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USSR: Nuclear Power Hit by Emerging Antinuclear Lobby

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An Intelligence Assessment

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USSR: Nuclear Power Hit by Emerging Antinuclear Lobby

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An Intelligence Assessment

This paper was prepared by
Office of Soviet Analysis, with
contributions by
Office of Scientific and Weapons Research.
Comments and queries are welcome and may be
directed to the Chief, National Issues Group, SOVA,

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USSR: Nuclear Power Hit by Emerging Antinuclear Lobby 25X1

Key Judgments

Information available as of 31 May 1988 was used in this report.

An antinuclear "lobby" is emerging in the Soviet Union. It is loosely organized and geographically dispersed but has successfully challenged the nuclear power program, causing delays and even cutbacks in plant construction. The lobby has also provoked what may be a protracted struggle between advocates and critics of nuclear energy. 25X1

Since 1987, pressure from inside and outside the Soviet nuclear industry has resulted in the cancellation or suspension of construction on 10 projects involving 25 reactors—about 20 percent of all nuclear power plant capacity scheduled to be built by the year 2000. Despite unprecedented criticism, the industry is not facing a crisis. New capacity has grown 23 percent since the Chernobyl' accident, electricity output from this source is growing, and critics have not shut down any operating power plants. 25X1

The industry's managers, however, are on the defensive, and continued opposition would handicap the planning and construction of projects for the 1990s. Currently, the critics are focusing their efforts on plants under construction near major cities, earthquake-prone areas, reservoirs, and heating plants. The situation would get worse for the nuclear energy industry if critics were to broaden their attacks to include other plants on the drawing board and plants now operating. We have identified 19 additional projects that are particularly vulnerable to criticism about safety and location—some 5 percent of operating capacity and 30 percent of the projects scheduled to be built by the year 2000. 25X1

Citizen opposition to nuclear energy is emerging among a cross section of the public and elite in several areas of the country. These critics have become increasingly vocal under *glasnost*—particularly in local and cultural publications—and have organized into informal, unofficial coalitions representing party officials, academic and scientific institutions, and the community at large. Spurred by the 1986 Chernobyl' accident, an antinuclear lobby coalesced first in the Ukraine, where it pressed authorities to halt construction of several projects and is seeking to limit expansion of nuclear energy in the republic. Opponents have also had successes elsewhere; plans for power plants in Armenia, Belorussia, Lithuania, and parts of the Russian Republic have been cut back or dropped. 25X1

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We expect the struggle between advocates and critics of nuclear energy to drag on for the next few years, perhaps intensifying if the more open atmosphere of *glasnost* continues unabated. The course of this debate will be greatly influenced by several interrelated factors:

- Moscow's overall energy balance will be crucial. The regime will be more likely to yield to the antinuclear arguments so long as energy supply meets domestic demand and export commitments, but any faltering in performance is likely to stiffen resistance.

- The level of nationalist unrest and the regime's reaction will also be key factors. Many nuclear power plants are located in non-Russian areas, and Moscow is becoming increasingly sensitive to public opinion on this issue and its potential for triggering unrest. A broad-based coalition of experts and officials with reasonable criticisms of the nuclear program would be difficult for Moscow to ignore. If nationalist unrest escalates, however, the regime will crack down hard on its critics, including those involved in the antinuclear movement.

- Gorbachev's efforts to restructure and democratize the party and public life will also have an indirect but vital bearing on the outcome. Proposed reforms, if adopted, could produce a party and government structure more responsive to public demands. If the reforms are blocked or slowed by a mounting conservative opposition, however, those who distrust the critics—managers in the nuclear industry and some local officials—will be encouraged to resist demands of the antinuclear groups.

- Who wins the battle for power now in progress among the various bureaucracies in the nuclear program will affect the nuclear industry's future. If those responsible for ensuring safety—such as the State Committee for Nuclear Safety—gain influence and independence, the critics will probably gain a more sympathetic hearing.

- A final unpredictable factor may be the industry's safety record. Technical analysis indicates that the risk of a major accident in a number of currently operating Soviet reactors is much greater than in comparable Western reactors. If the industry succeeds in establishing credibility on the safety issue by taking steps the critics consider necessary, opposition will rapidly decline. Nonetheless, another major accident—with damage

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to the ecology or loss of life—or even a pattern of gross safety violations would bring the critics increased support, perhaps even prompting industry experts to join antinuclear groups. 25X1

Given the current political and economic situation, we believe the regime will pursue a policy of compromise between the critics and the industry. The regime already appears to be moving in this direction by shelving the most sensitive or controversial projects while trying to upgrade safety and to maintain an overall commitment to nuclear power:

- Very few operating plants are likely to be closed since this would cause a myriad of problems for Moscow's short- and long-term energy plans and raise serious questions about the reactors the USSR has delivered to its allies and sold elsewhere.

- Nor is a forceful crackdown on the critics likely, as this would fly in the face of *glasnost* and strengthen nationalist as well as environmentalist opposition. 25X1

This controversy over nuclear power will influence decisions during a key period of energy policy formulation. By 1995 the impact of projects already canceled will be felt, making emergency planning of replacement projects necessary. Moreover, decisions taken in the next few years will be critical for nuclear power in the 1990s and beyond. Energy planners are now framing the next five-year plan and will need high-level guidance on allocations to new nuclear construction and safety upgrades and on how much to rely on fossil fuels and conservation. 25X1

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Scope Note

After a massive and largely effective effort to cope with the world's worst nuclear accident at Chernobyl', the USSR has managed to overcome many of the political and economic repercussions- 25X1
An important remaining issue is whether disparate antinuclear voices in the USSR will play a role in policymaking. This Assessment analyzes how various critics—in what could be described as an emerging antinuclear lobby—are challenging the Soviet nuclear power program. 25X1

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USSR: Nuclear Plant Suspensions and Cancellations

