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The Chernobyl' Accident: Social and Political Implications

A Research Paper

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The Chernobyl' Accident: Social and Political Implications

A Research Paper

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**The Chernobyl' Accident:
Social and Political
Implications**

Scope Note

This research paper focuses on the societal and political implications of the first major domestic and international crisis under General Secretary Mikhail Gorbachev. It examines the impact of the Chernobyl' accident on the Soviet population, popular reaction to the event, and the effect on popular attitudes toward the Soviet bureaucracy and leadership. It provides the reader with a feel for how various strata of Soviet society reacted to this near-catastrophic event during a period of leadership-induced social ferment.

[

] The current study provides information on crisis decisionmaking under Gorbachev but does not deal in depth with the implications for the Soviet nuclear program. These issues have been treated comprehensively in the DI Research Paper *The Soviet Nuclear Power Program After the Chernobyl' Accident.*

] DI Research Paper SOV 87-10032X [

] June 1987, *The Soviet Nuclear*

Power Program After the Chernobyl' Accident.

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The Chernobyl' Accident: Social and Political Implications

Summary

Information available
as of 5 December 1987
was used in this report.

The explosion of the Chernobyl' nuclear reactor in April 1986 presented a serious problem for Gorbachev's efforts to portray the new leadership as a reasonable and accountable government. The accident led to the emergence of nuclear energy policy as a significant public issue. Moscow's delay in reporting the accident to its people and neighbors left it open to charges of disregard for public health and eroded confidence in the regime. The psychological consequences of the Chernobyl' accident are likely to be long term and not limited to the immediately affected geographic areas.

Soviet citizens—in contrast to their counterparts in the West—have not mounted a successful campaign against the development of nuclear power, but antinuclear sentiment is growing in the aftermath of the Chernobyl' accident. Some members of the elite with policy influence have much less confidence in the safety of the Soviet nuclear system. Even ordinary citizens apparently worry that the regime's determination to rely more heavily on nuclear power will increase pressure on the nuclear sector to place growth above safety. They are reluctant to trust official assurances that safety alterations have been made and that existing safety rules will be enforced.

Regime claims that radiation fallout from Chernobyl' will not add significantly to the normal incidence of cancer have not silenced rumors and anxiety about health issues. A large segment of the population living in the European section of the USSR apparently believes it is in danger from radiation and continues to link genetic abnormalities, cancers, and poor health in general to the accident. These concerns are probably greatest among the 135,000 evacuees and more than 20,000 recovery workers—mainly military reservists—nearly all of whom are non-Russians.

We have evidence of considerable fear of contaminated food and water that is likely to continue. The effects of this fear were still being felt in the farmers' markets this past summer, and Moscow probably is concerned that this apprehension could result in workers' resistance to transfers to the Chernobyl' region, an inability to sell products from the region, and increased demand for medical services

Chernobyl' also had an adverse impact on the regime's credibility. More than a year after the accident, Soviet citizens continue to criticize top officials for initially concealing the Chernobyl' accident, and some think the regime's response to the disaster exposed the insincerity of Gorbachev's openness (*glasnost*) policy.

The regime brought many of these problems on itself by initially reacting with its traditional secrecy. Immediately after the accident, an information blackout was imposed until international pressure forced a grudging admission followed by a propaganda counterattack. Gorbachev himself remained silent until 14 May, almost three weeks after the accident, probably to minimize his personal responsibility and to wait for his experts to gain control of the situation.

Once Gorbachev got involved, however, he exploited the initial public relations setback to push his own reform agenda. By demonstrating that suppressing information about domestic problems can backfire, the accident gave added impetus to his drive for openness in the Soviet media. Several articles in *Pravda*, for example, pointed out that a lack of complete information had encouraged harmful rumors, and supporters of Gorbachev's policy criticized the domestic media's early silence.

Gorbachev also used the accident to eliminate some Brezhnev holdovers. He retired three elderly members of the Central Committee who were rumored to share some blame for the disaster. In addition, several ministry-level officials in the nuclear industry were fired, six Chernobyl' plant managers received jail sentences, and 27 party officials were expelled from the party either for contributing to the accident or for being inattentive to the evacuees' needs.

By laying the blame on local authorities, attacking the West for exploiting the disaster, and pressing forward with domestic reform, Gorbachev has so far largely avoided personal accountability. {

} Gorbachev favored prompt publication of information but met resistance in the Politburo. However, this story conceivably was put out by his supporters to exonerate him.

The costs to regime credibility were especially serious in the Ukraine, Belorussia, and the Baltic. Dissatisfaction with the regime's handling of the Chernobyl' accident exacerbated longstanding popular frustrations in these regions:

- The nuclear radioactive contamination of Ukrainian and Belorussian territory and the dislocation of Ukrainian and Belorussian people provoked dissatisfaction with the Soviet policy of placing nuclear plants near populated centers and strengthened the environmentalist lobby in the Ukraine.
- Chernobyl' sparked demonstrations in the Baltic, where ecology-sensitive issues had already provoked anti-Russian demonstrations and Moscow's callup of reservists to clean up Chernobyl' was perceived as ethnic discrimination.

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The new consciousness about environmental issues spurred by Chernobyl' has contributed to a climate of public activism that could contest Moscow's plans for nuclear power expansion in the next decade. Some 60 members of the Ukrainian Academy of Sciences signed a petition opposing the completion of units 5 and 6 at Chernobyl' because the project leaders had failed to adjust their plans to the new postaccident conditions. Reportedly, the petition was about to be made public when Moscow decided to shelve the expansion plans for the nuclear plant, conceivably in response to the arguments advanced by the Ukrainian group and possibly other public opposition.

Local Soviet press accounts indicate that concern about the safety of the nuclear industry is particularly high in areas with Chernobyl'-type reactors, like Kursk, Leningrad, Smolensk, Ignalina, and Chernobyl' itself. Demonstrations against the Ignalina and Leningrad nuclear plants were held in June 1986 as well as this year, and there is evidence that two nuclear projects have been recently shelved because of public reaction. Even though there have been greater efforts to reassure the public and perhaps some rethinking of the strategy for siting nuclear power plants, [] [] the public's apprehension about the regime's commitment to make the necessary safety modifications remains well founded. (

Despite the fact that ministries responsible for nuclear industry have been given a formal mandate to achieve more stringent safety standards, there is no indication that public resentment will compel changes in the direction of Soviet nuclear power policy. The major bureaucracies resent public pressure and there are some signs of backtracking on *glasnost*:

- Despite Moscow's avowed openness policy, the July 1987 legal followup of the accident was conducted in secret, probably in an effort to avoid revealing technical testimony that addressed reactor design flaws.
- In the spring of 1987, Soviet reporters complained that the authorities were still tightly controlling information on Chernobyl', leaving the public largely in the dark.
- The official Soviet report presented to the International Atomic Energy Agency at the August 1986 meeting in Vienna, and made widely available to the West, was never released to the Soviet general public.

Soviet leaders probably hope that the consequences of Chernobyl' will fade from public view. Continued publicity poses difficulties because long-term environmental and health consequences will require further allocations of resources, which Moscow appears unwilling to make. A debate about the

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location and safety of nuclear plants is troublesome to a regime formally committed to nuclear energy and the economic benefits of building nuclear plants near highly populated areas. (

In an era of continued reform policies, another nuclear mishap, even a comparatively minor one, could unleash a backlash against nuclear energy that would be harder to ignore and might hasten the process of retiring the Chernobyl'-type (RBMK) reactor:

- The democratization campaign unveiled by Gorbachev, Yakovlev, and other senior leaders presupposes more sensitivity to public opinion.
- Legislation presented at the June 1987 Supreme Soviet on public referendums on local issues may give the people a mechanism to express their concerns.
- Public groups have been able to exert pressure on other environment-related issues through mass demonstrations.
- Some critics of current nuclear policy, including prominent journalists, probably can be more influential under *glasnost*.

In addition, the Gorbachev regime has issued a number of broader policy statements designed to curb pollution and improve health and appears willing to provide resources to support these policies. In July 1987, the CPSU Central Committee issued a sweeping resolution on ecology aimed at improving safety in the workplace and the quality of air and water. A month later, it announced a crash program to improve the medical system. The new Law on the Restructuring of Public Health stresses major reforms in the area of health through prevention and, given the growing concern with pollution and industrial safety, may be implemented more rapidly than usual. (

Accommodation to popular frustration carries a danger for the regime and could make the situation worse by exciting expectations. The population will be more attentive to future regime performance in the areas of nuclear safety, public health, and ecology. There is increased discussion of these issues in the intellectual community, and social initiative groups are taking the issues to the street. These concerns are not likely to evaporate. As public dissatisfaction becomes more evident, the Chernobyl' accident may provide a focal point around which disgruntled citizens can organize, and Moscow may discover that Chernobyl' is a continuing irritant with a potential for social and ethnic tensions for years to come.

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The Chernobyl' Accident: Social and Political Implications

Regime Handling of the Chernobyl' Crisis

The accident at the Chernobyl' nuclear power plant on the morning of 26 April 1986 set off a sequence of events the Kremlin and Soviet populace are still grappling with. The belief in the safety of Soviet nuclear design had been widely shared among Soviet nuclear specialists, and most experts believed that an accident like the one at Chernobyl' could never happen, leaving them ill prepared to cope with a crisis of such magnitude.¹

The government commission that investigated the accident concluded that the world's worst nuclear accident was caused by a bungled test at Chernobyl's unit 4 reactor, but Soviet media and reporting both indicate that more basic problems with reactor safety were also partly to blame. The top leaders were informed of the accident almost immediately and members of a government commission were on the scene within a few hours, but they apparently failed to give a high priority to prompt evacuation or the release of accurate information that could have stemmed rumors or facilitated more rapid public health precautions, like those taken in Poland.

The delay and uncertainty that characterized the regime's initial response can be explained in part by the magnitude of the Chernobyl' disaster, which would have been difficult for any government to

¹ In 1984, Academician Valeriy Legasov, a member of the presidium of the USSR Academy of Sciences and first deputy director of the prestigious Kurchatov Atomic Energy Institute, published an economic analysis on the acceptable level of risk in nuclear energy. He concluded that plants are designed and constructed so that there is no risk to human health not only during normal operation but even in the event of a catastrophe, such as an earthquake or an aircraft crashing into the reactor. Legasov was one of the first to visit the scene of the disaster as a member of the government commission entrusted with the investigation of the Chernobyl' accident. He was clearly amazed by the scope of the devastation as were most specialists worldwide. "Frankly speaking," he said in a later interview, "I could never imagine that I would witness such an accident which was believed to be quite improbable by specialists in nuclear engineering."

handle. The leadership quickly recovered from this brief period of hesitation and effectively responded to control the radiation release, to evacuate and resettle 135,000 persons, to decontaminate most of the Chernobyl' environs sufficiently to permit workers to continue the recovery operations, and to reduce the public relations damage. The break in Gorbachev's political momentum appears to have been temporary, and, by laying the blame on local authorities, Gorbachev has avoided any personal accountability.

Formation of Decisionmaking Bodies

Moscow officials were at the scene of the accident within hours after the explosion occurred, according to nuclear physicist Boris Semenov, the Soviet delegate to the International Atomic Energy Agency (IAEA) board of governors. Semenov told IAEA board members in late May that Gorbachev and other members of the top leadership learned of the accident at Chernobyl' early in the morning of 26 April. A group within the Politburo under the direction of Nikolay Ryzhkov, chairman of the USSR Council of Ministers, was formed to deal with the accident. In addition, a special government commission headed by Boris Shcherbina, deputy chairman of the Council of Ministers, was formed that morning to investigate the causes of the accident.⁴ This commission immediately took over direction of the emergency response and recovery effort.

Maj. Gen. Vladimir P. Pikalov, chief of the chemical troops of the USSR Defense Ministry, and a decorated Hero of Soviet Union for his work at Chernobyl', told *Pravda* in December 1986 that he was summoned to the General Staff headquarters in the early morning hours and ordered by General Staff Chief Sergey

⁴ The on-site head of the commission rotated every two weeks starting 9 May 1986, with various deputy premiers serving their turn as its director. These included Ivan Silayev, Yuri Maslyukov, Lev Voronin, Vladimir Gusev, Genadiy Vedernikov, and Boris Shcherbina.

