

Russia Nuclear Power Development Chronology

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Last update: January 2008

This annotated chronology is based on the data sources that follow each entry. Public sources often provide conflicting information on classified military programs. In some cases we are unable to resolve these discrepancies, in others we have deliberately refrained from doing so to highlight the potential influence of false or misleading information as it appeared over time. In many cases, we are unable to independently verify claims. Hence in reviewing this chronology, readers should take into account the credibility of the sources employed here.

Inclusion in this chronology does not necessarily indicate that a particular development is of direct or indirect proliferation significance. Some entries provide international or domestic context for technological development and national policymaking. Moreover, some entries may refer to developments with positive consequences for nonproliferation.

2004

16 January 2004

GOSATOMNADZOR EXTENDS NPP SERVICE LIVES

On 16 January 2004, Interfax reported that Rosenergoatom had received a license from Gosatomnadzor to extend the service life of Bilibino NPP Unit 1 for a year. In 2001-2002, licenses were issued to extend the service lives of Novovoronezh NPP Units 3 and 4, and in 2003 a similar license was issued to Unit 1 at Kola NPP. As of January 2004, work was under way to upgrade the equipment at Leningrad NPP Unit 1 and Kola NPP Unit 2. Requests to extend the service lives of both units will be submitted to Gosatomnadzor in 2004.

- "Gosatomnadzor prodлил ekspluatatsiyu 1-go bloka Bilibinskoy AES na god," Interfax, 16 January 2004.

19 January 2004

NEW VK-300 REACTOR TO BE BUILT FOR ARKHANGELSK NPP

According to a 19 January 2004 Interfax report, Rosenergoatom will send a request to Gosatomnadzor in 2004 to obtain a license to build a new VK-300 reactor in Arkhangelsk oblast. The agreement to build the new Arkhangelsk NPP was signed in late November 2001. According to Rosenergoatom, the 20 billion rubles (about \$695 million as of 19 January 2004) NPP construction project will begin in 2-3 years, and the NPP will be put into operation after 2010. In 2004, the decision will be made on a final NPP construction site. The new Arkhangelsk NPP will operate on four reactors with the total power of 1,200 MW and provide three major cities in the region (Arkhangelsk, Severodvinsk, and Novodvinsk) with power. For earlier information on the Arkhangelsk NPP see the 5/8/2002 entry, below.

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-"Rosenergoatom napravit v Gosatomnadzor zayavku na provedeniye proyektnykh rabot po novomu reaktoru dlya Arkhangelskoy ATETs," Interfax, 19 January 2004.

2 February 2004

27 NPP SAFETY PROJECTS TO BE IMPLEMENTED BY ROSENERGOATOM AND FRAMATOM IN 2004

On 2 February 2004, Interfax reported that Rosenergoatom and France's Framatom plan to implement 27 projects in 2004, at a cost of several million Euro, to increase NPP safety.[1] In 2003, Rosenergoatom implemented \$17 million in international projects.[2] Another measure to increase NPP safety involves a December 2004 agreement between the Ministry of Justice and Ministry of Defense aimed at creating a special task force to protect NPPs.[3] Despite these measures, according to Gosatomnadzor the level of physical protection of NPPs is unsatisfactory. In 2003, the 299 inspections at NPPs revealed 175 violations. In 2002, 324 violations were discovered during 256 inspections.[4]

Sources:

[1] Rosenergoatom i Framatom v 2004 godu realizuyut 27 proyektov po povysheniyu bezopasnosti rossiyskikh AES," Interfax, 2 February 2004.

[2] "Rosenergoatom v 2003 godu realizoval 25 mezhdunarodnykh proyektov po yadernoy bezopasnosti na \$17 mln." Interfax, 13 February 2004.

[3] Sergey Ovsiyenko, "V dekabre etogo goda budet sozdano spetspodrazdeleniye po okhrane rossiyskikh AES," ITAR-TASS, 28 November 2003; in *Yadernyy Kontrol*, No. 44, 26 November - 3 December, 2003.

[4] "Gosatomnadzor priznayet neudovletvoritelnoy fizicheskuyu zashchitu yadernykh obektov v Rossii," Interfax, 27 February 2004.