Action	Announced	Plant Name	Reactor Type	Prior Status [a]	Startup Scheduled	Investment [b] (*million rubles*)
Canceled	April 1987	Chernobyl' 5	RBMK-1000	Construction	Mid-1988	400
		Chernobyl' 6		Construction	Early 1990	75
Suspended	Mid-1987 [c]	Gor'kiy 1	AST-500	Construction	Mid-1986	100
		Gor'kiy 2		Construction	Mid-1988	80
Canceled [d]	Mid-1987	Kostroma 1	RBMK-1500	Site preparation	1992	30
		Kostroma 2		Site preparation	1994	
		Kostroma 3		Planning	1997	
		Kostroma 4		Planning	1999	
Suspended	Late 1987 [c]	Odessa 1	VVER-1000	Construction	1992	50
		Odessa 2		Construction	1994	15
Canceled	November 1987	Chigirin 1	VVER-1000	Site preparation	1994	20
		Chigirin 2		Site preparation	1995	
		Chigirin 3		Planning	1996	
		Chigirin 4		Planning	1997	
Canceled	December 1987	Armenia 3	VVER-440	Planning	1993	5
		Armenia 4	VVER-440	Planning	1995	
Canceled	December 1987	Ignalina 4	RBMK-1500	Site preparation	1994	10
Suspended	December 1987	Khar'kov 1	VVER-1000	Site preparation	1993	15
		Khar'kov 2		Site preparation	1995	
Canceled	January 1988	Krasnodar 1	VVER-1000	Site preparation	1998	14
		Krasnodar 2		Site preparation	1999	
		Krasnodar 3		Planning	2000	
		Krasnodar 4		Planning	2001	
Canceled	Early 1988 [c]	Minsk 1	VVER-1000	Construction	1992	35
		Minsk 2		Site preparation	1994	

[a] Construction includes building of reactor and ancillary facilities. Site preparation includes building of construction support facilities and worker housing.

[b] Investment includes spending on construction support facilities and worker housing. At plants where work is at the planning or site-preparation stages (Krasnodar and Chigirin), spending can be transferred to nonnuclear applications. At Chernobyl', salvage operations could reclaim equipment for installation at the seven RBMKs still scheduled to be built.

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[d] The Kostroma plant will be redesigned to use VVER reactors; nearly all investment can be recovered.

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USSR: Nuclear Power Hit by Emerging Antinuclear Lobby

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In the two years since the Chernobyl' accident, both official and unofficial Soviet views of the nuclear power program have undergone striking changes. Some leading authorities in the nuclear industry have changed from enthusiastic boosters to critics of key elements of the program. Similarly, individual citizens and unofficial groups have been able to raise objections to the use of nuclear energy in the press and in street demonstrations. Such objections reportedly played an important role in decisions to cancel or suspend construction on 10 projects involving 25 reactors since April 1987 (see table). Several of these were within a year or two of startup.

Projects Currently Disrupted

Critics from inside and outside the nuclear power industry have found fault with projects using each of the main Soviet reactor types (see inset):

- At first the critics focused on the plants with Chernobyl'-type, RBMK reactors; 15 of these were scheduled for completion at five nuclear power plants when the Chernobyl' accident sidetracked plans. Since the accident, one RBMK has been commissioned, seven have been canceled, and seven are still planned for startup (see figure 1). Criticism of the latest RBMK design, the 1500, appears to have ended its use in new projects—only one more is scheduled to be built.

- The VVER reactor is scheduled to become the workhorse of the 1990s. The toughest criticisms of this reactor were made by nuclear industry insiders and appeared in limited-circulation technical journals. Public challenges to projects using this reactor fault the poor choices for plant locations—in earthquake-prone areas or too near cities or historical sites or sites of underestimated ecological impact—rather than the plants themselves.

USSR: Commercial Nuclear Reactor and Plant Types

RBMK. *A graphite-moderated, boiling-water reactor. It is produced in two standardized capacities: 1,000 megawatts (MW) and 1,500 MW (electrical rating).*

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VVER. *A pressurized-water reactor, in which the water is used as both a moderator and a coolant. It is produced in two standardized capacities: 440 MW and 1,000 MW (electrical rating).*

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BN. *A fast-breeder reactor that, as its name implies, can produce or "breed" nuclear fuel for other reactors as it operates.*

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AST, ATETs. *These two types of nuclear plants are designed to supply hot water for centralized heat networks. The AST will use a specially modified reactor of 500 MW (thermal rating) that the Soviets plan to dedicate solely for heat supply to cities. The ATETs plant will supply both electricity and hot water to cities and possibly large industrial customers. The ATETs will use a VVER-1000 reactor.*

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- Citizens' groups have also apparently challenged the guidelines that allow nuclear plants to be built close to cities if they are to be linked to central heating networks. As a result, startup operations of the first plant of this type (AST) at Gor'kiy and construction of similar plants (ATETs) at Odessa and Khar'kov have reportedly been placed on hold. Another plant at Minsk appears to be canceled.

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Figure 1
Canceled or Suspended Soviet Nuclear Power Projects

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- The breeder reactors (BN) are a key element of Soviet plans for the 1990s and beyond. Thus far, public critics have ignored the breeder program, probably because only two reactors are planned for construction by the late 1990s and their locations in the Urals are away from major population centers. The largest of the two operating breeder reactors (BN-600) at Beloyarsk, however, has been criticized by some specialists concerned about the adequacy of its containment.

Nuclear Energy Is Great . . . But Not in My Oblast

The objections presented by local critics that apparently influenced the decisions to cancel or suspend these projects combined an attack on the competence of one or more organizations responsible for planning nuclear power facilities with arguments that questioned the suitability of a plant's location and its safety. These objections came from informal, unofficial coalitions representing party officials, academic and scientific institutions, and the community at large. They have gained public recognition in the Ukraine and Armenia and in parts of the Russian Republic.

In keeping with such a diverse constituency, the antinuclear "lobby" expresses a variety of reactions to nuclear energy. Some of the critics have rejected nuclear energy totally. Some are against only selected projects or criticize only certain aspects of projects and appear willing to compromise. Other critics have seized on the nuclear issue as a means to have a say in the planning for their republics—planning that has been done almost entirely in Moscow.

Many of the criticisms published in the Soviet press appear to have been crafted to make the objections more acceptable to central authorities, more amenable to negotiation. For example, the groups in the Ukraine and Krasnodar Kray have declared themselves to be proenvironment (some even support nuclear energy) and interested in stronger guarantees that water, air, and land in their communities will be protected. The objections to nuclear plants argued most extensively have to do with thermal pollution of waterways, loss of farmland, reduced tourism revenue, and possible damage to historical sites, although safety considerations have played a role.

