogen explosion, while the second one was a nuclear explosion. The result of these explosions resulted in the deposition of 100-250 tons of radioactive material (i.e., dust and debris) into the surrounding area. This is around one hundred times more radiation than that of the atom bombs dropped by the Allies on Hiroshima and Nagasaki.

17 Schmid, “Nuclear-Powered State,” 142.

time of the cleanup at the Chernobyl Nuclear Power Plant (CNPP).¹⁸

Additionally, “The 30-year Mental Health Legacy of the Chernobyl Disaster,” published in the journal *World Psychiatry*, and “Mental Health Consequences of the Chernobyl Disaster,” published in the *Journal of Radiological Protection*, were valuable finds, as these articles argue that mental health has been the widest public health issue since the Chernobyl nuclear meltdown.¹⁹ Other scholars, such as Thom Davies in “A Visual Geography of Chernobyl: Double Exposure,” take—as he calls it—a “visual approach on an invisible issue,” by using photography to examine life in the shadow of Chernobyl.²⁰ A final portion of scholarship that is critical to the argument regarding health after Chernobyl deals with the long-term effects of ARS. This is some of the most easily accessed scholarship when looking at Chernobyl health effects. Works such as Maureen Hatch and Elisabeth Cardis’s article entitled “Somatic Health Effects of Chernobyl: 30 Years On” and Volodymyr G. Bebeshko and his team’s work, “Medical Monitoring Results of Survivors with Acute Radiation Syndrome after Chernobyl Disaster,” both analyze the long-term (or chronic) health effects of ARS on Chernobyl workers and

surrounding residents.²¹ It is with the help of these sources and articles that I formulate my argument.

Short-term effects of

Acute Radiation Syndrome

This brings me to my first point. This area of research relies heavily on the accounts of Chernobyl victims and survivors. If it were not for their testimonies, little would truly be known about what happened in the following days, weeks, and months post-Chernobyl. One official document, organized by the USSR Ministry of Health, reads: “One must say definitely that we can today be certain that there are no effects of [the] Chernobyl accident on human health.”²² Yet in *Voices from Chernobyl*, journalist Svetlana Alexievich interviews survivors whose firsthand accounts directly contradict the claims that the Soviet government was making. One of the first accounts listed in her book retells the last days of a Chernobyl first responder, Vasily Ignatenko, and provides a vivid account of ARS.²³ The story is told from the perspective of his wife, Lyudmilla Ignatenko, and according to Lyudmilla, the initial symptoms of ARS start small and then quickly change. Throughout much of this process, from Vasily’s diagnosis of ARS to the time of his death (approximately 14 days), the Soviet officials were very careful to never tell the family too much about what was happening.

Vasily Ignatenko and his team of firemen received the call out to the CNPP only moments

18 M. E. Eglite, T. J. Zvagule, K. D. Rainsford, J. D. Reste, E. V. Čurbakova, and N. N. Kurjane. “Clinical Aspects of the Health Disturbances in Chernobyl Nuclear Power Plant Accident Clean-up Workers (liquidators) from Latvia.” *Inflammopharmacology* 17, no. 3 (2009): 163–169.

19 Johan M. Havenaar, Evelyn J. Bromet, and Semyon Gluzman. “The 30-year Mental Health Legacy of the Chernobyl Disaster.” *World psychiatry* 15, no. 2 (2016): 181–182. PubMed Central. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4911770/>; Evelyn J. Bromet. “Mental Health Consequences of the Chernobyl Disaster.” *Journal of Radiological Protection* 32, no. 1 (2012): N71–N75. IOPscience. <https://iopscience.iop.org/article/10.1088/0952-4746/32/1/N71/pdf>.

20 Thom Davies. “A Visual Geography of Chernobyl: Double Exposure.” *International Labor and Working-Class History* 84 (2013): 116–39. doi:10.1017/S0147547913000379.

21 Maureen Hatch and Elisabeth Cardis. “Somatic Health Effects of Chernobyl: 30 Years On.” *European Journal of Epidemiology* 32, no. 12 (2017): 1047–1054. Springer Link. <https://link.springer.com/content/pdf/10.1007/s10654-017-0303-6.pdf>; Volodymyr G. Bebeshko, Alexander N. Kovalenko, David A. Belyi, Dmitry A. Bazyka, Anatoliy A. Chumak, Victor A. Sushko, and Vasyly M. Gayiday. “Medical Monitoring Results of Survivors with Acute Radiation Syndrome after Chernobyl Disaster.” *International Congress series* 1258 (2003): 115–122. Science Direct.