Laxity and Poor Design of the Chernobyl' Plant

The report of the investigation presented to the Central Committee of the CPSU stressed the Chernobyl' accident was caused by a "one-in-a-million" chain of events, but Western experts maintain that an accident was possible because of dangerous design characteristics that make the RBMK—a graphite-moderated reactor—vulnerable to accidents. Because many of these deficiencies cannot quickly and cheaply be remedied, the RBMK will continue to be considerably less safe than other type reactors, and planned safety enhancements will not raise these reactors to Western safety standards.

Construction of Soviet nuclear plants has been hampered by inefficient design bureaucracies, bottlenecks in component manufacturing, and overambitious planning that resulted in some substandard construction. The chief design engineer for the ventilation system of the Kursk and Chernobyl' nuclear power stations from 1974 to 1980 gave a good example of industry's use of inferior components. The Chernobyl' and Kursk ventilation systems were built from ungalvanized sheet steel to reduce cost. Similar problems with construction and workmanship halted work projects at the Rostov nuclear plant in April 1986, indicating that these conditions are widespread in the industry.

On the eve of the accident, a Pripjat' resident, in an article published by the Ukrainian literary weekly *Literaturna Ukraina*, attempted to draw attention to problems at Chernobyl's unit 5—then under construction—including shortages of skilled labor, inferior materials, unsafe shortcuts, and unrealistic building programs. Further revelations of precarious safety conditions prevailing at the plant were provided in a report from the trial of those responsible for the accident at Chernobyl'. At the July trial the technical commission of experts charged the experiment that commenced before the accident was a continuation of a series of similar and unsuccessful research projects, including a near mishap during a similar experiment in 1985. The Soviets told a Japanese visitor this September that the experiment was initially proposed at the Leningrad and Irkutsk nuclear power plants but was refused. It was then done at the Chernobyl' plant.

Soviet Account of Accident to the IAEA in Vienna

The official Soviet version of the accident, as reported to the International Atomic Energy Agency (IAEA) in Vienna on 25-29 August 1986, is largely accepted in the West. Based on the conclusions of the Soviet Government commission investigating the accident, the world's worst nuclear accident was caused by a bungled attempt to test a minor part of the safety system of unit 4 of the Chernobyl' nuclear power plant. The experiment involved a scheme to use the rotational inertia of the turbogenerators to generate electricity to bridge a one-half minute gap between the loss of normal power and the beginning of auxiliary power supply in the event of the loss of normal supplies of electricity. The operators were under pressure to carry out the test, since another opportunity would not present itself until the next year.

According to the Soviet account at the IAEA meeting, the experiment was never officially approved and was not executed according to plan. The operators allowed the reactor to reach a highly unstable condition as a result of deliberately disabling some safety systems and a series of delays and mishaps. When the experiment began, the rate of cooling-water flow decreased, leading to increasing water temperature in the core and increased steam formation. Because of a design characteristic of the Chernobyl'-type reactors, the increased steam content in the core caused a power increase that quickly ran out of control. The power excursion ruptured fuel channels, and the pressure of the escaping steam blew apart the reactor's core and caused severe damage to the reactor building. Eyewitnesses report hearing a loud explosion and seeing sparks and burning chunks flying high into the night sky above unit 4 at 0123 hours on 26 April. The burning chunks fell back onto the roof of surrounding buildings and started several fires.

Akhromeyev and Minister of Defense Sergey Sokolov to go to Chernobyl' and take charge of the chemical troops there. Within minutes of his meeting with these officials and less than two hours after the accident occurred, Pikalov alerted the mobilized military units

in Kiev. He and the first brigade of chemical troops arrived in Kiev just over 12 hours after the explosion and, soon after, set up headquarters in the city of Chernobyl', 15 kilometers from the burning reactor. By the evening of 26 April the chemical troops were conducting radiological reconnaissance and continuous monitoring of radiation levels and weather data in the area surrounding the devastated Chernobyl' plant. According to General Pikalov, the health situation in Pripjat' had sharply deteriorated through the night of the 26th, and by 1000 hours on 27 April the planning to evacuate 47,000 persons from Pripjat' had begun.

Pikalov's account confirms Boris Shcherbina's statement at the 5 May press conference that he and other members of the commission were on the scene literally "within a few hours" of the explosion. This scenario strongly suggests that the leadership had the information channels it needed to evaluate the situation, despite the persistent Soviet line that "internal communication difficulties" had been the cause of the initial problems in dealing with the disaster. It also suggests that, while the decisionmakers began to react to the crisis by at least the afternoon of the 26th, safeguarding the population was not their first priority.

Evacuation and Decontamination

The Soviets initially responded to the accident as if it was a local emergency confined to unit 4 of the Chernobyl' nuclear power plant. Even after it was known that high levels of radioactivity were present, the accident was handled at first as a site emergency. Thousands of plant workers and their families in the city of Pripjat', located only 10 kilometers from the stricken plant, were neither informed about the accident, nor instructed to take precautions against radiation fallout. Evacuation was initiated 36 hours after the accident. Apparently there were no off-site emergency evacuation plans, and additional evacuation within the established 30-kilometer contamination zone continued for two weeks. The 2.5 million people living in Kiev, located less than 103 kilometers south of the reactor, were not warned publicly about the hazard until nine days later

The Evacuation of Pripjat'

The actual evacuation of the city of Pripjat' took place 36 hours after the initial release of radiation. What we know of Pripjat's evacuation is based entirely on Soviet retrospective accounts, since no television pictures or photographs of Pripjat' just before or after the dramatic evacuation have been released.

In later months, the press described the exodus as an orderly and efficient process. A caravan of more than 1,100 buses, mostly from Kiev, got under way on Sunday afternoon, carrying the townspeople in a line that stretched for almost 19 kilometers. The complete operation took less than three hours, a strikingly short time to move so many people.

Despite this impressive achievement, firsthand accounts of local officials directly involved in the evacuation present a picture of disorganization, supporting speculation there were no evacuation plans for an event such as the one unfolding at Chernobyl'. The Soviet press details how officials hastily decided on where to move such a large number of people; how to assemble the transportation; and what resources to tap to shelter, feed, and provide medical services for such a large number of evacuees. One Kiev Obkom official said that shortly before the evacuation an information group composed of oblast party officials, militiamen, and voluntary police (druzhinniki) went from house to house informing the residents of the evacuation. The people were given less than an hour's advance warning, and no additional information was provided for fear of creating a panic.

[who visited the Chernobyl' site, the current Chernobyl' plant director said that after the accident people reacted "very emotionally," because they had no previous emergency exercises about what to do after an accident and stressed the need for such a public education program for people living around nuclear plants.

The official figure on the number of people eventually evacuated from the Ukraine and Belorussia was 135,000, but the total number of those who left the area is probably much higher. In addition, some 400,000 children were evacuated from Kiev, and another 100,000 from points in Belorussia to Pioneer camps and summer resorts.

Initially, confusion seemed to reign among the officials on the spot, who seemed totally unprepared to deal with a catastrophe of such magnitude. In a later effort to explain the delay in the evacuation of Prip'yat', Valeriy Legasov, presidium member of the USSR Academy of Sciences and the first deputy director of the prestigious Kurchatov Atomic Energy Institute, told a US visiting nuclear delegation that it was an appropriate precaution taken to protect the people because the radioactive plume had traveled over the likely evacuation route. Information released at the trial of the Chernobyl' plant managers this July, however, revealed that no effort was made by plant officials to check the radiation levels in the city in the immediate aftermath and that the nuclear plant had no off-site measuring capabilities. Court testimony also showed that the staff at the plant was ordered by plant officials to keep quiet about radiation levels and that they reported to their superiors lower levels of radiation than actually measured. As noted, the first comprehensive readings of radiation levels in Prip'yat' were made on the evening of 26 April by the chemical troops who arrived earlier that day. As a result, schools and shops stayed open on 26 April and residents went about their business as usual.

The Soviets responded relatively quickly to dispatch medical teams to surrounding areas to screen the population. According to the vice president of the Academy of Medical Sciences, there were 1,300 health care personnel involved, grouped into 230 medical teams, mostly from the Ukrainian and Belorussian medical services, with support from military mobile medical teams. Nevertheless, there were shortages of medical personnel, medical supplies and radiation-detection equipment, [] [] As a result, the evacuees were forced to wait long periods of time to be processed at relocation centers, where they received a medical examination, a shower, and clean clothing.

Firemen's Effort to Contain Catastrophe

When the Prip'yat' firemen responded to the fire at the nuclear power plant only minutes after the explosion released a radioactive cloud, they did not know the full extent of the accident. The chief of a MVD directorate, Maj. Gen. V. M. Korniychuk told Literatura Ukraina in May that the message alerting the firemen indicated only that there was a fire in the plant. When the firemen arrived on the scene of the burning reactor, within minutes of the accident, they found that the roof over the control room was burning and part of it had already collapsed. Fires had broken out at different levels of the 215-foot high structure housing the reactor and were threatening to spread to the other reactor. The firemen had no special equipment except for the face mask, breathing apparatus, and heavy heat-resistant outer clothing standard in a firemen's uniform. |

The first shift of firefighters fought for two and a half hours before reinforcements came from nearby towns. Col. Leonid P. Telyatnikov, the plant's fire chief and the only survivor of the group of firefighters who first scaled the roof to put out the fire, said that they worked until they weakened and collapsed from radiation exposure burns, although at that time he thought it was from physical exhaustion. Many of the firemen had received a lethal dose of radiation by the time the fire was extinguished at 0653 hours. All six firemen working alongside Telyatnikov died, giving their lives to contain a fire that, left unchecked, could have spread the nuclear disaster to the other reactors in the Chernobyl' plant.

Ground Forces units from the three military districts in the immediate vicinity of the accident—the Kiev Military District (MD), the Belorussian MD, and the Carpathian MD—played a key role in the evacuation. Military personnel performed traffic control, provided extensive medical support, assisted with transportation, and food distribution. Curiously, the Soviet civil defense, which is responsible for rescue and recovery from peacetime disasters in addition to its wartime responsibility, did not play a major role in the evacuation.

In the evacuation, some decisions may have unintentionally aggravated the potentially dangerous health situation, while others indicated that protection of its citizens was not always the top priority. For example:

- In the Pripjat' countryside, where another 20,000 persons lived, cattle and horses from the state and collective farms surrounding the city were evacuated first, beginning a day after the city was evacuated. People followed in buses about 24 hours later. According to the Kiev Oblast deputy chairman for agriculture, the animals were moved first because people were needed to load the 51,000 head of cattle.

⌈ indicate that people from some villages located 3 to 4 kilometers from the city of Pripjat' were not moved until 6 May, 10 days after the accident.

The 30-kilometer evacuation zone, established within the first 24 hours after the accident, was chosen because it encompassed the general population living around the reactor and did not necessarily correspond to the actual areas of high radioactivity. Legasov admitted to Western scientists that later radiation calculations showed a need to adjust the zone to make it correspond more closely to the actual distribution of radiation. Eleven villages in Poleskiy Rayon in Ukraine—where many of the Pripjat' people were initially evacuated—were forced to reevacuate after radiation levels were reassessed to be unsafe. Later, *Moscow News* criticized local officials for rushing to resettle these villages inside the zone to give an appearance of normalcy without proper consideration for the safety of the inhabitants.