The Chernobyl' Connection 25X1

Even before the Chernobyl' accident, individual members of the Ukrainian Academy of Sciences and other intellectuals had become increasingly concerned about what they viewed as the disproportionate development of nuclear power in the Ukraine. Their objections to building nuclear plants near heavily populated areas have been recorded in the Soviet media. For example, the president of the Ukrainian Academy of Sciences, Boris Paton, raised the issue only a week before the accident. After the catastrophe, he was quick to declare Chernobyl' a consequence of failing to heed the warnings about locating nuclear plants. Emboldened by *glasnost*, Vitaliy Chumak, head of the Radiological Ecology Center at the Academy's Institute of Nuclear Research, and well-known Ukrainian poet Boris Oleynik publicly rebuked the Soviet nuclear industry for siting the Chernobyl' nuclear plant without fully considering public safety or the environment. 25X1

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On the eve of the first anniversary of the Chernobyl' accident, an informal but influential group of concerned scientists stated their opposition to nuclear energy plans for the Ukraine (see inset). In an unprecedented public hearing, over 60 experts and scientists from the Ukrainian Academy of Sciences took the Ministry of Atomic Energy to task over the question of completing units 5 and 6 of the Chernobyl' power plant—the third phase of the plant expansion begun in 1981. They opposed the construction of the two additional reactors at Chernobyl' not only on technical and environmental grounds but also on "moral grounds," arguing that the population is still suffering from radiation phobia and should be spared further concern. 25X1

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In March 1987 specialists from the Kiev and republic boards of the nuclear energy, biological, medical, geological, and water resources departments of the Ukrainian Academy of Sciences held a public

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Nuclear Energy Plans for the Ukraine

Soviet plans for nuclear energy call for the Ukraine to have the largest concentration of nuclear plants in the USSR. Before the critics began challenging the nuclear program, 10 projects were scheduled to be built in the Ukraine by the year 2000. These plants—detailed in the list below—comprise 39,880 megawatts of capacity, nearly all the new power plant capacity planned for the Ukraine:

Plant	*Action*	*Capacity (megawatts)*	*Status* [a]
Chernobyl'	. . . [b c]	*3,000*	*Operating*
		1,000	*1988*
		1,000	*1990*
Chigirin	. . . [b c]	*4,000*	*1994-97*
Crimean	. . . [b]	*4,000*	*1988-95*
Khmel'nitskiy	. . . [b]	*1,000*	*Operating*
		3,000	*1990-92*
Khar'kov	. . . [b d e]	*1,000*	*1993*
		1,000	*1995*
Kiev	*None* [e]	*1,000*	*1998*
		1,000	*2000*
Odessa	. . . [b d e]	*1,000*	*1992*
		1,000	*1994*
Rovno	. . . [b]	*1,880*	*Operating*
		3,000	*1990-95*
South Ukraine	. . . [b]	*2,000*	*Operating*
		1,000	*1989*
		1,000	*1991*
Zaporozh'ye	*None*	*4,000*	*Operating*
		4,000	*1988-95*

[a] *Dates refer to planned startup for capacity being designed or under construction.*
[b] *Plans for the plant being criticized.*
[c] *Plant construction partly or wholly canceled.*
[d] *Plant construction placed on hold.*
[e] *Plant will also supply hot water to centralized heat network.*

Energy planners wanted the Ukraine to produce electricity from nuclear plants to meet the growing needs of that republic and to send surplus output to neighboring republics and Eastern Europe. The Soviets arranged to build the Khmel'nitskiy nuclear power plant jointly with Poland and Czechoslovakia.

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Along with increasing the energy supply, the rapid growth in nuclear power plant capacity was expected to help stop growth in the use of fossil fuels. Eventually, the expansion of nuclear energy was to reduce fossil fuel use by facilitating the retirement of power plants fueled with coal or oil. A promised additional benefit would be the reduction in pollution that would accompany cuts in coal use.

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Criticism of the Ukrainian nuclear program leveled by some of the republic's citizens appears to be at variance with plans publicized by the nuclear industry. The critics' tally of nuclear projects scheduled for the Ukraine was short by three plants. One-third of the projects criticized as "new and unwarranted additions" were announced nearly seven years ago, and the largest nuclear project in the USSR—Zaporozh'ye, scheduled to be an 8,000-megawatt power plant—was not even mentioned by those protesting plants larger than 4,000 megawatts.

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discussion—reported in *Literaturnaya gazeta*—on Chernobyl's third phase of development. They recommended the expansion be canceled on economic and safety grounds (see inset). Nikolay Amosov, a full member of the Ukrainian Academy of Sciences, asked, "After tens of thousands of people have suffered a grave mental trauma and are still living in fear of the future, is there a moral right to expose them to new fears?" A lingering fear of radiation persists even two years after the accident. Speaking to an international conference in Kiev in May 1988, a leading Soviet doctor concerned with the accident confirmed that rumors of radiation leaks and radiation-related diseases were still rife. Despite repeated reassurances by authorities, for some there remains a "phobic" fear and hostility to everything having to do with nuclear power.

In April 1987 Andronik Petrosyants, who was then chairman of the State Committee for the Utilization of Atomic Energy, announced the shelving of units 5 and 6 at Chernobyl'. The Ukrainian group subsequently claimed this action was in response to public opposition.

the cancellation was the first case where public opinion may have played a substantial role in policy decisions.

In January 1988, the same Ukrainian group of specialists challenged plans to expand three existing nuclear power plants and called for a reassessment of the entire nuclear energy program in the republic. In an open letter addressed to the USSR Council of Ministers, published in the Ukrainian-language literary weekly *Literaturna Ukrayina*, the group pressed for nuclear development in the republic to be limited to plants currently scheduled for construction and opposed further expansion of three existing plants beyond that scheduled to be completed by the early 1990s. These concerned scientists directly challenged the Ministry of Atomic Energy on several points:

- They opposed further expansion of three existing nuclear power plants—Rovno, Khmel'nitskiy, and Southern Ukraine—all built near cities with a population of one million or more.