22 International Atomic Energy Agency, *Medical Aspects of the Chernobyl Accident*, 9.

23 Alexievich, *Voices from Chernobyl*, 1–23.

after the second explosion occurred. These men did not have the proper uniforms to protect against radiation, but Lyudmilla recalls that the men were not informed of the dangers; they were told it was “for a fire, that was it.”²⁴ Without notice, Ignatenkoy found out that the firemen—including her husband—had been taken from the local hospital and moved to Moscow for treatment, as it was determined that they were too injured to be treated there. In her interview with Alexievich, she recalls her husband’s face being “all swollen and puffed up,” to the extent that she “could barely see his eyes.”²⁵ During the following days, the swelling subsided and though he had chemical burns he seemed normal. In the following weeks, Ignatenkoy remarks that each day her husband changed and she would “[meet] a brand-new person.”²⁶ The radiation burns began to come to the surface of his skin and she describes the skin of his mouth and tongue coming off in layers.²⁷ His hair, as Lyudmilla recounts, came off in clumps on his pillow when he would turn his head.²⁸ She describes his skin beginning to change colors from blue, to red, to a grayish-brown, and then it began to crack or boil.²⁹ The radiation began attacking his internal organs in the second week, causing him to produce multiple stools that contained blood and mucus.³⁰ No morphine or medication could be administered because his veins and skin ripped and ruptured from needles and/or medical tape. During the last weeks of Vasily’s life, many Soviet scientists came in and took photographs of his body—a practice Lyudmilla found

cruel and inhumane.³¹ It is important to note, though, that these photos were used for scientific research only and not shown or broadcasted to the public.

There were a total of six firemen in Ignatenkoy’s unit who died within two weeks of the meltdown due to ARS, but they were not reported on as many news stories were heavily censored.³² Many of these men received large radiation burns that reddened or charred the skin.³³ Additionally, in the months following her husband’s death, Lyudmilla gave birth to a girl who died four hours after her birth. Doctors determined that the child had suffered from congenital heart disease and cirrhosis of the liver, due to radiation exposure.³⁴ Children and fetuses are among some of the most vulnerable groups when exposed to ARS, as “cells in children and fetuses divide rapidly, providing more opportunity for radiation to disrupt the process and cause cell

24 Alexievich, *Voices from Chernobyl*, 6.

25 Alexievich, *Voices from Chernobyl*, 6.

26 Alexievich, *Voices from Chernobyl*, 11. It was also during this time that doctors informed Lyudmilla that her husband and the other five firemen in the radiation unit could no longer digest the food she was making for them.

27 Alexievich, *Voices from Chernobyl*, 12.

28 Alexievich, *Voices from Chernobyl*, 13.

29 Alexievich, *Voices from Chernobyl*, 12-13.

30 Alexievich, *Voices from Chernobyl*, 13.

31 Alexievich, *Voices from Chernobyl*, 17. Lyudmilla recounts that when she would leave the room they would photograph her husband’s decaying body. He would be entirely naked with only a small sheet to cover him. By the end of the day, that sheet would be covered in Vasily’s blood and bodily fluid.

32 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, Ix-xvii. A note on Yaroshinskaya: Yaroshinskaya was also a journalist at the time of the CNPP meltdown. Her work covers stories from civilians in surrounding areas that were affected by Chernobyl and the radiation fallout. Her work and interviews with the public were censored by her news outlet when she presented them to try and get true stories about what was really happening out into the world.

33 William Zoller, *Chernobyl: the Destroyed Reactor*, “Radiation Burns on Firefighter.” Seattle: University of Washington Dept. of Chemistry, 1993. <https://digitalcollections.lib.washington.edu/digital/iiif/chernobyl/249/full/full/0/default.jpg>. (accessed April 11, 2022).; William Zoller, *Chernobyl: the Destroyed Reactor*, “Toes and hands of people exposed to radiation.” Seattle: University of Washington Dept. of Chemistry, 1992. <https://digitalcollections.lib.washington.edu/digital/iiif/chernobyl/249/full/full/0/default.jpg>. (accessed April 11, 2022).

