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The Legacy of Chernobyl' in 1997: Impact on Ukraine and Belarus

David R. Marples¹

Abstract: A western authority on the history and consequences of the 1986 disaster at the Chernobyl' nuclear power plant examines its continuing aftereffects on Ukraine and Belarus. The focus is on an examination of current levels of radioactive contamination, the number of people living in contaminated zones, prospects for the reutilization of farmland and the resettlement of populations previously evacuated, the public health situation in the affected areas, and the future of nuclear power in the two countries. The paper draws extensively on current coverage of these issues in the Ukrainian and Belarusian press, as well on as the author's observations in the field in the spring of 1997. *Journal of Economic Literature*, Classification Numbers: I31, J61, Q20. 2 figures, 27 references.

INTRODUCTION

More than 11 years have elapsed since the accident at the Chernobyl' nuclear power station in northern Ukraine. On the 10th anniversary of that event last year, there was significant international focus on the subject, and particularly on the health of the population living in the contaminated areas and the future of the Chernobyl' station itself. In addition, concern was expressed by the international community about the safety of Ukrainian nuclear power stations generally. This paper addresses several pertinent questions as another anniversary passes. To what extent have the effects of the radioactive contamination been overcome? Is there a possibility that the farmland affected could be used again? How many people are currently living in the contaminated zones and in what sort of conditions do they find themselves? Are people still being evacuated? Is nuclear power still a vital part of the energy structure of Ukraine? And will Belarus also choose the nuclear option to resolve an energy predicament that is reflected in that country's ability to provide for only 12 percent of its energy needs?

CONTAMINATED LANDS

It should be noted from the outset that although concentrations of radionuclides in the soil have diminished over time, their permanent removal is a matter for posterity. Ukrainian experts have offered the following forecast, dividing the process into four different stages, beginning in 1986.

Stage 1. This stage lasted for one year, ending in 1987 with a reduction in the level of radionuclides by 20 percent compared to the time of the accident.

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- Stage 2.* This stage, which persisted from 1987 to 1990, was characterized by the removal or dissipation of approximately 40 percent of harmful radionuclides.
- Stage 3.* This is the stage that currently is in force. It covers a 30-year period from 1990 to 2020, and is expected to result in the elimination of about 50 percent of the harmful radionuclides.
- Stage 4.* This final stage is anticipated to last a further 300 years and will lead to the disappearance of roughly 70 percent of the harmful radioisotopes. After this stage only the very long-term isotopes should remain, which are calculated to endure for ca. 100,000 years (Bol'shak, 1997, p. 9).

The area most affected by radiation encompasses the southern regions of Russia (particularly Bryansk Oblast), the three northern oblasts of Ukraine (Kyiv, Zhytomyr, and Chernihiv), and the Homel', Mahileu, and Brest oblasts of Belarus (Fig. 1).

Governmental policy in both the Soviet and post-Soviet periods has been to evacuate the population in the affected regions, which in turn are divided into areas of compulsory, secondary, and voluntary evacuation.² In the early post-accident years, the strategy was to relocate a large number of people within Ukraine (about 90,000 people) and a slightly larger number within Belarus (around 130,000) (Nestorenko, 1996, pp. 20, 27). Attention to the Russian regions was at best spasmodic.³ More recently, evacuations have occurred at a desultory pace. In Ukraine over the past five years, an estimated 24,000 families (approximately 52,800 people) have been evacuated (*Ukraina i Svit*, No. 16, 30 April-6 May 1997, p. 1), while the total in Belarus also has risen very slowly (Shakhot'ko, 1996, p. 76). In the latter country, the total number of people living in affected regions today has barely decreased: in 1991 it reportedly was 1.852 million, and in 1995 (the latest reported figure) it was 1.841 million (*Ibid.*, p. 78). In Ukraine, the latest figure is 2.37 million (*Ukraina i Svit*, 30 April-6 May 1997, p. 1).

The totals have remained high for several reasons. First, the authorities have concentrated on removing people from the regions of highest contamination. In these areas—including the so-called zone of alienation (lying within a 30-km radius from the nuclear station)—the numbers have dropped dramatically (see Fig. 2). Second, in Belarus particularly, there is today a marked reluctance to leave regions if jobs cannot be found elsewhere, or if the population is of advanced age. Third, there is some evidence that families in contaminated areas have developed a better sense of community and of family than their counterparts elsewhere, and many prefer to remain in the zone.⁴ Finally, certain areas have remained on the register for evacuation but the authorities have for various reasons delayed the program. In the case of two regions of northern Ukraine (Polis'ke Rayon in Kyiv Oblast and parts of Zhytomyr Oblast), the radiation problems were discovered in 1994, increasing the area of the zone of alienation by 1,000 km², but the population had not been moved as of spring 1997 (*Holos Ukrainy*, 19 April 1997, p. 1).⁵

²For background on the evacuation plans immediately following the accident, see Shabad (1969)—*Ed.*, *PSGE*.