Prominent Scientists Against Nuclear Expansion in the Ukraine

Aleksandr Alymov
Full member of Ukrainian Academy of Sciences. Recommended cancellation of units 5 and 6 at Chernobyl' and was the leading advocate of stopping expansion of Rovno, South Ukraine, and Khmel'nitskiy. 25X1

Nikolay Amosov
Full member of Ukrainian Academy of Sciences, Director of the Institute for Cardiovascular Surgery in Kiev. Recommended against expansion of Chernobyl' and three other plants. 25X1
25X1

Andrey Grodzinskiy
Corresponding member of Ukrainian Academy of Sciences. Botanist, author of numerous papers on soil science and agriculture. Recommended against expansion of Chernobyl' and the other three nuclear plants. 25X1
25X1

Dmitriy Grodzinskiy 25X1
Corresponding member of the Ukrainian Academy of Sciences; Chief, Biophysics and Radiobiology Department of the Botany Institute; expert on radiation effects on man and environment. Signed the January letter against expansion. 25X1 25X1

Zorin, V. V.
Doctor of Technical Sciences and expert on environmental effects of chemicals. Signed the January letter against expansion. 25X1

Shestopalov, V. M.
Deputy Director of the Institute for Geological Sciences and corresponding member of Ukrainian Academy of Sciences. Expert on ground water in the Ukraine. Signed the January letter against expansion. 25X1

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- They rejected the Ministry's claim that additional units were needed to meet projected energy needs for the republic's industry, saying that economic feasibility studies done by the Ukrainian Academy of Sciences Council showed that expansion was unnecessary.

- They expressed reservations about the Ministry's "militant" position and "attempts to impose its decisions again and again in opposition to public opinion" and without consultation or discussion with republic experts.

- They pointed out that "the bitter lessons of Chernobyl' " had no visible impact on Moscow's bureaucracy and called for a complete reassessment of the entire nuclear power program in the republic.

The latest two groups to join the antinuclear lobby are leading Ukrainian mathematicians and cyberneticians. In support of the earlier open letter signed by 13 Ukrainian scientists, they defended in the March issue of *Literaturna Ukrayina* the Ukraine's right to have a say in the planning and decisionmaking about increasing the republic's nuclear energy capacity. The two groups even suggested that a referendum be conducted in the Ukraine about the issue.

Although the Ukrainian scientists and specialists who are critical of nuclear power have sought a broad base of support among Ukrainian scientists, there are still many who strongly disagree with them. In a radio interview, one of the leading critics conceded that Ukrainian scientists are sharply divided over the future of nuclear power. They hope that a state commission can arbitrate the issue. It is more likely, however, that the struggle will spread, drawing in backers of the Ukrainian coal industry—which could possibly recoup some lost investment and priority if nuclear power founders—energy conservationists, and any other republic organization with a direct interest in a decision about the future of nuclear energy.

Other segments of the Ukrainian population, such as the intellectuals, are also opposing nuclear plants. In June 1987, a group of writers from Cherkassy Oblast put *glasnost* to the test and mounted a public campaign against a nuclear power plant under construction in their oblast. Intellectuals from the Cherkassy branch of the Ukrainian Union of Writers published another open letter in *Literaturna Ukrayina* and circulated a petition signed by 6,000 people to halt construction on the nuclear power plant in Chigirin. Their argument was based on environmental and historical reasons—Chigirin was the capital of an independent Ukraine in the 17th century—as well as on perceived mismanagement of planning for the city's power plant projects. Drawing parallels with Chernobyl', they also expressed the fear that an accident at the Chigirin nuclear plant would endanger the largely agricultural oblasts of Cherkassy, Kirovograd, and Poltava and contaminate the Dnepr River basin, threatening settlements downstream of Chigirin. 25X1

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The August open letter carried the signature of Fyodor Morgun, the party chief of the neighboring Poltavskaya Oblast who has since been appointed to head the new State Committee for Environmental Protection created in January. Morgun, a close supporter of Gorbachev, is a full Central Committee member and an apparent political rival of Ukrainian First Secretary Vladimir Shcherbitskiy. 25X1

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the construction at Chigirin was halted in November, largely because of adverse public opinion. Even after the decision, Cherkassy party boss Ivan Lutak—a close Shcherbitskiy protege—complained in an interview that the public does not understand the issues and has no role in these decisions. Significantly, the letter was also signed by a previously jailed dissident, Vasyl Zakharchenko, pointing up that elite and extreme views have a way of converging on environmental grievances.[2] 25X1

A new unofficial group of intellectuals, the Ukrainian Cultural and Ecological Club, organized a large antinuclear demonstration in Kiev on the second anniversary of Chernobyl', indicating that 25X1

[2] In the February Armenian nationalist demonstrations, the Armenian elite and the general public united behind the demand that the predominantly Armenian Nagorno-Karabakh Oblast in Azerbaijan be incorporated into Armenia. 25X1

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antinuclear and nationalist sentiment is on the rise there. Police, however, broke up the group of more than 500 participants and arrested 20.

Beyond Chernobyl'

The open opposition to nuclear energy in the Ukraine may be a reflection of a broader antinuclear mood in the country following the Chernobyl' disaster. In January 1988 *Pravda* and *Komsomol'skaya pravda* reported that the construction of a nuclear plant in Krasnodar, near the Black Sea, had been abandoned after a campaign by local residents. The scrapping of the Krasnodar plant was the first acknowledgement in the Soviet media of the growing fear of nuclear power in the country outside the Ukraine. Last November the head of the government commission investigating the Chernobyl' accident told the Western press that citizens' initiatives blocked further construction on the Minsk and the Odessa nuclear power plants.

There have also been demonstrations against the construction of a new reactor at the Ignalina nuclear plant in Lithuania, and residents of both Leningrad and Estonia have opposed the operation of the Leningrad nuclear plant located in Sosnovyy Bor, most recently in a peaceful protest in Leningrad on the second anniversary of the Chernobyl' accident in late April.

Although the March outbreak of nationalist grievances in Armenia was sparked by a longstanding territorial dispute, the initial demonstrations in Yerevan on 18 and 19 February were rooted in concern over environmental issues, including longstanding concern over reactor safety. In late 1986, over 300 Armenian intellectuals sent a petition to Gorbachev protesting environmental conditions and "radiation leaks" at the existing nuclear power station near Yerevan. Last October thousands of demonstrators, waving banners saying "Save Armenia from Radioactive and Chemical Genocide" and demanding the return of the two formerly Armenian territories, were joined by republic and local officials, suggesting a solid backing for the issues not only by the Armenian population but also by some party officials.