19 March 2004

BILIBINO NPP TO RECEIVE 15 YEAR LIFETIME EXTENSION

The service lifetime of Bilibino NPP was recently extended for 15 additional years. Reportedly, this is the final extension, after which the plant should be taken out of operation. Rosenergoatom will reportedly cover the plant's operational expenses, including \$20 million for plant safety as well as equipment replacement. Rosenergoatom will also receive assistance in the sum of \$700,000 from the Russian federal program "Nuclear and radiation safety of Russia."

-"Lifetime of Bilibino NPP extended for 15 years more," *Bellona*, www.bellona.no, 19 March 2003.

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2003

28 January 2003

ROSENERGOATOM INVESTMENTS TO TOTAL ABOUT \$692 MILLION IN 2003

On 28 January 2003, Interfax reported that Rosenergoatom's total investment in 2003 will total 22.2 billion rubles (about \$692 million as of 28 January 2003). According to Rosenergoatom Director General Oleg Sarayev, initial plans called for an investment of 30.7 billion rubles (nearly \$966 million). However, this amount was but by the

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Federal Energy Commission. Rosenergoatom plans to complete the construction of Kalinin NPP Unit 3 in 2003. According to Mikhail Rogov, assistant to the Rosenergoatom director general, 11 billion rubles (about \$346 million) of the total investment have been already reserved for this project. In addition, plans call for upgrading Unit 1 at Leningrad NPP, which has an uranium-graphite reactor, as well as two reactors at Kola NPP. Rosenergoatom also plans to put new generating facilities into operation.

- "Investitsiyi Rosenergoatoma v 2003 godu sostavit 22,2 mlrd rubley," Interfax, 28 January 2003.

February 2003

NPP CONSTRUCTION IN TATARSTAN DISCUSSED

According to the February 2003 issue of *Atompressa*, the Tatarstan government is considering the resumption of NPP construction in the village of Kamskiye Polyany. A decision will be made after the conclusion of a geological assessment, which must show that there are no tectonic fractures under the construction site if the project is to move forward. This assessment can be conducted only with the permission of Tatarstan's parliament. Tatarstan Prime Minister Rustam Minnikhanov believes that an NPP would allow the republic to eliminate its power deficit and solve social problems. Kamskiye Polyany was specifically built for the future NPP. As of December 2002, its population is 16,000 people, and unemployment rate is 6.7%.

NPP construction originally began in 1985. It was halted in 1989 due to pressure from the public and the scientific community, who opposed building the NPP in the area after prospecting revealed limestone cavern breaks under the site. NPP facilities were therefore mothballed. Unit 1 was 70% complete at the time.

- "Budet li AES v Tatarstane," *Atompressa*, No. 7 (534), February 2003; "Vlasti Tatarstana izuchayut vozmozhnost dostroyki AES v poselke Kamskiye Polyany," Interfax, 9 December 2002; "Tatarstan Media Highlights 1-4 Dec." in FBIS Document CEP20021208000035, 4 December 2002.

5 February 2003

ROSENERGOATOM LIKELY TO DECLINE EUROPEAN COMMISSION LOAN TO COMPLETE KURSK NPP UNIT 5

According to a 5 February 2003 Interfax report, Rosenergoatom most likely will decline the offer of a European Commission loan to finish the construction of Kursk NPP Unit 5. NPP experts estimate roughly \$200 million is needed to complete Unit 5, which is 85% complete. According to Interfax, construction of this type of reactor usually costs about \$1 billion. The reason Russia's nuclear company intends to decline to accept the loan is the European Commission's condition that old Russian RBMK-type power reactors be shut down in return for the loan. According to Rosenergoatom, all operating RBMK reactors have Gosatomnadzor licenses, and do not need to be closed. As of February 2003, 11 of Russia's 30 operating power reactors were RBMK reactors.

- "'Rosenergoatom' ne ustrayayut usloviya kredita Evrokommisii na dostroyku bloka Kurskoy AES," Interfax, 5 February 2003.