Despite continuing concerns among scientists, no further evacuations were authorized. ⌈

⌋, a confidential report intended for Gorbachev established that some inhabitants of the Chernobyl' region were actually resettled in contaminated areas outside the 30-kilometer zone. The report was an attempt by Soviet scientists to alert Gorbachev to their discovery that the prevailing wind deposited radioactive particles from the radioactive plume in an irregular

pattern. According to the source, isolated hot spots could be found 65 kilometers to the east of the power plant where many inhabitants of the Chernobyl' region were resettled (see figure 1)

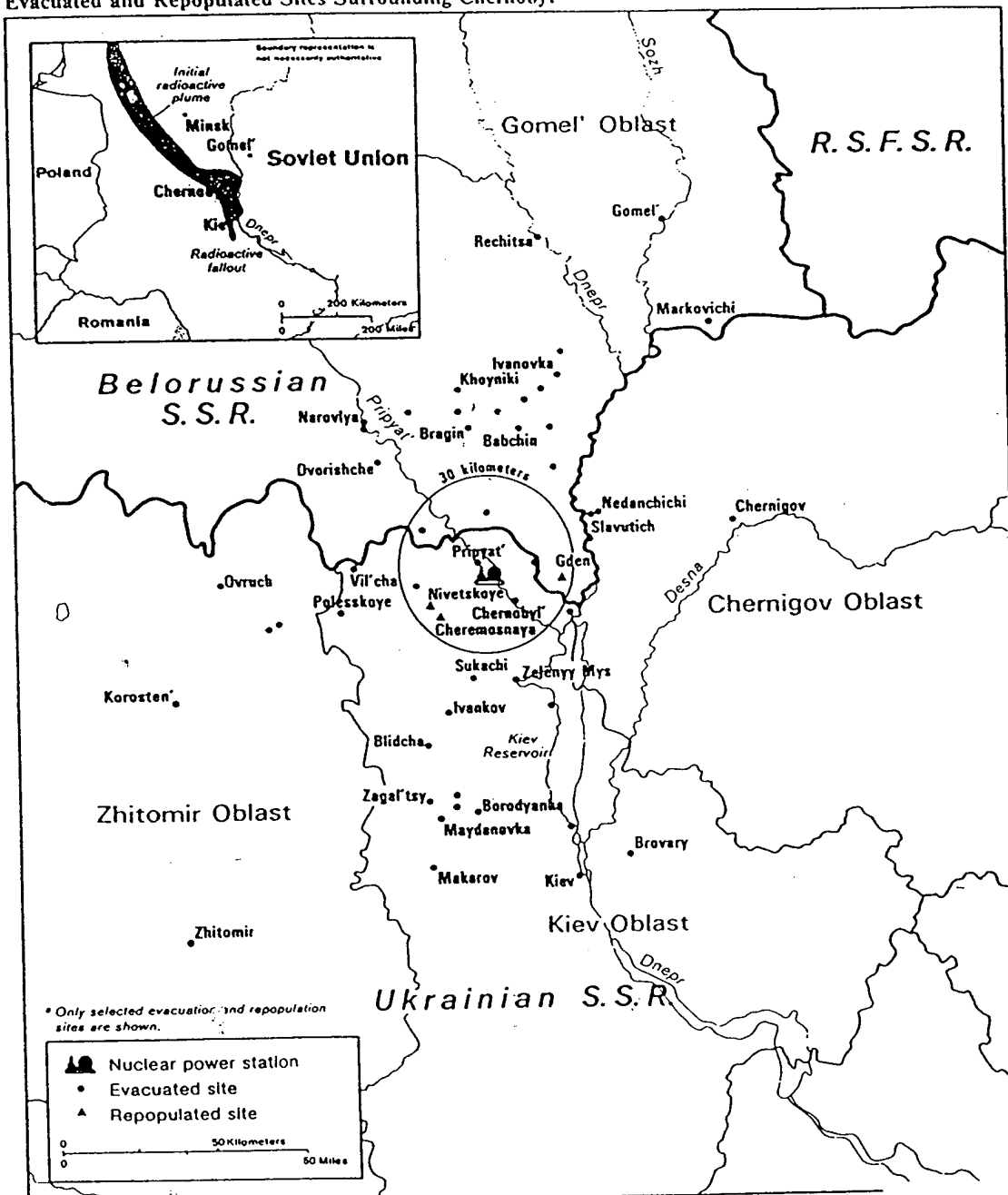
Although ⌈ they considered a second evacuation, Soviet authorities did not exercise this option, probably because they wanted to avoid further dislocations. While some selective evacuation beyond the 30-kilometer zone was observed near Gomel' and Chernigov starting 9 May, a decision to expand the evacuation zone to 50 kilometers would have displaced an additional 75,000 civilians in southern Belorussia alone, at a time when the designated receiving areas were overflowing with Chernobyl' evacuees.

Moreover, the Soviets did no preventive evacuation, with the exception of the extensive evacuation of children in the broader region.⁵ For example, although Mogilev Oblast in Belorussia, 320 kilometers northwest of Chernobyl', received sufficient radiation fallout from heavy rains on 27 and 28 April to prompt officials to close many wells, scrape and remove layers of contaminated soil, and ban sale and consumption of local milk and meat and vegetables, only the children were evacuated. Tens of thousands of people in the contaminated villages were not evacuated and received minimal information about the dangers of radiation, according to the rayon chief physician.

The evacuation of the nearby town of Chernobyl' and its environs—with a population of some 44,000—was begun only after radiation levels began to rise rapidly there on 3 May. Delaying the evacuation until then also allowed May Day festivities to take place in Chernobyl', as well as in Kiev, as if nothing unusual had happened. ⌈ the 500 buses and 200 trucks that came to evacuate Chernobyl' on 3 and 4 May were the same buses that came

⁵ Starting 8 May, school-age children went to Pioneer camps, children between the ages of 3 and 6 were evacuated with the kindergarten teachers and medical workers, while children under 3 were evacuated with their mothers to vacation areas.

Figure 1
Evacuated and Repopulated Sites Surrounding Chernobyl**



from Kiev a week earlier to evacuate Pripjat'. They had been decontaminated and returned to Kiev in time for the two-day May Day celebration there. After the festivities were over, the buses returned to Chernobyl' to continue with the evacuation.

Trauma of Relocation. [and some newspaper articles have admitted numerous foul-ups, suggesting the evacuation was far less orderly than the media first reported. An initial attempt to keep records was quickly abandoned, and later it was difficult for families to find each other because they were scattered to the farflung villages in the surrounding area. One Soviet documentary called it "a nightmarish situation," where children became separated from their parents and families were divided. For weeks some people did not know where family members were or how long they would have to stay in their new surroundings. Some officials complained in the press that they could not always tell the parents where their children were going because some camps were refusing to take the children from the Chernobyl' area.

Some individuals were even left behind in the confusion. According to a Soviet account, two elderly women were discovered in their house in Pripjat' two months later, apparently living on what was left in the house. They reportedly stayed because they did not want to abandon their domestic animals, which were not evacuated.

The dispersion of the Chernobyl' evacuees spread fear and rumors in a ripple effect far beyond the borders of the Ukraine and Belorussia to areas as far away as Siberia, Kirghiziya, Uzbekistan, and the Baltic republics. Many people resented the Chernobyl' refugees because they took scarce housing from local families and factories were compelled to take workers for whom there were no jobs. An engineer from the Chernobyl' plant spoke of the callousness and indifference he encountered while looking for a job after resettlement. Jokes circulating in the Siberian city of Omsk—where a large number of evacuees were resettled—reflected the resentment local people felt toward the refugees who exacerbated the chronic housing shortage there. For example, "Oh, Your apartment was taken from you? Do not worry, the resettlers have a high mortality rate."

Many in the general population feared the Chernobyl' evacuees because of the widespread belief that radiation was contagious and that the evacuees could infect the healthy population. In Estonia, a rumor was spread that the normal death rate rose in Tallinn on the arrival of 3,000 Ukrainian and Belorussian evacuees. [an elderly couple who arrived by train from Kiev in early May having trouble getting their Moscow relatives to take them in, even after they were checked by a dosimeter at the station. A letter from one Chernobyl' displaced person, which appeared in the press, perhaps best summarizes the feelings of the evacuated population: "In an instant, we lost our homes, our jobs, friends, surroundings, our whole microworld."

Reservists Shoulder the Burden of Decontamination.

The recovery force at Chernobyl' consisted of tens of thousands of people. Most were military reservists and regular military and civil defense troops. Despite the high public profile that the Soviet media accorded the Chernobyl' volunteers, evidence [indicates that a widespread callup of military reservists for a period of two to six months provided the main work force in the contaminated area

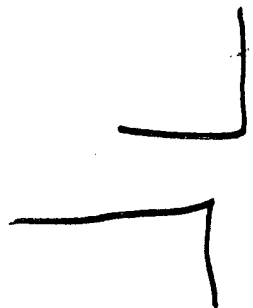
In addition to the evacuees, these recovery workers have been exposed to relatively high levels of radiation. According to their own statement, the Soviets initially permitted the workers to be exposed to 25 roentgen equivalent man (rem). According to the international guidelines for permissible levels for workers, a 25-rem dose is appropriate only for a very small number of people and, preferably, volunteers. Soviet nuclear officials told a [visiting the zone in June 1987 that some 20,000 persons were still working in the zone, half of them military personnel. More recent guidelines indicate that these men are now being limited to a total dose of 5 rem—the internationally accepted dose—before being transferred.*

* The rem is a measure of radiation's effect on humans. Medical experts say that blood changes begin at a dose of about 25 rem. Sickness usually starts at 100 rem and severe sickness at 200 rem, with death coming for nearly everyone who has absorbed 1,000 rem. The 25-rem exposures are almost twice the average exposure of the civilian evacuees, hence these recovery workers will face a higher risk) /

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Figure 2. a) Military reservists decontaminating one of the villages in Chernobyl' Rayon inside the 30-kilometer zone in August 1986.



b) A June 1986 photo of a military field camp for chemical troops working inside the contaminated zone. (u)



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A Soviet reporter who wrote five unusually candid articles in the Estonian Komsomol newspaper *Noorte Haal* described the treatment of reservists from Estonia as brutal and their working conditions as dangerous and harsh. The articles stated that several workers became sick from high levels of radiation, and some men voluntarily exposed themselves to high levels to receive an early discharge (see figure 2).¹

According to an account in a Stockholm daily, some Estonian conscripts avoided decontamination duties in the Ukraine by paying a bribe of 500 rubles to a high-ranking military official in Estonia, who has since been arrested. (Reportedly, this same official extracted twice that to escape duty in Afghanistan.) Although the claim that he has been arrested and executed has been denied by TASS, he had already been publicly named in the Soviet media for abuse of office.

Handling of Information

The Kremlin's silence of almost three days embarrassed the Soviet leaders at a time when they were just beginning to proclaim Gorbachev's new policy of openness. The official Soviet news agency TASS made the first brief announcement at 2100 hours, 28 April, and only after angry demands for information from Sweden, the first country to announce fallout detected from the stricken Chernobyl' plant. In many ways, Moscow's initial response to the Chernobyl' nuclear accident was similar to that in the KAL shootdown in 1983, when an information blackout was imposed until international pressure forced a grudging admission of the event, followed by a propaganda counterattack

In the initial period after the explosion, there were indications that differences among top Soviet leaders about how much information to provide the public may have contributed to delays and missteps [

] Gorbachev—at some unspecified time early in the crisis—reportedly met resistance from all Politburo members except KGB

7 [

chief Chebrikov and Russian premier Vorotnikov, in his attempt to persuade the Politburo to release information quickly. Close Gorbachev allies—like Moscow party boss Boris Yel'tsin—were defensive about the initial delay. Party Secretary Dobrynin gave the impression that the Politburo had been divided over how much to reveal and that Gorbachev was overruled when he recommended prompt airing of the news [

]

It is possible that rumors of tension within the leadership were orchestrated to minimize Gorbachev's personal responsibility. Reportedly, the Ukrainian party boss Vladimir Shcherbitskiy—a full Politburo member—had contacted Gorbachev within an hour of the accident asking for instructions and was directed to say nothing. In public, at least, Soviet officials have justified the delay on grounds that it was necessary to avoid public alarm. Thus, for example, the deputy director of the Institute of Power Engineering, Ivan Ya. Yemel'yanov, who was later fired for his prominent role in the RBMK reactor design, told the Italian Communist Party paper *Unita* in late May that it was not in the public interest to release critical information to the people. He told the interviewer the regime opted for selective release of information to prevent a tide of panic because "we could not cause terror in Kiev."

This logic was apparently prevalent among those on the scene. Some local officials, such as the health officers at the Pripyat' hospital, were alerted to the dangerous situation soon after the explosion, when the hospital began to receive the first casualties from the burning reactor [the health officers began monitoring the radiation levels at the hospital but failed to inform the city population. Prip'yat' residents appearing in a Soviet documentary said these same health officers even denied that an accident had occurred when questioned by some citizens.

]

The Civil Defense Role in Chernobyl'

The Chernobyl' accident provided the first opportunity to study the performance of the Soviet civil defense program when confronted with a large-scale nuclear accident. The civil defense program, a nationwide program under military control, is responsible for rescue and recovery from peacetime disasters in addition to its wartime responsibilities. On the basis of Soviet unclassified writing [] the program, we expected civil defense staffs and military civil defense units to play a leading role in the evacuation and cleanup of Chernobyl'. These staffs and units, however, did not respond as we had anticipated. Although military civil defense units were active throughout the cleanup effort, they appeared to perform support functions, while chemical defense staffs, MVD units, and various party and governmental organizations played the key roles. Civil defense units assisted in decontaminating, controlling traffic, coordinating logistics, and monitoring radiation levels; we do not think, however, that they were involved in the evacuation. More surprising is the lack of visibility of civilian civil defense staffs at the plant and in surrounding rayons. Although some civil defense personnel assisted in the cleanup, the staffs did not participate on the whole

The fact that civil defense did not play a prominent role was reflected in Soviet media coverage of the accident. We expected the Soviets to use the accident as an opportunity to stress the importance of the program to the general population. The press has made few references to the actions of the civil defense forces. One article published in June 1987 revealed public criticism of the local civil defense authorities

for their part in the response. At the same time, civil defense has not received outright criticism from the leadership and civil defense personnel have not been publicly charged with criminal action. Although we think that the replacement of the Chief of the USSR Civil Defense Staff a few months after the accident was part of Gorbachev's plans to revitalize the Ministry of Defense, the timing, as noted, was reportedly related to displeasure with the performance of civil defense forces in the cleanup.