Last December the chairman of the Armenian Council of Ministers announced that there will be no more nuclear plants built in earthquake-prone Armenia, apparently in response to longstanding public concern over safety. We believe that critics from within the nuclear industry are pressing to close the existing plant because they believe the cost of abandoning it and writing off the remaining 15 years of its productive life may be cheaper than retrofitting the two reactors to ensure their safe operation in the event of an earthquake. With the retirement of Andronik Petrosyants, an Armenian who headed the powerful State Committee for Utilization of Atomic Energy from 1962 to 1987, there may be more willingness in the nuclear industry to close the plant. In view of the festering public dissatisfaction in Armenia after the de facto rejection of shifting Nagorno-Karabakh Oblast to Armenia, Moscow might agree to close the nuclear power plant, along with halting the chemical plant project, as part of ecological and cultural concessions designed to win over moderate Armenian nationalists. 25X1

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The Nuclear Industry Responds

The nuclear industry's response to the challenge in the Ukraine was delivered in several interviews published in the Ukrainian press during February 1988. The industry's specialists offered some compromises: they indicated that proposed sites for new nuclear power plants located along the Dnepr water basin would be abandoned as the critics wanted. They also promised to work with republic and local authorities to find a new, more acceptable location for the Khar'kov plant. 25X1

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On other issues the nuclear industry yielded little to the critics. Industry officials stated that the Crimean plant would proceed as planned despite the opposition. The officials defended their plans for the Chigirin plant, but agreed to stop the project on the condition that capacity equivalent to the amount planned for Chigirin be added—against the critics wishes—to the Rovno, Khmel'nitskiy, and South Ukraine nuclear power projects. 25X1

Now that the nuclear industry has responded to its critics in the Ukraine, the next move is up to the latter. They could agree to work with the industry through local and republic authorities on the agenda 25X1

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that the industry left open for negotiation. Or the critics could return to their demands for limits on nuclear energy in the Ukraine. In the latter case, critics could hope to block the nuclear industry's plans with support from local or republic party members, or organize more public petitions or even demonstrations.

Outside the Ukraine, industry managers continue to defend the overall safety of the nuclear program but have offered little rebuttal to calls for suspending or canceling construction of plants. They may have decided that resisting public opposition to new plants in earthquake-prone areas of Armenia and Krasnodar Kray could provoke a basic challenge to the safety of the nuclear plants themselves. Such a challenge would almost certainly question the integrity of the existing nuclear power plant in Armenia and possibly invite a general review of the technical qualifications of many other, older nuclear plants. Nuclear industry officials have not publicly acknowledged the opposition to operation of the Leningrad and Ignalina plants. These facilities appear to be continuing normal operations.

A new approach to the safety issue now gaining support in the nuclear industry is the development of reactors that are, by design, inherently safe. A prototype of one class of inherently safe reactors—a high-temperature, gas-cooled reactor (HTGR)—appears to be under construction near Zagorsk. Soviet plans call for construction of two more HTGR reactors by the mid-1990s.

Bureaucracies Battle for Position

Various bureaucracies in the nuclear program and some unrelated agencies and individuals are using the debate over nuclear energy to advance their own interests. These bureaucrats are endorsing existing criticisms of nuclear energy or formulating their own objections in the hope that adjustments in the nuclear program will mean that resources will be directed to support their projects. From this perspective, the current criticism reflects the latest round in a bureaucratic battle for a decisive voice in the nuclear power program. Within the Soviet nuclear industry a variety of institutional viewpoints hold sway.

The Ministry of Atomic Energy, the State Committee for Safety in the Atomic Power Industry, the State Committee for the Utilization of Atomic Energy, and the Ministry of Power and Electrification have varying positions regarding different reactor types and enforcement of safety regulations and promote their own research and development agenda. The cancellations, suspensions, and criticisms of nuclear projects have focused attention on the failings of the whole project planning process and will probably result in bureaucratic casualties and possibly boost the influence of Soviet nuclear safety specialists. 25X1

One bureaucracy that lost in the post-Chernobyl' reorganization of the nuclear industry—the Ministry of Power and Electrification—has been singled out in several of the recent criticisms of nuclear plants. Responsibility for operation of nuclear power plants was taken away from this Ministry after the Chernobyl' accident and transferred to the newly created Ministry of Atomic Energy. The remaining authority of the Ministry of Power and Electrification over the planning, design, and construction of nuclear projects is now jeopardized. The Ministry of Atomic Energy could eventually be assigned all these functions for nuclear projects, leaving the Ministry of Power and Electrification with responsibility for only hydroelectric and fossil-fueled power plants. In the recent challenges, backers of RBMKs, such as the State Committee for the Utilization of Atomic Energy, also lost more of their shrinking share of the nuclear program. By the late 1990s, the last of the RBMKs will have been built. 25X1

A bureaucracy that may now gain influence is the State Committee for Nuclear Safety. Founded in 1983 to centralize authority for quality control in the nuclear industry, this committee has been fighting for independence. Although it has the final word on whether nuclear plants and their components are in compliance with Soviet safety regulations, the committee has been repeatedly thwarted by nuclear plant builders. It has been chronically short handed, and its efforts at safety enforcement have often been blocked by appeals to higher authority. Nevertheless, with vigorous hiring and training to bring the staff up to

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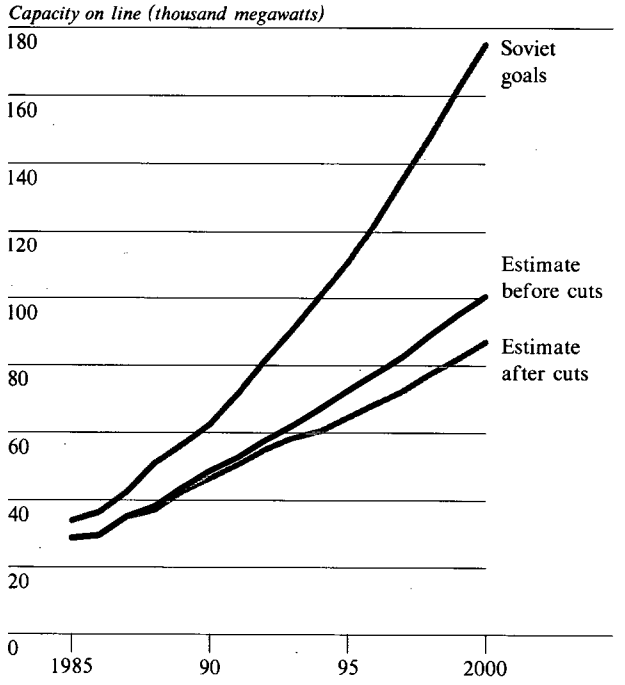
strength and support from above to enable the inspectors to enforce regulations, the nuclear industry could look to the safety committee to put objectivity into criticism of the nuclear program and to help win back public confidence.