³It was eventually ascertained that 18 oblasts of Russia had sustained levels of soil contamination from radioactive cesium in excess of 1 curie per km². Contaminated soils, for example, occupied some 20 percent of the total areas of both Ryazan' and Tambov oblasts. Despite this fact, no evacuations took place in the affected areas of Russia.

⁴See, for example, the survey conducted in Belarus by two sociologists (Burova and Levitskaya, 1996), who found, in a broad survey of 750 families (both within the zone and resettled from it), that those who have remained behind consider themselves to be better parents and to be much closer to their children than those living elsewhere.

⁵Some areas have had their land "deactivated" and are now considered safe for habitation (see, for example, Potikha, 1997, p. 7. The author cited is deputy minister for matters of extraordinary situations and protection of the population from the results of the Chernobyl' catastrophe.

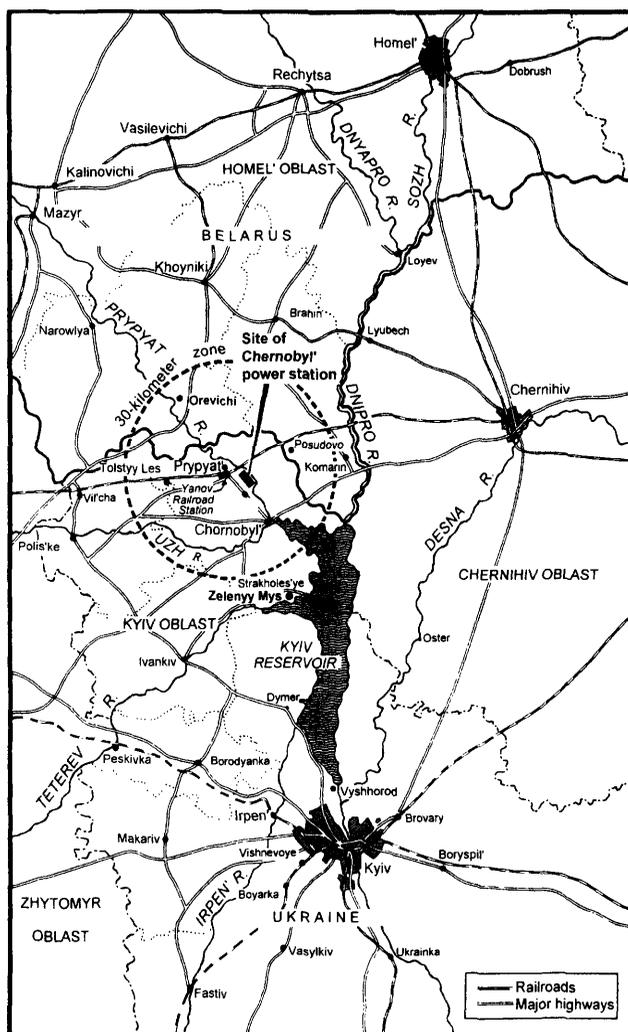


Fig. 1. Location map of Chernobyl' nuclear power station and affected areas.

HEALTH PROBLEMS

It has been pointed out by several investigators (Marples, 1991b, p. 300; 1996b, p. 23; International Chernobyl' Project, 1991, p. 44) that health problems are among the most difficult to discern because of official secrecy and various factors that influence the health of the population in the affected areas. Nonetheless, concerns remain in both countries. According to statistics issued by the Ukrainian Ministry of Health, 773 people died in 1996 from causes officially linked to their work on the clean-up campaign at the Chernobyl' station—these are among the so-called “liquidators.” In addition, there are 47,000 “invalids of Chernobyl',” of whom 8,000 were so defined in 1996 alone.⁶ The

⁶The term can be applied to those with various ailments. But it also pertains to anyone who worked in the Chernobyl' region for a certain length of time, whether or not they are physically ill today. It would be misleading, therefore, to equate the figure of 47,000 with those “suffering” directly from the consequences of Chernobyl' in anything other than psychological terms.