We have not yet been able to resolve the various explanations for the limited civil defense participation. One theory is that civil defense personnel may have made serious errors in the initial stage of the accident, thereby requiring the military to take complete control. The immediate involvement of General Pikalov and the lack of criticism in the press, however, does not support this explanation. A second theory is that civil defense forces may not have been involved more because other assets were more readily available. Civil defense forces have responded to other peacetime disasters, but the scope of the Chernobyl' accident may have been beyond reasonable expectations of peacetime activity by the civil defense units. A third theory is that our expectations may have been inflated by incorrectly interpreting Soviet civil defense writing as describing the current civil defense mission instead of long-term, not yet realized goals.^a

^a Analysis of the civil defense role in Chernobyl' is continuing and will appear in a forthcoming SOVA paper

An attempt was made to keep Kiev, with its 2.5 million population, completely in the dark. Beginning 30 April, travel was cut off to the city for US and other diplomats [] radiation-monitoring equipment was confiscated by the KGB from Kiev area institutes and laboratories, allegedly to control information and to keep the city population calm [] immediately

after the accident was announced, administrators of the Institute of Cybernetics, where the source worked, stopped colleagues from posting radiation levels saying such information was "secret." Such actions, however, only reinforced public concern, and the dosimeters and other equipment were returned in about two weeks. []

A deliberate show of normalcy prevailed under Shcherbitskiy, who was not an ardent exponent of *glasnost* at that time. The republic central newspaper on 28 April carried only the brief TASS announcement on the accident. Not even rudimentary information about the accident and the potential health hazards was made available to Kiev residents until several days later. The Ukrainian Health Minister Anatoliy Romanenko gave the first public health warnings to the citizens of the republic on 5 May—more than a week after the accident. In Belorussia such warnings were provided even later.

Some sources suggest that fuller information on the accident was available to local party and government officials, despite the initial reassuring tone of the media. For example, a former Russian journalist told a Western interviewer that his editorial office received a steady flow of alarming reports on the second day of the accident but was forbidden to print the information. Consequently, the office released only the official TASS reports.

Propaganda Counterattack

Once the Soviets realized they could not conceal the accident, they launched a public relations effort that bore the imprint of Gorbachev's *glasnost* policy. In addition to releasing a large amount of information about the Chernobyl' accident, Moscow employed several other tactics designed to minimize its responsibility for what happened, restore popular confidence in the regime, regain credibility abroad, and shift blame to the West for exploiting Soviet problems. The authorities have:

- Alleged that the reactor safety problems—until the Chernobyl' accident—have been more common and serious in the West.
- Depicted the mishap as a failure of a handful of people rather than of the system and highlighted the courage and self-sacrifice of the Soviet people in dealing with it (see figure 3).
- Denounced Western media for making political capital from Soviet misfortune and used the nuclear mishap to push Soviet arms control proposals (see figure 4).
- Played down in media accounts the long-term health risks and emphasized progress in decontamination and recovery operations.

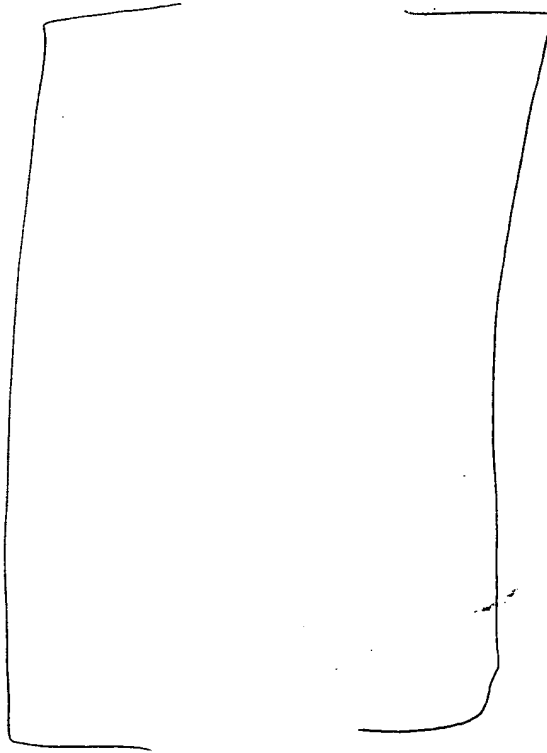


Figure 3. Chernobyl' Victims as Heroes: The Soviet press consciously exploited the Chernobyl' disaster to marshal citizen support for regime policies. It was full of stories of sacrifice and heroism of workers engaged in the cleanup of Chernobyl', comparing their work with the heroic deeds of World War II soldiers. Those who died in the accident were given heroes' funerals and were posthumously awarded the title of "Hero of the Soviet Union." This photo, which appeared in Pravda Ukrainy on 4 July 1986, depicts a monument erected at the Cherkassy Technical School for firemen in the Ukraine where some of the firemen who died were trained.

Gorbachev himself remained silent until 14 May, almost three weeks after the accident. By lowering his own profile and allowing others to take the heat, he probably hoped to be associated with recovery rather than disaster and thus avoid blame. When he at last spoke on 14 May, he used the opportunity to present

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Figure 4. The May 1986 issue of the Soviet Journal Ogonyok carried this caricature of the West under the caption "Irradiation by Lies." The teeth spell out "gloating over other's misfortune"; the signs read "anti-Soviet agitation," and "anti-Soviet falsehoods and fabrications."

to Western observers the compassionate, humane face of the Soviet Government during a tragic accident and to promote himself as a peacemaker. A recurrent theme has been that the accident demonstrates the need for removal of the nuclear weapons from Europe, where a conflict could unleash the radiation equivalent of dozens of Chernobyl's. He also used the occasion to announce an extension of the Soviet nuclear test moratorium.

Offering Up Scapegoats

To minimize its responsibility for what happened, the regime blamed lower level officials for mishandling the situation in order to insulate top leaders from criticism. Minister for Power and Electrification Anatoly Mayorets, the official directly responsible for the power plant, was sharply reprimanded. Several other senior officials were fired outright for their incompetent performance, including the Chairman of the State Committee for Safety in the Nuclear Power Industry, Yevgeniy Kulov, for "failing to ensure compliance with safety regulations." Several local functionaries were also removed for being inattentive to the needs of the evacuees (see table)

Meanwhile, plant officials have been tried for their involvement. At the Chernobyl' trial in July 1987—initially open to international press and subsequently

conducted behind closed doors—the former director of the Chernobyl' nuclear plant, Victor Bryukhanov, his chief and deputy chief engineers—Nikolay Fomin and Anatoliy Dyatlov—and three less senior managers were convicted of safety regulations violations that led to loss of life. They received sentences in labor camps, ranging from two to 10 years. As a further admonition to bureaucrats that they will be held accountable for their actions, the regime reportedly plans to bring to trial the people responsible for the design flaws in the reactor

The casing out in 1986 of three Central Committee members, rumored to share some blame for the accident, suggests Gorbachev also used the nuclear disaster to eliminate some elderly holdovers from the Brezhnev era:

- President of the USSR Academy of Sciences Anatoly Aleksandrov—who reportedly had a part in the reactor's design—retired October 1986. Although he was well above retirement age and rumors about his prospective retirement circulated for some time, he publicly criticized his own performance and hinted that mistakes he made regarding Chernobyl' helped prompt his retirement.
- The 88-year-old Minister for Medium Machine Building Yefim Slavskiy, whose organization is responsible for the military nuclear program and for handling nuclear fuel for civilian reactors, also retired in November 1986, several months after his first deputy was fired because of the accident.
- Deputy Defense Minister responsible for civil defense Aleksandr Altunin—whose organization apparently was ill equipped to deal with the crisis—retired sometime during summer 1986.

Despite Gorbachev's interest in using the accident against the old guard, one top Brezhnev protege—Ukrainian party leader Vladimir Shcherbitskiy—has so far managed to survive, despite rumors that Gorbachev wanted to use Chernobyl' against him [

Shcherbitskiy was able to escape blame for the accident, and we have no evidence that

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Political Fallout From Chernobyl'



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Political Fallout From Chernobyl' (continued)

the mishandling of the evacuation has been laid at his doorstep [

] he was treating Gorbachev's reported instructions to keep quiet after the accident, which came in a cable, as insurance against an attempt by the General Secretary to force him into retirement. [Shcherbitskiy had refused to sign an approval for activating the Chernobyl' nuclear plant at its completion, requesting instead that the permit be signed by Moscow. This maneuvering may have helped Shcherbitskiy avoid blame for the catastrophe. Gorbachev could still use the accident as one point in a bill of indictment, should he decide to move against Shcherbitskiy or other officials linked to Chernobyl', but this becomes progressively less likely as more time passes.

The Costs of Chernobyl'

In terms of domestic public opinion, the regime clearly paid a price for the accident. Its handling of the event, at least initially, created a credibility gap for the leadership and has heightened public apprehension about the safety of nuclear power, public health, and the environment. It also gave new impetus to environmental groups, highlighting the strong environmentalist bent of intellectuals who constitute a growing lobby. Moscow's callup of mostly non-Russian reservists to clean up Chernobyl' sparked some nationalist dissent. Although the economic disruption is expected to be only short term, the cost of cleaning up and safety modifications will have a

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minor adverse effect on Gorbachev's economic modernization effort and will make it harder for the regime to deliver on its promises of better health care, more housing, and safer work conditions.

Damage to Regime Credibility and Reputation

In the short term, Moscow's failure to disclose information about the Chernobyl' nuclear accident to its citizens, thousands of whom have been affected in some way, exacerbated fears, created widespread alarm, and started the rumor mill churning. A Kiev resident told [redacted] in September that she was outraged at the authorities for withholding timely information and accused officials of deliberately postponing public announcement of the disaster until after the May Day celebration to show happy Kievans dancing in the streets. A joke circulating in the city some time later shows that public opinion reflected this citizen's feelings toward the authorities: "On May Day, the faces of demonstrators in Kiev were radiating." Residents also cite the international annual bicycle race—which was permitted to take place through the city streets one day after the May Day celebration, despite the possible health hazards and withdrawals of some foreign competitors—as an example of leadership callousness. A radiologist in Kiev sent his wife and children to Moscow because he believed the authorities would issue false radiation levels.

Soviet citizens received no immediate instructions on how to protect themselves against radiation, but neighboring countries such as Poland and Finland were warning their people. Residents of Kiev and other Soviet citizens found this particularly reprehensible. Many in Kiev heard that Poland, for example, had dispensed iodine pills for children under 16 in its northwestern provinces to protect them from radioactive iodine-131. The Kievans reportedly resorted to their own version of an iodine—wine, and vodka cocktail—according to rumor.

Public resentments were probably further fueled by rumors that the party elite was taking special precautions. [redacted]

[redacted] Ukrainian party boss Shcherbitskiy had ordered the evacuation of members of the ruling strata and their families before any of the ordinary

"Warning": A Documentary Film

One of the most extraordinary examples of Gorbachev's glasnost policy to date came from two Soviet journalists assigned to cover the accident at Chernobyl'. Lev Nikolayev and Aleksandr Krutov reported on the accident almost from the very beginning and subsequently produced a documentary film from the daily coverage of the immediate aftermath called "Warning." The film, which was shown to Soviet citizens on the first anniversary of the accident, captures in honest and unsparing detail the "unthinkable" catastrophe.