Public concern about nuclear energy also will be expressed through other agencies. For example, the appointment of Fyodor Morgun—a champion of environmental protection—to the State Committee for Environmental Protection, formed in January 1988, may give teeth to the new body.[3] Morgun can be expected to lead the campaign against the Soviet Union's mounting environmental problems, probably putting greater emphasis on ecological balance, land and water conservation, and public concerns in planning nuclear projects.

A deputy director of the Center of International Projects, has said the State Committee for Environmental Protection was designed in part to dislodge and attack the conservative faction within the environmental industry. If true, Vladimir Dolgikh, the party secretary for energy and heavy industry, may be under pressure to resign. A Brezhnev appointee, he has long been co-opted by the nuclear industry and is the protector of its status quo. Although he managed to hold on to his job after the Chernobyl' nuclear accident in April 1986 while many lower level officials were removed, in the wake of growing antinuclear protest he again may be in a precarious position.

Figure 2
USSR: Impact of Cuts on Nuclear Program



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Economic Costs

The challenges to nuclear power have serious but not as yet critical economic costs (see figure 2). Despite the unprecedented criticism, the industry's ability to meet current goals is not in serious trouble—new nuclear power plants are coming on line, electricity output from this source is growing, and critics have not shut down any operating power plants. About one-third of the 850 million rubles invested in the disrupted nuclear projects could be reclaimed as other industrial projects are built at the abandoned sites or equipment is transferred from canceled plants to those still under construction.

Replacement projects have already been proposed for some of those canceled, but the Ministry of Power and Electrification will need to act much more quickly

[3] This new "super" environmental committee—which presently consists only of Morgun, his newly identified deputy Valentin Sokolovskiy, and a secretary, according to Moscow Embassy sources—could excercise broad responsibilities, having both regulatory and enforcement powers. According to the deputy director of the Center of International Projects, the new committee would have a direct impact on state construction committee projects—which could include the design of nuclear power plants—subjecting them to environmental review.

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than usual on the proposals if a tightening of electricity supplies in the mid-to-late 1990s is to be avoided. Quick action on the replacement of nuclear capacity with fossil-fueled capacity would minimize power disruptions, but current Soviet energy policy calls for substitution of nuclear power for fossil fuels.[4]

The cost of a major disruption to the nuclear program—severe cuts in plans for new plants or lengthy safety-related shutdowns of most of the 45 operating reactors—would be a sizable shock to the Soviet economy and nearly a knockout blow to the Ukraine. In 1987, electricity from nuclear power plants contributed about 2.5 percent of total Soviet energy output and 11 percent of the USSR's electricity. If the industry were able to operate in a business-as-usual climate, nuclear energy would become even more important. We estimate that by 1990 the nuclear share of total energy output would grow to about 3.5 percent, and electricity from nuclear plants would provide nearly 15 percent of the country's power production. In the Ukraine last year, nuclear energy supplied over 9 percent of the electricity generated. The Ukrainian press noted that nuclear power plants accounted for all of the increase in power output during 1987.

Other Projects That Could Draw Criticism

The spate of nuclear project setbacks indicates that *glasnost* is having a major impact on nuclear energy policymaking. The policy of openness has made it acceptable to criticize not only the execution of plans but also the plan itself. The Chernobyl' accident damaged the credibility of nuclear experts and drew the public's attention to the shortcomings of the program. Soviet energy planners may hope to limit project reviews to those few that are now drawing fire, but this is unlikely because the technical merit and public acceptance of a number of other nuclear projects are now questionable.

[4] The projects that were cut or put on hold represent 25,315 megawatts of capacity, about 20 percent of all nuclear power plant capacity scheduled to be built by the year 2000.

Thus far, criticism has been aimed at four of the five nuclear heating plants currently under construction. Only the facility located in Voronezh has escaped public criticism.[5] It now appears that plans for the late 1990s are in question—nuclear power is scheduled to supply both electricity and heat to about 20 cities. Most if not all planned nuclear heating facilities will be held up or even abandoned if public confidence in nuclear energy is not restored. 25X1

Another target for critics could be the older model VVER-440s operating in Kola and Novovoronezhskiy that do not have emergency core cooling systems and containment structures. Modifying these plants to bring them into compliance with current Soviet (and worldwide) safety standards would mean long downtime and require spending nearly as much as originally invested in the reactors. Given the cost of these fixes, the option of permanently shutting down the reactors may gain support. If the safety of the older VVER-440s becomes an issue in the USSR, East Europeans could face the same tough choices. Ten reactors of this type are currently in operation there. 25X1

Since the choice of location for nuclear projects has begun to be successfully challenged, planners can probably expect further difficulty at several proposed sites. In the Georgian Republic, for example, resistance to nuclear projects received the backing of local party officials long before opposition of this sort was viewed leniently in Moscow. Therefore, plans for a nuclear power plant to be built in that republic will probably be thoroughly scrutinized. Similar local opposition is likely to be directed at proposed nuclear power plants in Azerbaijan, Belorussia, the Crimea, and the Tatar Autonomous Republic. 25X1

The remaining seven RBMKs now under construction will continue to be the focus of attention for Soviet safety specialists and public critics. 25X1

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These reactors are less than 50-percent complete; stopping construction now would improve prospects for recovering most of the investment.