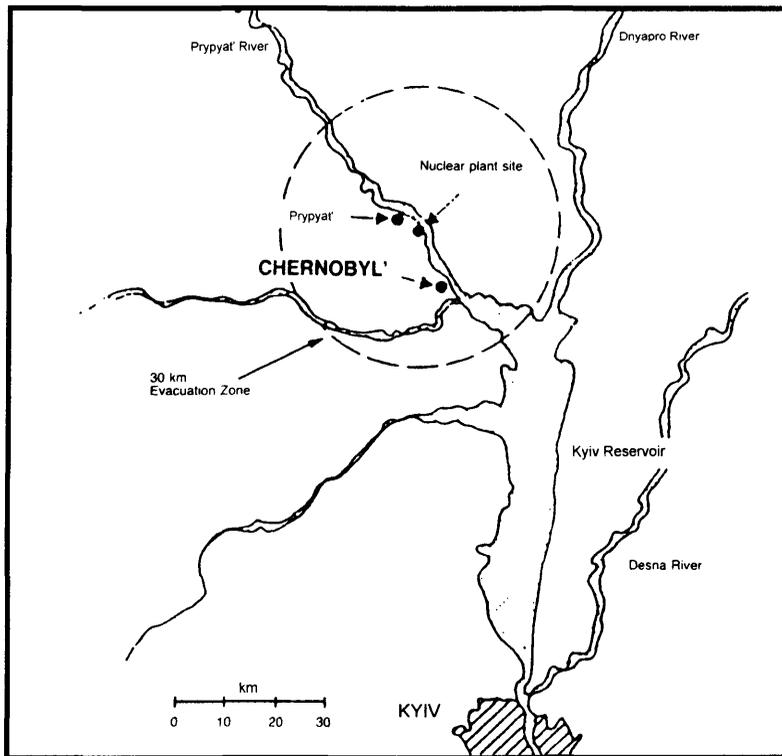


Fig. 2. Area near the Chernobyl' reactor site (after Marples, 1988, p. 2; Medvedev, 1991, p. 25).

general level of illness (number of reported cases of illness of all types) among adults and children who resided in affected zones has risen by a factor of 3.8 since 1987 (Torbin, 1997). Diseases of the respiratory and digestive systems remain high. Cancer of the thyroid gland among children has reached epidemic levels, particularly in Belarus (Marples, 1996a, pp. 100-109) and in some areas, health problems among children have reportedly multiplied.⁷ Finally, there is no question that people living in the contaminated zones are suffering from stress, a variety of psychological problems, including clinical depression, and general pessimism about the future.⁸

The key problem in the health sphere has been lack of access to medical or dispensing facilities. In Ukraine, the dilemma has been offset to some extent by the prolific amount of international aid delivered to Chernobyl' victims, particularly children (Suprun, 1997). The government has responded to the situation this year by offering cash compensation to victims, according to the area in which they reside (Kavun, 1997). In Belarus, on the other hand, although aid has been plentiful, the current regime of Aleksandr Lukashenko has sought to restrict the activities of all nongovernmental agencies working

⁷In Zhytomyr Oblast of Ukraine, for example, it has been noted that whereas 10 years ago, 70 percent of children were "practically" healthy, only 25 percent can be placed in this category today (Kavun, 1997, citing the deputy chairman of the Oblast government, Valerii Bondarev).

⁸See, for example, Vorona et al. (1996, p. 87), for a sociological survey conducted in 1992 among 598 people in both contaminated and "clean" zones of Ukraine.

within the country, and those organizations sending aid into Belarus have been subjected to a variety of harassments and delays at the border.⁹

THE NUCLEAR ENERGY QUESTION

Governments in both Ukraine and Belarus have wrestled with the issue of nuclear energy over the past several years. In Ukraine's case, the major problem has been that of closing the Chernobyl' station under the terms of an agreement concluded in 1996 between the Ukrainian government and the G-7 countries and Committee for Security and Cooperation in Europe. The parties involved agreed that the plant must be decommissioned by 2000. On most other issues, however, there has been little consensus between Ukraine and the international community. Both have accused the other of bad faith at various times. The international community has been bewildered by what appears to be vacillation on the part of the Ukrainian authorities with respect to the closure of Chernobyl', whereas the Ukrainians have complained of the slowness of the assigned aid in reaching Kyiv. Furthermore, many in Ukraine believe that recent improvements at the Chernobyl' station have made the plant safer than the remaining RBMK units in Russia, and thus Ukraine's nuclear power industry is being singled out for criticism unfairly.¹⁰

Nevertheless, Ukraine's actions with respect to the Chernobyl' plant have been perplexing. In November 1996, Unit 1 of the Chernobyl' station was taken out of service, in accordance with the April 1996 agreement. Yet there was no indication whether this represented a permanent closure. Moreover, it was announced simultaneously that the second unit, closed since a fire in 1991, was to be brought back into service prior to the year 2000. As has been pointed out by Western observers, however, it would hardly be economically expedient to bring Unit 2 back into service if the authorities really were intending to close down the plant by the end of the century (see Launer and Young, 1997).