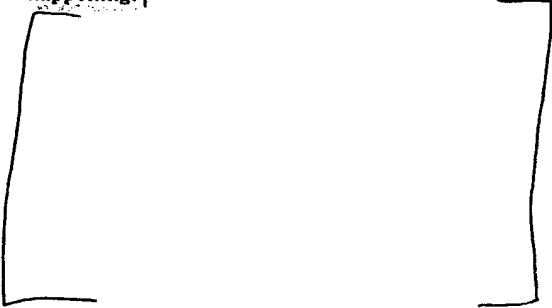
The documentary opens with a panoramic shot from a helicopter of the destroyed reactor; the red glow from the burning graphite is still clearly visible on the morning of the 28th of April. In one of the sequences, the film shows the clinic at Pripyat', which received the first casualties suffering from radiation sickness and burns. The commentator asks the chief physician why he did not warn the people of Pripyat'. "It was not my sphere of action," the doctor replied. A Pripyat' health worker is seen telling the commentator that local officials covered up the accident and turned away people who offered their assistance, saying that nothing had happened. She also said that the "management" had emergency plans available, yet, they did not even tell us to close the windows and doors, and allowed our children go to school."

citizens in Kiev heard about the disaster. Many city residents said that they realized that something very serious occurred at Chernobyl' when families of party members suddenly left for "vacation" on 28 April.

[redacted] that party members were the first to be evacuated

Faced with the initial information blackout, some Soviet citizens turned to Western radiobroadcasts, others relied on connections to party and government

officials who had more complete information or personal contacts with foreigners to tell them what was happening. [



Gorbachev's subsequent openness and domestic reform measures have deflected public attention from Chernobyl' to a considerable extent, and the heavy play given to alleged foreign overreaction to the catastrophe had some success in shifting public anger to the West. Many citizens accepted Soviet propaganda that the West was responsible for the panic and hysteria surrounding Chernobyl' and that the accident presented less public danger than the Three Mile Island accident or the Bhopal toxic gas leak that killed more than 2,000 persons

Although many Soviet citizens not directly affected by the accident appear to have accepted the regime's explanation, those in the affected regions continue to fault top officials for initially concealing the Chernobyl' accident, and some think the regime's response to the disaster showed the insincerity of the new openness policy. A strongly worded indictment of incompetence, which appeared in the June 1987 monthly *Yunist'* in the form of public letters, accused local officials at Pripyat' and Kiev of criminal irresponsibility for their role in the coverup. The fire chief, Leonid Telyatnikov, who risked his life putting out the fire at the plant on the night of the explosion, was quoted by the Soviet magazine *Smena* as saying he was ashamed



of local Communist party officials who failed to use their power to protect the population after the disaster.

Some Soviet intellectuals were angry with the regime for failing to be honest. However, they blamed the technocrats for the accident, believing that the traditional arrogant attitude of nuclear bureaucracies—willingness to take risks for the sake of scientific progress at the expense of the people—has been the root cause of the Chernobyl' disaster. Some ordinary citizens share this point of view with the intellectuals. Because they believe that this attitude is pervasive among the Soviet technocrats, the public is reluctant to accept the regime's assurances that the safety of the Soviet nuclear plants has been improved in the aftermath of Chernobyl'

Health Problems

Despite Gorbachev's success in overcoming the initial embarrassment and, even to some extent, turning the issue to his favor, there have been real long-term human costs, particularly in the affected region. The chaotic nature of the evacuation alienated a number of the evacuees and stirred fear and resentment among the general population, thus broadening the psychological impact of the accident. The handling of the evacuation has contributed to public anxiety about health issues, which the regime has been unable to allay fully. Moscow's concern that public fears will have serious economic consequences including resistance to transfers of workers to the region, inability to sell products from the region, and increased demand for medical services by fearful people have already been borne out

Although the final human toll from the effects of radiation will be difficult for scientists to predict, many of the 135,000 evacuees from the 30-kilometer zone have been exposed to sufficiently high levels of radiation to increase their risk of long-term health problems. The regime apparently acknowledged this fact when it blamed local party leaders and ministry officials at the recent trial of Chernobyl' plant managers for failing to properly protect the population from the effects of radiation fallout and for delaying the evacuation.

As preoccupation with the massive evacuation eases, attention has turned to the impact of Chernobyl' on the long-term health of the general populace. Some Western estimates claim that over the next 70 years Chernobyl' could be responsible for up to 10,000 additional cancer deaths in the Soviet Union. The Soviets have publicly assessed a much lower figure and have assured their citizens that the radioactive fallout from Chernobyl' will not significantly add to the normal incidence of cancer. Although most official Western estimates agree with the Soviet figures, the public remains skeptical, and anxiety over health issues persists. In an open letter to *Pravda* addressed to Gorbachev, a resident of Pripyat'—the father of three—protested the slow evacuation from the city and blamed the authorities for jeopardizing his family's health.

Given the psychological reaction to the disaster of many Soviets who probably have not suffered measurable health effects of radiation, the accident's full impact on social attitudes has been out of proportion to the actual risk. Despite evidence to the contrary, a large segment of the Soviet population believes there will be dire health consequences from the accident and continues to link its poor health to the Chernobyl' radiation fallout.

Articles in the Soviet press indicate that anxiety about radiation fallout has not completely subsided in the general population, and the rumor mill is still churning. In December 1986, letters to the Belorussian daily *Sovetskaya Belorussiya* criticized the behavior of the authorities following the accident for failure to inform the population about the risk to which they were exposed, and demanded to know why children were not evacuated from towns in Belorussia just within the 30-kilometer zone.

The psychological consequences of the Chernobyl' accident are likely to be long term, for the public will continue to link even unrelated cancers, genetic abnormalities, and other illnesses to the disaster:

- A year after the accident, doctors from the new Center for Radiation Medicine in Kiev reported that much of the population is affected by a syndrome of radiophobia, and that many of those who

Rumor Mill

In the absence of factual information, some Western reporters estimated the immediate death toll in the thousands, with thousands more soon to follow. They also speculated that the water supplies serving the 2.5 million people in Kiev were contaminated. Stories filtering back into the USSR via Western radiobroadcasts were matched by those spread by the Soviet citizens themselves. A good example is the well-publicized story by a former Soviet dissident who lived in Kiev at the time of the nuclear accident. He insisted that Soviet authorities covered up the deaths in Kiev hospitals of some 15,000 persons from the town of Pripyat' who died shortly after the accident from radiation sickness. Rumors circulated that:

- *Kiev was being evacuated to Moscow, and all the roads leading from Chernobyl' were clogged with refugees fleeing the explosion.*
- *The streets of Chernobyl' were full of dead bodies and animal carcasses.*
- *There was no food or water in the Ukraine.*
- *Many people died before they could be evacuated and had been thrown into common graves and buried by bulldozers.*

took part in the cleanup show clinical changes described as situation neurosis unconnected with radiation.

- Kiev physicians have come up against the psychological consequences of the Chernobyl' accident. Kiev radio announced on 21 April 1987 that, in the span of several days, more than 25,000 city residents requested complete medical checkups at Kiev's clinics.

- *Σ* a famous Soviet athlete recently pressured the RSFSR sports committee to transfer his daughter, an Olympic medalist from Kiev, to another city. She had a child who was sick, and she believed that her son would not get better as long as they remained in Kiev in the "radiation-polluted atmosphere."

- Citizens as far away as Leningrad worried about whooping cough and diphtheria among the children last winter because they feared that their resistance may have been lowered due to the radioactive fallout from Chernobyl'.
- A doctor told [] who was diagnosed as having a malignant brain tumor in August 1986—that her cancer might be related to the effects of radiation from Chernobyl'. The diagnosis—medically unlikely, even though there are fast-growing brain tumors—indicates that trained professionals may be subject to the same overreaction.

Local officials appear to be aware of the public mistrust but have been unable to stem it. In an interview with Western journalists last December, Ukrainian Health Minister Romanenko said some people in the Chernobyl'-Kiev area are asking for a blood test every 10 days, "three times more often than recommended." (The blood test measures changes in the bone due to radiation exposure.) Although authorities brush aside such public concern as rumor and ignorance, they admit that, even a year later, the population remains skeptical and refuses to be reassured by officials. Romanenko expressed his frustration during a press conference on Chernobyl's first anniversary, saying that many still continue to stay indoors as much as possible, refuse to open windows, and avoid eating many foods, despite assurances that there is no longer a need for such precautions.

Responding to continued popular anxiety and discontent, *Pravda Ukrainy* on 23 November 1986 announced the formation of special centers in Kiev and Chernigov Oblasts as well as the major health care centers in the city of Kiev to handle the questions about health risks from radiation. The creation of such centers eight months after the accident indicated regime recognition that public trust has eroded.

Moscow is sensitive to the credibility gap created by public anxiety about health issues and has tried to counter by vigilant monitoring of information released to the public. Although Moscow has admitted 31 deaths—all within the first three months of the incident—grounds for public doubt remain. When the

Estimates of Chernobyl's Impact on Health

According to a draft report from a US Government task force presented at a meeting of the Nuclear Regulatory Commission (NRC) on 6 February 1987, the release of radiation from the Chernobyl' explosion and fire may cause up to 4,000 cancer deaths in Europe and 10,000 additional unanticipated cancer deaths in the Soviet Union during the next 70 years. The interagency government task force, chaired by Harold R. Denton of the NRC, also estimated that the accident may eventually cause mental retardation in up to 300 newborn babies in the Soviet Union. These were infants born of women who were pregnant at the time of the accident and who lived within 30 kilometers of the nuclear reactor. NRC officials said that the figures represent the US Government's best assessment at that time of the long-term health toll from the disaster.

A more recent unofficial study claims 39,000 may die of cancer in the next 50 years, most of them outside the Soviet Union. According to our experts, this study does not use reliable or complete data, but may further contribute to public uncertainty in the USSR and Western Europe. The Soviets are estimating an increase of 1,000 to 3,000 cancer deaths over the next 50 years in the Soviet Union or less than 0.4 percent of the natural death rate.*

* This information is from the monthly journal *Science*, 8 May 1987, "Recalculating the Cost of Chernobyl'." pp. 958-59. The chief author of the report is Marvin Goldman of the University of California at Davis

Soviet weekly journal *Nedelya* disclosed in its May 1987 edition the death of the filmmaker Vladimir Shevchenko from radiation exposure received while making a documentary "Chernobyl': A Chronicle of Difficult Weeks," the regime reacted quickly.⁹ Leonid Il'in, vice president of the USSR Medical Academy,

⁹ Shevchenko died sometime in March 1987 but has not been included in this official toll. The regime maintains that there have been no additional deaths from the accident since June 1986 when the official death toll was put at 31, and that only the 237 members of the initial group of plant workers and firemen had radiation sickness

told the Ukrainian republic newspaper that Shevchenko suffered from a fatal illness before his involvement in filming cleanup operations between May and August 1986. Il'in also denied *Nedelya's* statement that some of Shevchenko's cameramen are now in the hospital with radiation sickness.

Clearly, Moscow is concerned that revelations such as the filmmaker's death will reinforce suspicion among the Soviet population that the regime is not being candid in its treatment of the health risks. Fear is probably high among the families of the tens of thousands of military and civilian personnel who were ordered to the zone for decontamination work and the evacuees. Health problems among the reservists, most of whom are non-Russians, could increase social tension and anti-Russian sentiments.¹⁰

Anxiety Over Food and Water. In addition to concerns about overall health risks, there is evidence that considerable fear of contaminated food and water is likely to continue. The effects of this concern were still being felt in the farmers' markets as recently as this summer. According to the USSR Ministry of Health, all produce on sale until August 1987 had to have a stamp certifying the product had passed inspection for radiation. Shoppers reportedly continue to suspiciously question the vendors about the origin of the food and frequently ask to see the vendor's passport to be certain the produce was grown outside the Chernobyl' region.

Fear of radiation-contaminated food was not limited to the affected regions. People reportedly avoided eating meat and drinking milk as far away as Leningrad. A resident of the city traveling abroad said, although meat was abundant in Leningrad during the summer of 1986, people were afraid to buy it. Similarly, powdered milk became scarce because people were buying it instead of fresh milk. The source also reported it was necessary to call in soldiers from a nearby military division to butcher livestock in a Leningrad meat factory because the workers refused

¹⁰ Our judgment that most of the reservists at Chernobyl' were non-Russians is based on the identity of the operational units mobilized for the cleanup effort. They came from throughout the Soviet Union—including Ukraine, Belorussia, Estonia, Kirghiziya, and Siberia.

Chernobyl' Area Kolkhoz Markets

The official banning of anything grown in the Chernobyl' region has given way to rumors that Chernobyl's irradiated vegetable gardens and orchards produce apples and tomatoes of unusual size. Many jokes capture the citizens' continued fears and skepticism regarding official reassurances of the safety of the food they eat. One particularly cynical joke making the rounds is a good illustration: An old woman at a Moscow collective farm market shouts; "Apples from Chernobyl', apples from Chernobyl'!" A visitor asks her aghast, "Who would buy such apples?" She replies, "They are very popular—some buy them for their wives, mothers-in-law. . . ."