Some of the problems at Soviet nuclear power plants built in the 1970s are so serious that even a complete overhaul would not significantly improve overall safety. The detailed technical data necessary for critics to reach such a conclusion is available—but apparently not yet exploited—in the Soviet technical literature. A close reading of this literature could lead critics outside the nuclear program to question:

- The quality of workmanship and materials used in nuclear plants—particularly those in the reactor. The steel, for example, could become brittle after years of operation and may fracture under certain stresses.
- The ability of nuclear plants to survive or function safely in even a minor fire.
- The willingness of the nuclear industry to modify or retrofit existing reactors to bring them into compliance with the latest changes in Soviet regulations on nuclear safety.

Long-Run Implications for Nuclear Power

Soviet planners have reason to be concerned about the future of nuclear power. The industry's managers have been put on the defensive, handicapping the planning and construction of projects for the 1990s. The situation could get worse for the nuclear energy industry because the clash between critics and advocates is not resolved. Critics could broaden their attacks to include many of the facilities on the drawing board and plants already in operation. We have identified 19 additional facilities that are vulnerable to criticism—some 5 percent of current operating capacity and 30 percent of the projects scheduled for construction by the year 2000.

We believe a large-scale cancellation is unlikely on several counts. Only a few operating nuclear power plants have been seriously challenged. Moreover, many of the influential critics—like Andrey Sakharov, who has published on this issue in *Moscow News*—still apparently share the conviction that nuclear safety can be improved and nuclear power is necessary for the USSR. Even in their attacks on shortcomings in the program, the critics exempted certain projects. Somewhat surprisingly the 8,000-megawatt Zaporozh'ye plant in the Ukraine—destined to be the largest facility of its kind in the USSR—has not yet been mentioned in the objections to other projects.

Moscow will probably balk if the loss of nuclear power is deemed too damaging to goals for energy supply or if the cost of safety improvements is judged too high. Improving the safety and reliability of nuclear power plants will not be cheap, but neither will heavier reliance on fossil fuels. The latter would require massive new investments if the energy sector had to continue meeting domestic demand and export commitments without a significant contribution from nuclear energy. Moscow is more likely to yield to the antinuclear arguments so long as the major energy-producing industries—oil, natural gas, and coal—continue to expand. During 1986-87 energy output grew at a robust annual average of 3.7 percent. Any faltering in the performance of the energy sector is likely to stiffen resistance to proposed changes in the largely successful nuclear power program.

The central authorities might move in one of several directions without giving in to the maximum demands of the critics:

- They could deprive critics of media access and throw their weight solidly behind nuclear energy. By doing so, they would severely restrict the critics' ability to influence policy.
- They could attack critics for "bourgeois nationalism" that places local interests ahead of Soviet Union interests. Such an attack, in fact, coincided with the ouster of Ukrainian party boss Petr Shelest in 1972 for being too soft on nationalism.

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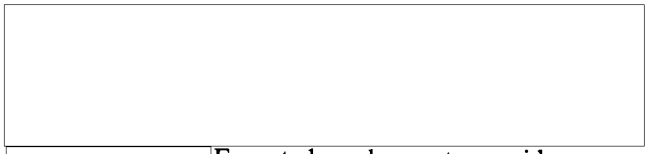
Given current political and economic realities, however, a conciliatory approach seems the most likely. It would be acceptable to moderate critics—like Sakharov—and would accord well with Gorbachev's policies of *glasnost* and greater public involvement in decisionmaking.



Experts have begun to consider new designs for nuclear heating plants that could be built farther from cities.

While the regime will be inclined to compromise so long as the energy balance remains generally adequate, the industry has some powerful allies in its struggle with its critics. The demand to stop all nuclear projects in the Ukraine would be opposed by several economically important groups that would be affected by the electricity shortages likely to occur in the wake of cancellations. For economic planners and managers in much of European USSR, loss of nuclear energy would mean economic setbacks, trouble with East European countries over voided contracts for sales of electricity, and environmental questions about the impact of energy sources needed to fuel power plants built to replace nuclear projects.

It could provoke a strong response from the industries supporting the nuclear program, particularly in the Ukraine. Planning, building, operating, and supplying nuclear power plants is a major industry in the republic. About 100,000 people are directly employed by the nuclear industry in eight of the republic's 25 oblasts, and probably several times that number of workers are in supporting industries. The Ukrainian nuclear industry has already demonstrated its political clout in a successful competition with the highly respected Leningrad Metallurgical Plant over the supply of turbines to all Soviet nuclear power plants. The nuclear industry is likely to use these political connections to oppose further project cuts called for by the industry's critics.

A key element in the balance between critics and advocates of nuclear energy remains unknown—the ultimate political strength of the critics. The political power of Western antinuclear lobbies has, in large measure, derived from open access to the media and the ability to focus public pressure—including the threat of removal from office—on key politicians. These groups have made an issue of the safety and cost of nuclear energy in local, regional, and national political arenas. 25X1 25X1 25X1

Unlike their Western counterparts, Soviet antinuclear critics face clear constraints on media access and have no direct way to affect the careers of party bosses who ignore their complaints about nuclear energy. Critics complained that a recent television program on nuclear power made them appear extremist or naive and easily dismissed by industry spokesman. Critics have not gotten their arguments to a nationwide audience in most cases. Media coverage of the Armenian antinuclear group, for example, did not reach the central press until recently. 25X1 25X1 25X1

However, as experience with antinuclear movements in other countries shows, the consensus that nuclear energy is a safe, reliable, and cost-effective energy source can disappear. Nuclear industry managers could underestimate the local or regional opposition to construction of certain plants and try to ramrod a project through. If the groups opposing this project are politically well connected, the ensuing struggle could spread to other nuclear projects. Irritated regional authorities might use this pretext to call for investigations or inspections at a number of nuclear projects rather than just at the single plant that began the confrontation. 25X1 25X1

The radicalizing of critics within the industry would also compound problems. Currently, these critics are publicizing objections to nuclear plant designs or to construction flaws in a manner intended to reassure the public that safety considerations are getting increasing attention, apparently with the blessing, or at least acquiescence, of the industry authorities. Nuclear design engineers have debated plant shortcomings in limited-circulation technical journals. Similarly, articles by nuclear safety specialists that publicize problems in the construction of plants seldom claim that these mistakes undermine the safety of the facility. 25X1 25X1