34 Alexievich, *Voices from Chernobyl*, 6.

damage.”³⁵ With regard to children, many who lived in or near the exclusion zones near the CNPP were becoming ill. In the town of Narodichi, a town about 97 kilometers west of Pripyat, approximately “one in every two school children was reportedly absent from school at any time due to illness.”³⁶ It was not uncommon for mothers to have to take their children to hospitals for “weakness, pains in their joints, low hemoglobin counts, enlarged thyroid and lymphatic glands, headaches, stomach aches, [and] nonstop throat infections.”³⁷ The Soviet government, however, continued to mislead their people and systematically conceal many victims’ medical information.³⁸

Long-term Effects of Acute Radiation Syndrome

The long-term effects of Chernobyl are developing each day. Considering that the meltdown at Chernobyl is recent in history, many of the survivors are still alive and their conditions and response to ARS are still being monitored. An article entitled “Clinical Aspects of the Health Disturbances in Chernobyl Nuclear Power Plant Accident Clean-up Workers (liquidators) from Latvia,” examines some of the earliest evidence of ARS following the Chernobyl meltdown, and compares these numbers with more recent survivor test results. The Ukrainian team of researchers uses many investigative measures to conduct this study, including the Latvian State Register, passport data (information showing when/how long these workers were present at the site), and questionnaires given to the workers to evaluate the

long-term effects of ARS.³⁹ This study analyzes over 6,000 liquidators, most being men of reproductive age, who experienced radiation exposure for 1–6 months.⁴⁰ While this information has been recorded since the clean-up efforts in 1986, it has only “been recorded in the Latvian State Register” since 1994.⁴¹ With analysis of the data, the team found that changes in the health of CNPP accident clean-up workers over the observation period 1987–2007 showed that “morbidity exceeds that of age- and sex-matched non-exposed population with a trend for increase.”⁴²

Additionally, the articles entitled “Medical Monitoring Results of Survivors with Acute Radiation Syndrome after Chernobyl Disaster” and “Somatic Health Effects of Chernobyl: 30 Years On” conclude that poor response time in evacuating civilians from exclusion zones resulted in an increased risk of or deaths from nervous system issues, endocrine system problems, thyroid cancers, and heart disease.⁴³ Many Soviet officials attempted to downplay the effects of ARS and cited ARS as one of many factors along with: “heavy smoking, poor nutrition, the pollution of air and water by heavy industrial plants, and the likes of Chernobyl” as a cause for increased health issues.⁴⁴ This is contradicted by the increase of—most notably—thyroid cancer cases. The highest rate of issues

35 United States Environmental Protection Agency, “Radiation Health Effects.” EPA. April 14, 2021. <https://www.epa.gov/radiation/radiation-health-effects#:~:text=A%20very%20high%20level%20of,known%20as%20E2%80%9Cradiation%20sickness.%E2%80%9D>.

36 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, 134.

37 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, 134.

38 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, xvii.

39 Eglite, et. al, “Clinical Aspects of the Health Disturbances in Chernobyl.”

40 Eglite, et. al., “Clinical Aspects of the Health Disturbances in Chernobyl,” 164.

41 Eglite, et. al., “Clinical Aspects of the Health Disturbances in Chernobyl,” 163.

42 Eglite, et. al., “Clinical Aspects of the Health Disturbances in Chernobyl,” 165.

43 Bebeshko, et al., “Medical Monitoring Results of Survivors,” 116; Hatch. “Somatic Health Effects of Chernobyl.” 1051.

44 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, xiv–xv. This information was provided by Evgeny Demidchik, director of the Thyroid Tumor Clinic. This clinic is a part of the Byelorussian Institute of Oncology. Demidchik is a lead researcher of adolescent thyroid cancer and has been studying the effects of this cancer through the institute since 1966, when one of the first cases was reported and registered.

pertaining to thyroid diseases and cancers is seen in children who grew up in or around contaminated zones.⁴⁵ The study of thyroid cancer in children did not begin until 1966, as this was a rare disease with only approximately one case per year.⁴⁶ After the incident at Chernobyl, cases rose to more than fifty cases a year, seen mostly in children in exclusion zones.⁴⁷ By 1993, 260 had been documented, and most of these came from the regions most affected by Chernobyl.⁴⁸ This is compared to only six cases that were registered from regions outside of the contaminated zones.⁴⁹