There has been concern about the situation at Ukraine's nuclear power stations. An inspection of two proposed new reactors at the Khmelnytsky and Rivne stations in Ukraine—the two VVER-1000 capacity reactors could in theory compensate for the closure of two RBMK-1000 units at Chernobyl'—found that safety levels were unsatisfactory (Kostenko, 1997). Furthermore, personnel at Ukrainian stations were reported as being demoralized by constant public criticism, poor training facilities, and irregular wage payments (Honcharov, 1997). Given these problems, the further development of Ukraine's nuclear industry, which accounts for about 40 percent of the country's electricity production today, appears to be problematic at best.

In Belarus, there are no currently operating nuclear plants, although there has been an extensive debate for a number of years concerning such a possibility (Marple, 1996a, pp. 127-133). Recently, three locations were designated as potential sites for construction of a nuclear power station—Dubrovno (Vitsebsk Oblast), and Shklau and Bykhau (Mahileu Oblast) (Bol'shakov, 1997). In late January 1997, at a roundtable on nuclear energy questions in Kyiv, Aleksandr Mikhalevich, director of the Institute for Problems of

⁹In March-April 1997, the largest charitable organization in Belarus, the Fund for the Children of Chernobyl', headed by Gennadiy Grushevoy, a former parliamentary deputy for the opposition, was under investigation by the Belarusian KGB. When the author visited the headquarters of this Fund in April 1997, he was informed that its future closure was likely. All children traveling abroad for recuperation now require individual passports, whereas in the past they all could be included in the passport of their interpreter. Concomitantly, a large shipment of medical supplies from the Chernobyl' Children's Fund of Ireland was delayed at the border for almost two days on the grounds that some of the food contained therein was not permitted in the republic.

¹⁰See, for example, Sich (1996, pp. 36-37) for a full account of this debate.

Energetics, Academy of Sciences of Belarus, stated that Belarus intends to bring its first nuclear power station into operation by the year 2003. By February, geodesists already had taken land surveys in the villages of Baevo and Zaruby in Dubrovno Rayon.¹¹ A local construction enterprise also has been asked to supply for a five-year period highly qualified drivers, bulldozer operators, crane operators, and electricians (Dement'evskiy, 1997). Mikhalevich declared that 43 percent of people surveyed supported a nuclear plant, whereas 38.9 percent were opposed. However, a prominent investigative newspaper could find no one in Baevo and Zaruby who supported such construction (*Argumenty i fakty v Belarusi*, 23 February 1997).

Belarus is notably short of energy, which may explain why a plurality of people in the country most damaged by the world's worst nuclear disaster would support the construction of a nuclear power plant. Yet the energy situation is somewhat less serious than it was even five years ago, because of the contraction of Belarusian industrial output.¹² An energy conservation program also is in place that would appear to militate against the nuclear power option. Nonetheless, it appears that the decision to commence building may already have been taken by the government and the six-year period allocated to construction is notably brief. The decision may owe more to the political ambitions of the president than the needs of the economy; i.e., Lukashenko may feel that his bargaining position in talks with Russia will be enhanced to the extent that Belarus becomes more self-sufficient economically, especially with respect to energy.

THE CONSEQUENCES

The consequences of the 1996 accident at Chernobyl' continue to plague both Belarus and Ukraine. In Belarus, in particular, almost 20 percent of its land has been removed from agricultural cultivation. People remaining in the zone suffer from great psychological tension, but are becoming increasingly reluctant to move from their homes despite the danger of contaminated food—they often remove the children, however. The financial burden of the disaster has been colossal. It has been estimated, for example, that Ukraine has expended \$13.8 billion over the past five years on reducing the impact of Chernobyl' (*Ukraina i Svit*, 30 April-6 May 1997, p. 1), whereas in 1992, the Belarusian leader Stanislav Shushkevich provided a figure of BR206 billion for his republic (about \$18.7 billion according to the exchange rate at that time). Both countries are struggling economically, although arguably Ukraine has been more successful in obtaining international aid and credits from the G-7 countries, IMF, World Bank, and the European Bank for Reconstruction and Development.¹³