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However, if designers and safety specialists were to make their objections known to the general public through the leading media, they could cause considerable difficulties for the industry's already tarnished image. If they used the opportunity to emphasize the safety impact and the continued resistance of the nuclear establishment to corrective action, the insiders would be making a radical break from their employers and would probably intensify resistance to use of nuclear energy. Valeriy Legasov, the first deputy director of the Kurchatov Institute and a key member of the Chernobyl' commission who recently commited suicide, made precisely these points in his "memoirs"—his term for his recollections of the Chernobyl' recovery and general commentary on the nuclear industry—excerpts of which were published recently in *Pravda*. While maintaining an obvious commitment to nuclear power, he pointed to a series of safety violations and a generally complacent attitude on the part of the Soviet nuclear industry. Citing Premier Ryzhkov, Legasov agreed that the Chernobyl' accident "was not pure chance and that the nuclear power industry had been moving toward this terrible event with a certain degree of inevitability" (see inset).

Outlook

Opposition to nuclear energy will have broad nationalist as well as economic implications for a number of Soviet republics. The Ukrainian antinuclear lobby has placed its view of the republic's interests—environmental and cultural—above the country's energy plans. This environmental nationalism could set a dangerous precedent, particularly if it succeeds in other regions—like the Baltic, Georgia, or Armenia—where environmental activism and nationalism are already linked. In the present atmosphere of rising nationalist tensions, the nuclear issue could provide a rallying point for ethnic discontent and fuel anti-Russian sentiment.

We expect the struggle between advocates and critics of nuclear energy to drag on for the next few years, perhaps becoming more intense if the more open

From Legasov's "Memoirs"

In his "memoirs," Valeriy Legasov described his growing awareness that, while "fundamentally little different from Western design," Soviet nuclear industry equipment "lacked good control and diagnostic systems":

- *Recalling the Chernobyl' accident, he complained: "We now know that the reactor protection control system was defective, and proposals were made on how to eliminate this defect . . . the designer was in no hurry to change the system. What happened at the Chernobyl' power station itself had been going on for a number of years: experiments were drawn up and carried out in an extremely negligent and untidy way . . . there were no dry runs before the experiment was conducted. Station personnel could independently carry out some actions not sanctioned by professionals—representatives of the State Committee for the Supervision of Safe Working Practices of the Atomic Power Industry were present at the Chernobyl' station but were not aware of the experiment being conducted or of the program. No attention was paid to the state of the instruments or the state of equipment before it was time for planned preventive maintenance."* 25X1

- *He particularly bemoaned the attitude of some of the professionals and nuclear plant operators who believed a nuclear reactor was only a "samovar." "There grew up a generation of engineers who were skilled at their own work but did not perceive in a critical fashion the very apparatuses and systems ensuring their safety. . . . There was no possible way to organize serious, objective scientific analysis of the real situation, identify the entire sequence of events, analyze all the possible problems, and find the way to eliminate them."* 25X1

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atmosphere of *glasnost* continues unabated. Several interrelated factors will play an important role in determining the course of this debate:

- The level of nationalist unrest, and the regime's reaction to it, will be a key factor. Many nuclear power plants are located in non-Russian areas and the regime is becoming increasingly sensitive to public opinion and the potential for unrest. If critics can organize a broad-based coalition of officials and experts and avoid appearing extremist in their demands, they will be more difficult to ignore. If nationalist unrest escalates uncontrollably, however, the regime will crack down hard—even on moderate critics like most of those involved in the antinuclear movement.

- Gorbachev's political efforts to press restructuring and democratize the party and public life will also have an indirect, but important, bearing on the outcome. Reforms being proposed for the 19th Party Conference could result in a party and government structure more responsive to public demands, particularly on environmental issues. A law that went into effect in January has already given the public the right to hold referendums on major economic projects. If Gorbachev's reforms are blocked or slowed by a mounting conservative opposition, however, representatives of the nuclear power industry and local officials distrustful of the critics will be encouraged to resist the demands.

- There is a battle for power in progress among the various bureaucracies in the nuclear program, and the victor will have an effect on the nuclear industry. If the bureaucracy concerned with safety—such as the Committee for Nuclear Safety—gains influence and independence, concerns of the critics will probably gain a more sympathetic hearing.

- A final, unpredictable factor, might be the industry's safety record. If the industry succeeds in establishing credibility on the safety issue and takes the steps critics consider necessary to address their concerns, opposition will decline rapidly. However, if there is another major accident—involving damage to the ecology or loss of life—or even a pattern of repeated safety shortcomings, critics may gain increased support and perhaps even induce some technical experts—who are aware of major construction or design shortcomings—to join the antinuclear coalition. 25X1

On balance, we believe the regime will pursue a policy of compromise between the critics and the industry, given the current political and economic situation. The regime already appears to be moving in this direction by shelving the most sensitive or controversial projects while trying to upgrade safety and maintain an overall commitment to the need for nuclear power:

- Very few operating plants are likely to be closed because this would cause a myriad of problems to Moscow's energy plans and raise serious questions about the reactors the USSR has delivered to its allies and sold elsewhere.

- Nor is a forceful crackdown on the critics likely, as this would fly in the face of *glasnost* and strengthen nationalist as well as environmental opposition. 25X1

Decisions taken in the next few years will be critical for nuclear power in the 1990s and beyond. Energy planners are now starting to frame the next five-year plan, and will need to have high-level guidance on how much to allocate to new construction and safety upgrades and on how much to rely on fossil fuels and conservation. Moreover, by 1995, the impact of projects already canceled will be felt. Without a strong commitment from the top or steps to win over or mollify critics, the nuclear power industry may be in for the rockiest time in its existence. 25X1

Certainly another nuclear accident sufficiently serious to cause loss of life, many injuries, or trigger evacuation of nearby communities would support the demands of critics for a sharply curtailed nuclear energy program. As long as the Soviets continue to operate their older VVER reactors such an accident is possible.[6] 25X1

[6] Recent studies conducted in the United States suggest that, although the risk of a major accident is low, the probability of one occuring at some older Soviet reactors is as much as 1,000 times greater than at nuclear plants located in the West. 25X1 25X1

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