Belorussian kolkhoz markets were also affected. Shoppers reportedly avoided buying plums from Belorussia, fearing the fruit came from the Ukraine.

11 percent of a total of 270,000 food samples taken this May in southern Belorussia contained radioactive matter

no radiation-related illnesses have been reported in Belorussia since the accident.

the massive banning of foodstuffs—the second most important pathway of exposure to cesium, the first being ground deposits—probably reduced the overall level of exposure by a factor of 10 to 20

to do the work, believing the livestock to be contaminated with radioactive material.

Despite repeated official assurances by the Health Ministry and the Medical Academy that the foodstuffs and water are carefully checked for radiation and are completely safe, renewed fear gripped the Chernobyl' region during the 1987 spring floods. People worried that the runoff from the melting snow could threaten to contaminate the water supply with radiation. Kiev in

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Protecting Water Supplies

The marshy portion of Poles'ye region west of Chernobyl', which received the highest level of radioactive contamination, is not a major agricultural area, but it contains the headwaters of Prip'yat' River, which flows into the Kiev Reservoir. The reservoir, also supplied by the Dnepr River, provides water to some 32 million people.

The Soviet report to the International Atomic Energy Agency in August 1986 conceded that high levels of cesium-137 are expected to be relatively persistent in the marshes of Belorussia and the Ukraine in the next few years. As long as the radioactivity remains in the marsh's plants and soil, the water's supplies are in danger of contamination.

To protect water resources against contamination, in September 1986 the Soviets began to install nonoverflow dams, filtering dikes with a fill of a special material to prevent the possibility of radionuclides being washed into the river in hazardous quantities. Pravda said at the end of October 1986 that a 29-kilometer network of such barriers had been built around the Chernobyl' nuclear power plant water supplies at a cost of 11 million rubles.

March 1987 reported that rumors circulated about a reevacuation of area children, and bottled water stocks were wiped out all across the region as people stocked up for the perceived emergency

In November 1986. [

] that a new water supply pipeline was being constructed for the inhabitants of Kiev. Although Kiev's existing water supply from the Dnepr River was found to be safe from contamination, concern by the government regarding the possibility of residual contamination led to the construction of an alternative water source from the Desna River [

] This assessment was not made public for fear of causing a further bout of panic among the local population. Since then, the water supply from the

Dnepr has been resumed, and continued reports confirmed that the water in the Kiev Reservoir remains safe.

Strain on Health Care System. Medical resources diverted to treat the Chernobyl'-related medical problems are likely to further strain the Soviet health care delivery system and intensify public frustration. Soviet health care even before Chernobyl' was inadequate to deal with many medical problems associated with contemporary industrial society and has been the object of recent criticism from top leaders, including Gorbachev.

The medical costs of monitoring and treating as many as 500,000 people—an official Soviet figure—for radiation effects will burden the health care system. A team of Soviet physicians visiting the United States in October 1987 told an audience of American physicians that the medical cost of treating the Chernobyl' victims and screening the population has reached 16 billion dollars (see figure 5).¹¹

The accident exposed widespread shortages in medical supplies and equipment. To fill the gap, the Soviets have been relying heavily on Western medical equipment. Much of this Western medical technology will be used in the new Kiev Center on Radiation Effect on Humans.

This new All-Union Scientific Center for Radiation Medicine of the USSR Academy of Sciences—established in Kiev—has set up an all-union registry to monitor the radiation effects and cancer development in the 135,000 evacuees and other people under medical supervision exposed to radiation, but by early 1987 it had not yet been allocated enough money to carry out the program []

¹¹ Boris Shcherbina, head of the government commission, told a Western newspaper on 28 April 1987 that all the people who were in the contamination zone are under medical supervision and gave the total number of 500,000. The breakdown of this figure was provided by the Ukrainian Minister of Health this September: 20,000 in hospitals, more than 200,000 adults and almost 100,000 children.

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loss of health professionals to permanent relocation has created shortages in this sector in the Ukraine and Belorussia, according to the Kiev Oblast officials.

Opposition in the Republics

The most significant long-term cost of the accident may be the exacerbation of longstanding tensions and resentments among the non-Russian minorities. This is particularly true in western non-Russian republics of the USSR—the Baltic, Belorussia, and the Ukraine.

The Baltic. Moscow's requisitioning of food, housing, and summer places for the Chernobyl' evacuees and the conscription of reservists for decontamination aroused great resentment among ethnic nationals in the Baltic republics and led to active protests:

some 300 Estonian conscripts, who were sent to help decontaminate the Chernobyl' 30-kilometer zone, conducted a work stoppage when they were told in June 1986 that their tour had been extended from two to six months. a demonstration was held in Tallinn in support of the work stoppage and to protest the forcible use of military reservists for decontamination work.

a demonstration at a Soviet military base in Estonia over perceived ethnic discrimination in the conscription of non-Russians for military duty at Chernobyl'.

In Latvia and Estonia, where ethnic populations constitute only a bare majority, citizens reportedly protested the resettlement of Ukrainian and Belorussian Chernobyl' refugees because they viewed these Slavic "immigrants" as further evidence of Moscow's desire to dilute Baltic nationalities.

In Lithuania reported active demonstrations in June 1986 against the construction there of another reactor similar to the one at Chernobyl'.



Figure 5. Radiation burns on a Chernobyl' fireman, one of the 500,000 persons now being monitored for long-term effects of radiation.

it is not clear which organization is handling the program, what data the Soviets have collected, or what they are planning to do. This suggests that the program has little direction from Soviet leadership, and that the prospects for adequate long-term care for the Soviet citizens who were put at risk by the nuclear accident—mostly Ukrainians and Belorussians—are not guaranteed.

The cost of the nuclear accident is likely to be reflected not only in impaired health of evacuees but also in poorer health care provided to areas losing health care personnel as a result of the exodus of people from the Chernobyl' area. Although the initial transfer of Ukrainian and Belorussian medical teams to deal with Chernobyl'-related patients had only a short-term impact on the health delivery systems, the

- [workers went on strike for three days in an optics factory in June 1986, demanding that food in the cafeterias be checked for radioactivity and that wages be raised.

The widely held belief that many Baltic conscripts were sent to Chernobyl' against their will is bolstered by persistent—though contradictory—rumors of soldiers being shot by the Soviets for refusing to do decontamination work. Even if untrue, the rumors still merit attention as an indication of the intense fear felt by those engaged in the cleanup of Chernobyl' and the degree of opposition to the regime's handling of the crisis. For example:

- The Chairman of the Estonian Refugees Committee of Solidarity in Sweden reported that 12 Estonians were executed in June 1986 for refusing to take part in decontamination.

- A [This employees reported that 10 Soviet soldiers had been executed for trying to run away from the decontamination site.

[there had been resentment among the Estonians over the use of reservists for this activity, but was told that it was not true that people had been shot.

Belorussia and the Ukraine. The accident does not appear to have fueled as much antiregime or anti-Russian protest in the Ukraine or Belorussia as it did in the Baltic, but some groups have expressed strong dissatisfaction with the regime regarding Chernobyl':

[re-ported that chemical plant workers in that city held a sitdown strike in May 1986 over mandatory pay deduction for the Chernobyl' Aid Fund. The workers reportedly shouted that they were in no less danger (from chemical contamination in this case) than the people of Chernobyl'.

- Citing unidentified Soviet sources, a Western newspaper reported hundreds of residents in Kiev used the first anniversary of the the accident for a public demonstration to demand compensation for damages they had allegedly suffered.

Some Christian believers in the Ukraine expressed fear over the nuclear contamination of the 800-year-old Ukrainian town of Chernobyl', viewing the unprecedented event in religious terms.¹² A widely circulated rumor, reportedly started by Ukrainian Baptists, reached the West through *samizdat* sources, linking the events at Chernobyl' to the apocalyptic tale of a star by the same name *chernobyl'*—"wormwood"—which heralds the end of the world in the Book of Revelation.

Ukrainian officials are probably concerned with the religious dimension because of the continuing problems with the Protestant sects and the outlawed Ukrainian Catholic Church.¹³ In a religious connection with Chernobyl', people have been flocking to a small Ukrainian village—some 530 kilometers southwest of Chernobyl'—where a schoolgirl reportedly saw a vision of the Virgin Mary on the anniversary of the Chernobyl' nuclear disaster. According to an August 1987 article in *Literaturnaya gazeta*, more than 100,000 people converged on the village in the first month after the sighting. Since then, authorities have locked up the church where the vision reportedly appeared in an effort to discourage visitors. Despite that, the paper revealed that some 40,000 to 45,000 faithful visit the site daily, and even a Soviet journalist covering the story admitted seeing the vision (see figure 6)

¹² Chernobyl' was founded in 1160 as a principedom and has existed since then, thus occupying an important place in the national historical consciousness

¹³ Moscow displayed sensitivity to the religious issue when it allowed Mother Teresa, the Nobel laureate and Roman Catholic nun, to visit the Chernobyl' area this August. She requested to set up a charity mission. Their granting of her request would represent a significant shift in the official attitude toward religious activity in the Soviet Union

Figure 6. "Miracle in Grushevo"—the Western Ukrainian village in L'vov Oblast where a young girl reportedly saw a vision of the Virgin Mary on the first anniversary of the Chernobyl accident. In August 1987, Literaturnaya gazeta reported that "crowds of 40,000 to 45,000 persons converged on the site."

Although evidence of popular demonstrations and protest in the Ukraine and Belorussia is generally lacking, the accident fueled strong criticism among intellectuals, who were already upset about the siting of so many nuclear reactors in the region. At a recent writer's conference sponsored by the literary journal *Druzhba narodov*, Ukrainian writer and poet Vladimir Yavorovskiy implicitly blamed Moscow by noting that his people paid the price for the accident at Chernobyl: "There is a dead slice of Ukrainian and Belorussian land from which the people have departed." The Belorussian writer Ales' Adamovich—who has been a strong proponent of more openness and public control over the nuclear power decisions, told an audience attending a film festival in Berlin that a

2,000-megawatt nuclear plant under construction near Minsk had been converted to a thermoelectric plant because of public protest. The large Minsk nuclear heat and power plant, which is scheduled for completion in 1992, is a particularly sensitive public issue because it is situated close to the city with a population of 1.5 million. Legasov confirmed in November 1987 that the Minsk nuclear plant has been shelved because of public opposition."

Chernobyl' has even been invoked by the Russian nationalist group *Pamyat'* as part of its anti-Semitic arsenal to "cleanse" Jewish influence from the Soviet Union. They blamed the accident on the Zionists. Such sentiments show Chernobyl's continuing potential to inflame ethnic and social tensions that hinder Gorbachev's efforts to unite public opinion behind his domestic reform program.

Antinuclear Sentiment

The accident has further raised public consciousness about environmental issues that have received prominent media attention under Gorbachev. Environmental concerns have contributed to a climate of public activism that could contest Moscow's plans for accelerated nuclear power expansion in the next decade. The Ukraine, for instance, is still scheduled to increase the number of plants in the 1990s from four—one of which is Chernobyl'—to 10, each with multiple units. Many of these will be built near cities of a million or more, including Kiev, Khmel'nitskiy, Khar'kov, Odessa, Rovno, and Zaporozhye

Concern among scientists about the impact of nuclear plants in the Ukraine existed even before Chernobyl'. A week before the accident, the president of the Ukrainian Academy of Sciences, Boris Paton, publicly called for a review on siting and distribution of reactors in the republic and recommended the Ukrainian Academy of Sciences coordinate environmental protection programs in the republic. Since the accident, Paton has expressed his view that large industrial complexes should be held accountable for ecological disasters and that they should be required to maintain stringent safety measures ensuring "absolute reliability" of their technology.