The Mental Health Effects of Chernobyl

The study of mental health effects of the disaster is ever-evolving as well. Many mental health accounts were not taken into consideration until decades after the meltdown. “The 30-year Mental Health Legacy of the Chernobyl Disaster,” published in the journal *World Psychiatry*, and “Mental Health Consequences of the Chernobyl Disaster,” published in the *Journal of Radiological Protection*, were valuable finds.⁵⁰ These articles further elevate the argument that mental health has been the widest public health issue since the Chernobyl nuclear meltdown.⁵¹ Much like the previous source, the researchers focus their data pool specifically on liquidators who worked between April and October of 1986.⁵² Havenaar’s “The 30-year Mental Health Legacy of the Chernobyl Disaster,” also includes women who were either pregnant or had

young children in 1986 in their research.⁵³ By using registry studies and general population samples and surveys from affected areas, these papers conclude that the mental health consequences continue to be a concern and that mental health treatment in these areas is inadequate.⁵⁴ In “Mental Health Consequences of the Chernobyl Disaster,” Bromet also concludes that one leading factor of poor mental health (other than fear surrounding radiation) was connected to exposure dosage.⁵⁵

While these studies conclude that mental health is, in fact, still poor in these regions due to the meltdown, they also touch on distrust towards the government. In the months following the meltdown, families in surrounding areas began to be evacuated from their homes, oftentimes into poor conditions.⁵⁶ Some villages, such as the village of Rudnia-Ososanya, did not get evacuated for nearly four years after the meltdown and had little to no knowledge of its danger.⁵⁷ Recounts from survivors mention that “on April 27... neither the radio, the television, nor the newspapers had mentioned the explosion... [the] media only made the announcement two days later,” and oftentimes they received their news about Chernobyl from foreign news broadcasts.⁵⁸ Most of the information these smaller villages received came from neighboring villages or from people who were evacuating the villages, rather than the official Soviet government.⁵⁹

45 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, xiv-xv.

46 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, xiv-xv.

47 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, xiv-xv.

48 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, xiv-xv.

49 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, xiv-xv.

50 Havenaar, “The 30-year Mental Health Legacy of the Chernobyl Disaster.”; Bromet, “Mental Health Consequences of the Chernobyl Disaster.”

51 Havenaar, et al., “The 30-year Mental Health Legacy,” 181.

52 Havenaar, et al., “The 30-year Mental Health Legacy,” 181.; Bromet, “Mental Health Consequences of the Chernobyl Disaster,” N71.

53 Havenaar, et al., “The 30-year Mental Health Legacy,” 181.

54 Havenaar, et al., “The 30-year Mental Health Legacy,” 182.; Bromet, “Mental Health Consequences of the Chernobyl Disaster,” N71.

55 Bromet, “Mental Health Consequences of the Chernobyl Disaster.” N71. A note on mental health monitoring from Bromet: “Since mental health is a leading cause of disability, physical morbidity, and mortality, health monitoring after radiation accidents like Fukushima should include standard measures of well-being.”

56 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, 24.

57 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, 24.

58 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, 16-18.

59 Yaroshinskaya, *Chernobyl: the Forbidden Truth*, 17.

Conclusion

The meltdown at CNPP is an event that is regarded as the first of its kind. While the number of lives lost due to the meltdown stayed static at only thirty-two lives during the time of the USSR, the effects of the meltdown are still ongoing today. Children who were not administered iodine tablets early enough now live with the risk of or have died from cancers associated with ARS.⁶⁰ Liquidators, plant operators, and firemen risked their lives to put out the fires and encase the radioactive structure in its “sarcophagus,” only to be awarded with a medal from the Soviets,

then forgotten about.⁶¹ Loved ones of those lost still long for answers that they may never receive.⁶² While the explosion at reactor-4 on the night of April 26, 1986, may have happened in seconds, the results have lasted a lifetime and will not dissipate for many more. Whether the biggest threat was the invisible radiation to the bureaucrats running the operation is unknown. What is known, however, is that with proper safety techniques and truthful health updates, a disaster as devastating as this one may be alleviated in the future.

⁶⁰ Yaroshinskaya, *Chernobyl: the Forbidden Truth*, Xiv-xv.; Hatch. “Somatic Health Effects of Chernobyl.”; Alexieich, *Voices from Chernobyl*.

⁶¹ Alexieich, *Voices from Chernobyl*; Filburn, “Chernobyl Accident,” in *Three Mile Island, Chernobyl and Fukushima*.

⁶² Davies, “A Visual Geography of Chernobyl: Double Exposure,” 117; Alexieich, *Voices from Chernobyl*.

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