¹¹Several factors may underlie the decision to conduct preliminary surveys in the Dubrovno area. In the 1980s, a nuclear power and heating station (ATETs) was under construction at Rudnenske, some 25 miles east of Minsk, but the project was abandoned after public protests in 1988. It was generally believed that construction on this mothballed station might be restarted if Belarus ever opted for nuclear power. The fact that Dubrovno was selected instead indicates that the authorities are sensitive to the kind of protests that might have resulted had the station been completed near the capital. There have been similar concerns in Kyiv, which also was to have been the location of an ATETs (see *Den'*, 18 April 1997, p. 5). Moreover, Vitsebsk Oblast, where Dubrovno is located, has not been affected by radioactive fallout from Chernobyl', and the population is the least affected by "Chernobyl' trauma."

¹²Industrial output by the end of 1995 was only around 60 percent of the 1991 level, before increasing slightly (by ~3 percent) in 1996 (see *PlanEcon*, 1996, p. 96; *Finansovyye izvestiya*, December 19, 1996, p. 5)—*Ed.*, *PSGE*.

¹³Aid to Belarus from the U.S. Government and international lending organizations such as the World Bank and International Monetary Fund essentially has been suspended as a result of the slow pace of macroeconomic reform in the country and concerns over perceived human rights violations and deviation from democratic principles by the Lukashenko government (for background, see *Nezavisimaya gazeta*, March 14, 1997, p. 3)—*Ed.*, *PSGE*.

Ukraine, however, thus far has failed to gain international confidence in the safety of its nuclear power plants and has at times appeared reluctant to adhere to the timetable for the closure of the Chernobyl' station.¹⁴ Although international cooperation has continued to develop between Ukraine and the advanced industrial nations on nuclear energy questions, both sides have questioned the motives and actions of the other. Belarus, by contrast, has little international contact in this sphere other than with Russia, and has opted to go ahead with nuclear power plant construction not only without consultation with the IAEA—it has joined the Vienna Convention on Nuclear Safety, but has notably refrained from asking the IAEA for advice on locating its nuclear plant—but without foreseeable funds to support such construction, and without consulting the Belarusian parliament.¹⁵

In neither case do the protracted repercussions of Chernobyl' appear to have distracted the governments from their chosen courses. Nuclear energy remains a viable option in the two states most affected by the 1996 accident, despite the fact that neither has come remotely close to overcoming the consequences of the event. Both remain heavy energy consumers that are indebted to neighboring nations for imports of oil and natural gas (especially to Russia and Turkmenistan). For the anti-nuclear lobby, a key problem has been the lack of clear information on the health effects of the accident, which has deprived it of its main counterargument. That these public health consequences have been serious appears to be self evident. But in conditions that have at times approached economic collapse, with poor health facilities, unhealthy lifestyles, high levels of infant mortality, and a mounting gap between price rises and wage increases (if indeed wages are paid at all), the impact of Chernobyl' specifically on health and on lifestyle generally becomes increasingly difficult to assess.¹⁶

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¹⁴For reasons of space, I have omitted from this discussion the question of the covering ("Ukrytyta") over the destroyed fourth reactor, and the possibility of constructing "Ukrytyta-2" over the original building, which is slowly collapsing and has raised the specter of a release of radioactive dust into the atmosphere. For an update on the situation at the fourth unit, see Klyuchnykov (1997).

¹⁵It should be pointed out that after November 1996, when President Lukashenko won a referendum greatly increasing the authority of the presidency, he has issued an amended Constitution that has reduced the number of seats in parliament from 260 to 110. Numerous elected deputies have thus been unable to take their seats and the new parliament has yet to be recognized internationally. Belarus thus is moving toward a dictatorship rather than a parliamentary democracy (see, for example, *Narodnaya volya*, 4 March 1997, for a chronology of events).

¹⁶Health problems can, nevertheless, be discussed in the media, and this happens regularly in Ukraine. In Belarus, however, this is rarely the case today. The president's office has regulated the media to such an extent that articles regularly reflect official optimism, much as they did in the Soviet era. High-circulation newspapers, such as *Sovetskaya Belorussiya* and *Narodnaya hazeta*, devote little attention to Chernobyl' other than to suggest that affected lands will soon be brought back into agricultural use.

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