On the first anniversary of the Chernobyl' accident, Vitaliy Chumak, head of the Radiological Ecological Center at the Institute of Nuclear Research of the Ukrainian Academy of Sciences, criticized the Soviet nuclear industry in the English language weekly *Moscow News* for continuing to base their decisions on where to build nuclear plants mostly on logistical considerations—existing roads, labor resources, water resources—without fully considering public safety or the environment. Chumak's concern about siting several nuclear power stations close together near heavily

populated areas had been raised by Soviet scientists as early as 1979. In June 1987, the popular literary weekly *Literaturnaya gazeta* published an article by the Ukrainian poet Boris Oley'nik, specifically blaming the planners and designers of Chernobyl' for not heeding the warnings of scientists and economists and siting the giant nuclear power plant on a river flowing into a major water supply reservoir and in a flood plain of the Poles'ye region. More recently, a Western press account reported that an unofficial club called Svetlitz'a was gathering signatures in Kiev protesting the presence of nuclear power plants in heavily populated areas. Another example was provided by

a petition, reportedly circulating in Moscow, calling for the shutting down the Chernobyl' nuclear plant, halting construction of other nuclear plants, and changing the policy of siting nuclear plants near large cities. Reportedly, the petitioners are particularly disturbed with the construction now in progress on the nuclear power plant in Crimea, a popular and widely used resort area.

In the Caucasus, where the republic elites are not enthusiastic about nuclear energy, the Chernobyl' accident revived hopes among proponents of small-scale hydroelectric power plants (GES). Such plants powered the Soviet Union in the reconstruction years (1945-65), but in the last 15 years have been overshadowed by large thermal plants. According to recent press reports, Georgia, which has fought having a nuclear plant on its land, is also arguing strongly for more small-scale hydroelectric plants. These reports confirm the republic's commitment to pursue this option. This October, some 2,000 Armenians demonstrated in Yerevan for the closure of the nuclear power plant and a chemical factory that they say has polluted the area for 40 years

While Soviet citizens—in contrast to their counterparts in the West—have not mounted a major protest against the development of nuclear power, antinuclear sentiment is growing as noted by the Armenian demonstration and the formation of the Svetlitz'a group. Nuclear energy has also become more of a public issue after the regime's attempts to minimize

the effects of the nuclear accident. Local Soviet press indicates that concern is particularly high in areas with Chernobyl'-type reactors (RBMKs) like Kursk, Leningrad, Smolensk, and Ignalina in Lithuania. The Leningrad nuclear plant is located in Sosnovyy Bor, 70 kilometers northwest of Leningrad, near Estonia, and residents of both Leningrad and Estonia are worried about the safety of the plant. Recently, an unofficial environmental group, formed in opposition to the nuclear plant in Sosnovyy Bor, has asked to join a Leningrad coordinating organization for various environmental groups. The citizens of Sosnovyy Bor may have already won certain concessions from their city executive party committee (*gorispolkom*) regarding the ecology-sensitive project. According to *Pravda*, a promise was extracted from city officials to consider public opinion and environmental factors in future city planning.

more emphasis has been placed on reactor safety in the USSR since the Chernobyl' accident, probably as a result of public concern. However, Soviet citizens are apparently reluctant to trust official assurances that safety alterations in the other Soviet nuclear facilities have been made or that existing safety rules will be enforced. They worry that a greater demand for energy to make up the loss caused by Chernobyl' will increase pressure on the nuclear sector to place growth above safety. Throughout the summer of 1986, officials found it necessary to assure the public that the repairs on all remaining 14 graphite-moderated reactors have not been waived to overcome electricity shortfalls and that extensive safety checks were carried out even in a non-graphite nuclear reactor like the one in Armenia.

While it is unlikely that public opinion will alter the Soviet commitment to nuclear power, debate on the location and safety in the nuclear industry should continue to grow, particularly in the present atmosphere of greater openness. For example, in April 1987, some 60 members of the Ukrainian Academy of Sciences signed a petition opposing the completion of units 5 and 6 at Chernobyl'. Reportedly, the petition was about to be published by *Literaturnaya gazeta* when Moscow decided to shelve the expansion plans, conceivably in part as a response to public opposition.

Environmentalists have also successfully protested against the construction of new nuclear power plants. In November, the head of the government commission investigating the accident, Valeriy Legasov, told the Western press that public pressure caused the cancellation of the Minsk and Odessa nuclear power plants, and other reporting indicates the Soviets have suspended plans to operate the Gorkiy nuclear plant for the same reason.

Consumer Dissatisfaction

While the most serious costs have been to regime credibility, the need to divert state funds into containing the disaster may result in some readjustments to Gorbachev's initiatives for social programs, including better housing and health care, and may undermine the regime's ability to deliver on its promises.

Moscow announced in December 1986 that a total of 800 million rubles were budgeted for direct compensation in housing and short-term subsidies for the Chernobyl' victims. The rest of the cleanup operation—entombing the damaged fourth reactor, decontaminating the remaining reactors and plant environment, and protecting the water and soil from contamination—was initially projected to cost 2 billion rubles, or 0.2 percent of GNP for 1986, but Gorbachev told

in December that this estimate was too conservative. A Soviet engineer attached to the Chernobyl' government investigation commission estimated the cost of cleanup to be 25 billion rubles, or more than 2 percent of GNP for 1986.¹

The evacuation has aggravated housing shortages in some areas. A large number of those who were evacuated to cities far away from the republic, such as Frunze in Kirghiziya, stayed there. Housing was built for them and they were integrated into the work

¹ Disruption to the Soviet nuclear power industry through 1990 will be relatively minor and will not delay Soviet intentions to increase reliance on this energy source.

DI Research Paper SOV 87-10032X
June 1987, *The Soviet Nuclear Power Program After the Chernobyl' Accident*

Incidents in Soviet Nuclear Power Plants

Accidents in Soviet nuclear power plants were rarely discussed before Chernobyl'. The Soviets have consistently denied that such accidents had occurred. In part, this is a problem of the Soviet definition of a nuclear accident, which is so narrow that even the Chernobyl' accident may not qualify. However, the Soviets do report "incidents involving the nuclear plants" to the International Atomic Energy Agency. Some of the incidents reported include:

- A leak of primary-cooling water through the pressure-vessel-heat flange seal in unit 3 of the Kola nuclear reactor in 1983.
- Damage to one of the main circulation pumps in unit 1 of South Ukraine nuclear plant in 1983.
- Corrosion-erosion damage caused steam-generator tubes to leak in unit 3 of Novovoronezh nuclear power plant in 1983.
- Corrosion-erosion damage suffered by the reactor vessel at Kolskaya nuclear power plant in 1983.
- Shutdown of Kalinin's unit 1 because of malfunction of pilot-operated relief valve of the pressurizer in 1985.
- A primary coolant leak into a steam generator at the Rovno nuclear power plant in 1982, which damaged the units's steam generator and shut down the plant.

Reportedly these incidents did not involve the reactor core nor caused any radiation damage.

There have been more serious accidents at Soviet nuclear power plants, according to Pyotr Neporozhnyy, the former Minister of Power and Electrification, including an explosion and a radiation leak. He said to a US Congressman in 1987 that one accident

involved a rupturing of a coolant line, and another an explosion that spread radioactive steam to other parts of the unit.

Other sources have reported fires and other accidents at plant facilities:

- [There was a fire in the Armenian nuclear power plant in 1980-81.
- In a series of fictional short stories, which appeared in the November 1986 monthly journal Neva—but reportedly were based on the personal experience of Grigorij Medvedev, a senior engineer at a Soviet nuclear facility—the author describes slipshod safety practices, dangerous cleanup techniques, and a reactor power surge, similar to the one that actually happened at the Chernobyl' plant, resulting in several deaths. [

Medvedev admonished the planners against placing the Chernobyl' plant near Kiev more than a decade ago.

On 11 September 1987, Sotsialisticheskaya Industriya gave a list of 368 accidents in Soviet nuclear and conventional plants that happened between 1981 and 1984. They were all caused by plant operator error, according to the paper. It did not say how many accidents of the total took place in a nuclear plant and how many in a conventional plant, or list other nonoperator-caused accidents.

force. Soviet sources say some 120,000 persons have been completely and permanently rehoused (see figure 7). In addition, many fled on their own from nearby cities such as Kiev, Chernigov, and Gome[

] A samizdat letter from the Ukraine, which appeared in the Paris emigre paper *Russkaya Mysl'*, puts the number of those who left Kiev on their own at 150,000. Housing assigned to the

Chernobyl refugees have added to the chronic shortages in Kiev, Chernigov, and other cities. The former Premier Aleksandr Lyashko said that upward of 13,000 apartments will be needed to be replaced in the city of Kiev alone

Moscow eased part of the pinch on its coffers by forcing the population to bear some of the costs of the cleanup. Decontamination duty was assigned wherever possible to the military, whose wage costs are less because civilian cleanup workers received double wages. The regime also defrayed costs through so-called voluntary contributions made to a special Chernobyl' Aid Fund. The 530 million rubles, collected from the deduction of one day's wages from every Soviet worker, offset about one-fourth of the lowest official estimate but, as noted, cost was probably much higher. Many Soviet citizens told

as that the contributions were mandatory and were demanded even from retired elderly people on meager pensions. While many Soviets—possibly even a majority—welcomed an opportunity to help, the compulsory nature of the contributions probably generated some resentment.

Other involuntary costs imposed by the government were also unpopular. The cost for the apartments "borrowed," presumably on a temporary basis, from various enterprises and local soviets in different republics to house the evacuees was mostly borne by these enterprises. Some of the cost for the evacuation of large numbers of children and their mothers to Pioneer camps and vacation resorts was borne by various trade unions and local soviets, but the greatest cost was shouldered by individual families. Throughout the Soviet Union, parents had to find alternate summer places for their children and ways to finance them. Many regular planned vacations in Soviet resorts were canceled. The Black Sea coast was reportedly completely closed to all but Chernobyl'-area evacuees.

Implications for Regime Policy

Gorbachev's drive for increased open criticism of shortcomings in Soviet society and his announcement of domestic reform, *glasnost*, and democratization has already begun to divert domestic and foreign attention from Chernobyl'. Despite this, however, the Chernobyl' accident continues to pose several longer term




Figure 7. Thousands of evacuees were resettled in or near Kiev, many in hastily built settlements like the one depicted behind a displaced Chernobyl' woman.

The sudden loss of hundreds of thousands of people from the affected area is already having repercussions in social services and the agricultural labor force. Kiev Oblast party boss Revenko last December said the area faces serious shortages of specialists for state farms, schools, stores, and hospitals because most of the people who left the area after the accident have not returned and may never return. In addition, people are apparently reluctant to work in the contaminated zone where Chernobyl' nuclear plant units 1, 2, and 3 are now in operation. The new director of the plant and other experts expressed concern about shortages of workers—now at about half the preaccident strength.

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Relocation

Moscow announced the evacuation of 135,000 persons: approximately 30,000 from Belorussia's Gomel' Oblast and the remaining 105,000 from the Ukraine. Reportedly, thousands more left the nearby cities on their own. By the end of the summer of 1986, it was clear that most of the evacuated population would not be returning for the winter and more permanent resettlement was needed. Belorussia resettled 10,000 families in hastily constructed prefabricated houses in Gomel's northern rayons.

The Ukraine resettled upward of 27,000 people in the 56 new villages built just outside of the 30-kilometer zone. Many evacuees are still living in very crowded conditions, however. According to Kiev Oblast officials, there are plans to build another 3,000 homes and 1,500 apartments to alleviate the crowding.

The new homes have modern facilities, are completely furnished, and constitute a great improvement over the overwhelming majority of the housing stock left behind in the Chernobyl' countryside, according to local officials. Still, some evacuees refused to resettle there. Local officials say it is because of the remoteness of the area, but the real reason for their reluctance may be the nearness of the new settlements to the contamination zone.

Only 300 evacuees from the Ukraine have been permitted to return to two of the decontaminated villages in the zone. Further north of the site in Belorussia, the inhabitants of 10 villages—about 1,500 persons—have gone back to their dwellings. The rest have been permanently resettled elsewhere with their possessions and livestock.

Plant operators have been allocated 8,000 apartments in Kiev and Chernigov and another 6,000 apartments in other rayons and towns of Kiev Oblast. About 3,000 on-line operators at the recently restarted reactor units 1 and 2 shuttle between Kiev and Zelenyy Mys—the partly completed settlement on the banks of the Dnepr River—in a two-week rotation.

In October 1986, plans for the construction of a new city called Slavutich were advanced by the Central Committee of the Communist Party. Slavutich will be located in Chernigov Oblast and will house 20,000 power engineers and plant operators at its completion in two years, according to Soviet press (see figure 1).

problems. The public's confidence in the nuclear system has been shaken, and there is skepticism about the leadership's commitment to guarantee safety. The growing popular resentment and concern about environmental protection and individual safety is forcing the regime to give a higher priority to these issues, putting pressure on the nuclear ministries and departments and ultimately on national resources.

Chernobyl' and the Glasnost Debate

Gorbachev successfully exploited adverse Western publicity to the accident to extend his domestic glasnost campaign—which was only in its infancy when the accident occurred. The disaster spurred Gorbachev's move to open up discussion of social and

economic problems. []
Gorbachev hoped Chernobyl' would shake up the party establishment so that it will henceforth comply with his demand for more openness and honesty in internal party communications. The initial public relations debacle strengthened the argument for greater media openness in discussing domestic shortcomings. Several articles in *Pravda*, for example, pointed out that a lack of complete information had encouraged harmful rumors. Supporters of Gorbachev's glasnost policy, like the noted journalist Fedor Burlatskiy, criticized the domestic media's early silence as costing the regime credibility. []

C } Gorbachev said the precise means that can protect the party from errors in politics are openness, criticism, and self-criticism. "The price of these errors is known to all of us," he added, which no doubt in large part, applied to the Chernobyl' information coverup.

Since April 1986, on several occasions the Soviet media have promptly reported on accidents causing loss of life and publicized punitive measures taken against the officials responsible. Soviet media treatment of the sinking of the Admiral Nakhimov passenger liner in August 1986 because of gross negligence—apparently drunkenness—and the firing of the responsible minister and prosecution of its captain and his deputy is a striking example. Other disasters, such as a collision of two passenger trains that killed 40 persons because one of the engine drivers was asleep, the spectacular methane coal mine explosion in the Ukraine late last year, and the more recent one in Chaykino mine in Donetsk have been reported immediately.

A year after the accident, however, there are signs that the Soviets are again being less direct about Chernobyl' and that the openness in the months following the accident may have found its limits. Despite signs of popular concern, the regime has not taken steps to give the public more of a say on these issues. The major bureaucracies are resisting public pressure, and there are some signs of backtracking on *glasnost*:

- Two Soviet journalists complained this April in the Soviet weekly *Moscow News* that information on Chernobyl' is being withheld and is increasingly difficult to obtain, noting that information reported to the International Atomic Energy Agency is not being given to the public.
- The official Soviet report presented to the IAEA at the August 1986 meeting in Vienna, and made widely available to the West, was never released to the Soviet public. A 20-page summary was eventually published in the November issue of *Atomnaya Energiya*, and *Elektricheskiye stantsii*, both highly technical journals with a limited distribution.

- Despite pledges of cooperation at the outset, the Soviets have been reluctant to share the research on radiation data they have collected since the accident, according to the US Department of Energy and the Nuclear Regulatory Commission. In addition to the traditional reluctance of the Soviet Union to disclose information, the Soviets may fear new data will disagree with the information they have already made public or will prove embarrassing if future casualties appear among those being monitored, since they have claimed the health effect will be insignificant.

The *Moscow News* article suggests the traditional argument that public opinion has no role in the scientific and technical sphere is still being used to justify the restrictions. Many in the affected bureaucracies, and even some senior leaders, have a vested interest in ensuring the consequences of Chernobyl' disappear from public view. They would like to avoid a real debate on the direction of the Soviet nuclear energy policy and on the location and safety of existing and future nuclear plants. Such a debate is troublesome to a regime formally committed to nuclear energy and the economic benefits of building nuclear plants near highly populated areas. Moreover, continued publicity will leave the regime open to criticism if it is unwilling to allocate further resources to deal with long-term environmental and health consequences.

The news blackout during the three-week trial of plant officials in July was further indication that authorities are tightly controlling information on Chernobyl'. Shortly before the trial, Soviet Foreign Ministry officials described it as open and indicated Western reporters could attend. On the second day of the proceedings, however, foreign reporters were barred from the courtroom, and the trial continued behind closed doors. The decision to conduct the trial in secret, possibly in an effort to avoid revealing technical testimony that addressed reactor design flaws, demonstrates Moscow's sensitivity to issues that can feed the growing domestic concerns about the safety of the Soviet nuclear industry.

Criticism of official suppression of open discussion on Chernobyl' was voiced at the April All-Union Writer's Plenum by the Ukrainian poet Boris Oleynik. In his speech, he expressed his frustration with the central press, saying he has been denied access to the media to publish his reservations about the completion of units 5 and 6 at Chernobyl'. He told *Literaturnaya gazeta* he repeatedly tried to speak out but was not permitted to do so. Another prominent Soviet literary figure, Yevgeniy Yevtushenko, told *Izvestiya* there were attempts by unspecified ministries and departments to suppress the production of the Chernobyl' documentary, "Kolokol Chernobyl'ya," because the film was critical of nuclear technocrats.

Nuclear Energy Policy

While popular support for nuclear power in the West has been eroded further by the Chernobyl' disaster, Moscow's formally stated nuclear energy goals remain unchanged, despite signs of public anxiety. However, it is attempting to be responsive on the safety issue, creating an internal tension in regime policy.

The nuclear energy bureaucrats remain firm in their determination to rely more heavily on nuclear power. Minister of Atomic Energy Nikolay Lukonin announced in April 1987 that Moscow's plans to double electricity output at nuclear power stations by 1990, as compared with the 1985 level, and more than treble it by 1995 remain unshaken. According to Andronik Petros'yants, the recently retired head of the State Committee for Utilization of Atomic Energy, after the RBMKs already under construction are completed, the graphite-moderated reactor will be phased out in the Soviet Union, and future construction of nuclear plants will be based on water-cooled, water-moderated reactors. This change has not gone far enough to satisfy those among the Soviet environmentalists who demanded the closing of all Chernobyl'-type reactors, but energy needs and high cost apparently rule out this option.

The regime has meanwhile publicized new measures to ensure reactor safety, including a new decree on nuclear safety by the USSR Council of Ministers in July. In the same month, the Politburo passed a resolution for the development of automated systems

at nuclear power stations. What impact on safety these changes will have is not yet clear. The new decree designed to strengthen safety inspection regulations for the State Committee for Safety in the Atomic Energy Industry focuses primarily on new nuclear power stations. And more rigorous operator training and a few hardware modifications proposed by the Ministry of Atomic Energy will do little to improve the existing RBMKs reactors and the earlier pressurized water reactors (VVERs), which have significant safety problems. Decommissioning or extended shutdowns of these reactors may be the only safe solution, but not one that the Safety Committee is now capable of executing.

Since the accident, the nuclear energy industry has undergone an extensive reorganization designed, among other things, to make it more responsive to the public concerns of safety. The reference at the Chernobyl' trial to the secrecy of nuclear engineering is an implicit criticism of the industry's wholly technocratic approach, which had traditionally given little weight to social concerns. There is also renewed discussion on the siting of future nuclear plants in more remote areas, stressing ecology as a major consideration. However, it is too early to judge what actual changes these measures will bring.

Another Nuclear Accident?

Western analysts agree that the RBMK reactors—nearly half of the Soviet nuclear power capacity—have fundamental deficiencies that no reasonable modification can eliminate and pose a continued safety hazard, remaining vulnerable to severe accidents.¹⁷ The Soviet Union now has more experience and is better prepared to deal with a nuclear power plant accident than any other country in the world. Still, another nuclear catastrophe would deliver a serious blow to Soviet nuclear policy and could produce high-level political shakeup—including in the Central Committee and ministries responsible for

¹⁷ Although a serious accident in another Chernobyl'-type reactor would pose considerable social and political repercussions for the Soviets and could mean the end of RBMKs, a major accident in a VVER reactor would have far graver implications for Soviet confidence in nuclear reactor design because the water-moderated reactor is slated to be the workhorse of the 1990s, while the RBMK was being phased out even before Chernobyl'

Reorganization of the Nuclear Industry

Since the accident, the nuclear energy sector has undergone an extensive reorganization designed to make it more responsive to the concerns of safety. Currently, the ministries and Soviet organizations responsible for nuclear power in the USSR are as follows: (a) the Ministry of Atomic Energy (newly formed since July 1986 and headed by Nikolay Lukonin) assumed responsibility for operating all nuclear power plants, taking over some authority from other ministries; (b) the State Committee for Safety in the Atomic Power Industry; (c and d) the Ministry of Power and Electrification and the State Committee for the Utilization of Atomic Energy—which earlier controlled some plants but now have diminished authority; (e) the Ministry of Heavy Power and Transport Machine Building—which combined the responsibilities of the now defunct Ministries of Power Machine Building and of Heavy and Transport Machine Building; (f) the Ministry of Medium Machine Building; (g) and the Ministry of Health—which will follow up on the radiation risks.

Out of the previously existing bodies, the State Committee for Safety in the Nuclear Power Industry has undergone the most significant changes. It has a new director, Vadim Malyshev, and a larger number of field engineers to conduct inspections since Chernobyl'. Its old director, Yevgeniy V. Kulov, was fired. The committee's power has been spelled out and includes the authority to stop an operation if a violation of regulations occurs. Whether this authority will be exercised is still an open question

nuclear industry, which have been given a mandate to bring the Soviet reactors to more stringent safety standards

A segment of the Soviet population—including some members of the elite with some policy influence—has much less confidence in the regime's capacity to guarantee safety. Another nuclear mishap, even a comparatively minor one, could unleash a backlash

against nuclear energy and the regime that might be hard to ignore. Another accident would probably provoke public demonstrations of the sort increasingly used by independent groups as a platform for political and social issues.

These demonstrations have already had some effect on regime policy and have sometimes taken on an anti-Russian cast. The actions of the growing environmental lobby—like the well-organized groups in Leningrad, which led a demonstration of 10,000 persons to successfully press for the closure of a chemical complex polluting the environment in Kirishi, or the public campaign in northern Georgia to halt the Trans-Caucasus railway planned to tunnel through the Caucasus Mountains—could serve as a model. The regime is not likely to maintain a business-as-usual attitude the second time around, and major changes in the nuclear industry would have to be considered.

Outlook

Certain factors point to the potential for public opinions playing a greater role on nuclear power decisions in the future:

- The democratization campaign unveiled by Gorbachev, Yakovlev, and other senior leaders presupposes more sensitivity to public opinion if it is to be taken seriously. Some informal environmental groups have apparently been able to get their candidates on the ballot in Leningrad, and the new law on public review of legislation provides for discussion of the construction of new enterprises—presumably including nuclear power plants—and environmental issues.
- The views of some of the critics of nuclear power, like Boris Paton, a full member of the Central Committee, and some prominent journalists probably carry more clout under *glasnost* and have a better chance of keeping the pressure on the nuclear power industry.

- Finally, the Gorbachev regime would be embarrassed by a repeat of the Chernobyl' disaster, or even an accident on a much smaller scale, given the effort it has put into cultivating a positive image abroad.

Although there is no guarantee that public resentment will translate into policy changes on nuclear power—evidence now points in the opposite direction—it may mean greater efforts to reassure the public and, perhaps, some rethinking of the strategy for siting nuclear power plants.

Chernobyl' has created a degree of public disillusionment in the regime's capacity to guarantee personal security and its commitment to provide for the public well-being. Under the greater latitude of public debate in the Gorbachev era of *glasnost*—spurred in part by Chernobyl'—the Soviet citizenry is challenging national and regional authorities to solve longstanding societal problems, and there are signs of leadership support for giving a higher priority to these issues. Chernobyl' awakened public interest in the safety of industrial facilities and heightened public awareness of health and environmental issues. As noted, public demand to address some of these concerns has already led to specific action by the authorities, like halting construction of a hydroelectric plant in Latvia this spring, after the public protested its harmful impact on the environment.

In addition, the Gorbachev regime has issued a number of broader policy statements designed to curb pollution and improve health, and Gorbachev appears concerned about providing resources to support these policies. In July 1987, the CPSU Central Committee issued a sweeping resolution on ecology aimed at safety in the workplace and improving the quality of air and water. A month later the Committee announced a crash program to improve the health care system. The new Law on the Restructuring of Public Health stresses major reforms in the area of public health through prevention and may be implemented more rapidly than usual, given the growing concern about pollution and industrial safety.

Accommodation to popular frustration carries a danger for the regime, however, and could make the situation worse by exciting expectations. The population will be more attentive to future regime performance in the area of nuclear safety, public health, and ecology. There is increased discussion of these issues in the intellectual community, and social initiative groups are taking issues to the streets. These concerns are not likely to evaporate. As public dissatisfaction grows, the Chernobyl' accident may provide a focal point around which disgruntled citizens can organize, and Moscow may discover that Chernobyl' is a continuing irritant with a potential for social and ethnic tensions for years to come.