20 February 2003

RUSSIAN NPP SAFETY IMPROVED IN 2002

According to Gosatomnadzor Director Yuriy Vishnevsky in a 20 February 2003 Interfax report, radiation safety in Russia in 2002 showed improvement over 2001. In 2002, Gosatomnadzor conducted 11,449 on-site inspections, resulting in 12,294 citations; 157 violations were not eliminated by set deadlines. In 2002, Gosatomnadzor

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withdrew two licenses (as compared to nine in 2001), suspended 47 licenses (29 in 2001), issued 53 warnings to officials (137 in 2001), fined 44 officials in the amount of 57,960 rubles (about \$1,800 as of 20 February 2003) and 13 organizations in the amount of 420,000 rubles (over \$13,300), and submitted seven documents to investigative agencies, two of which are currently under consideration. According to a 2002 Gosatomnadzor report, 2,647 inspections were carried out at Russian NPPs. There were 41 accidents registered at NPPs in 2002, which is 18 accidents less than in 2001.

According to Nikolay Sorokin, Rosenergoatom technical director, one third of the NPP accidents were the fault of NPP personnel. In 2001, Russia was third after Japan and Germany in the number of emergency shutdowns per reactor. In 2002, the number of shutdowns decreased by almost five times and accounted for 0.4 shutdowns per reactor. Furthermore, the number of accidents not related to safety went down from 67 in 2001 to 38 in 2002. The number of accidents at research reactors in 2002 totaled 41. According to Gosatomnadzor, automatic protection systems went off 12 times in 2002. All accidents were of a zero level on the INES scale. An accident at Bilibino NPP in August 2002, when the Unit 2 reactor was stopped when a fuel element lost its air-tightness, was rated INES 1. Most of the accidents were registered at Leningrad (8) and Kursk (7) NPPs. The radiation exposure of NPP personnel also decreased. There were no cases of high radiation exposures registered among NPP personnel in 2002. Minatom Security and Emergency Situations Department Head Aleksandr Agapov also mentioned a dramatic decrease in the pollution level at sites near nuclear plants. The amount of the discharged contaminated wastewater in 2002 was only 3.1% of the amount registered in 2001.

- "Gosatomnadzor zayavlyayet ob uluchshenii sostoyaniya radiatsionnoy bezopasnosti v RF," Interfax, 20 February 2003; "Oshibki personala sostavlyayut okolo treti narusheniy na AES, sooruzhenykh po sovetским proyektam," Interfax, 19 February 2003 "V 2002 godu na rossiyskikh AES bylo zafiksirovano 38 narusheniy - Minatom," Interfax, 27 November 2003; R. Serebrennikov, ITAR-TASS, 5 March 2003 in "Rossiya. Opasnosti povtoreniya chernobylskoy katastrophy na AES Rossii net," Bulletin po atomnoy energii, May 2003.

14 March 2003

KOLA NPP SAFETY UPDATE

According to the Kola NPP press service, 160 projects to increase the safety of the NPP were implemented in 1989-2002, at a cost of roughly \$195 million. Nearly \$34 million was provided by the European Bank for Reconstruction and Development (EBRD), TACIS, the United States, Finland, and Sweden. Norway contributed over \$8 million. Earlier, in November 2002, Murmansk Oblast and the Norwegian province of Finnmark signed an agreement on reconstructing the Radon radioactive waste storage facility. The project will cost Nkr 8 million (about \$1.1 million as of 14 March 2003).

- "Norvezhskiy deputaty otsenivali uroven bezopasnosti Kolskoy AES," Interfax, 14 March 2003; "A zori i pravda zdes tikhiye," Rossiyskaya Federatsiya *Segodnya*, 12 May 2003 in Integrum Techno, <http://integrum.ru>.

17 March 2003

\$8 MILLION INVESTED BY NORWAY IN KOLA NPP SAFETY

On 17 March 2003, Interfax reported that according to Rosenergoatom, Russia and Norway had implemented 29 projects worth a total of \$8 million during 1989-2002 at the Kola NPP. The projects were aimed at enhancing facility safety. Another ten projects are currently under way. On 13 March 2003, the Kola NPP was visited by a

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delegation from the Norwegian Parliamentary Standing Committee on Energy and the Environment, which provided NPP staff with free technical assistance to enhance safety and protect the Barents Sea from pollution.

- "Russia, Norway invested over \$8 mln in safety enhancement at nuclear plant," Interfax, 17 March 2003.

June 2003

RUSSIAN GOVERNMENT RESOLUTION TO BUILD MORE POWER REACTORS DEEMED LEGAL

On 3 April 2003, the Byuro Pravovoy Informatsii information agency reported that the Russian Supreme Court's board of cassation had upheld a court decision dismissing a case brought by Greenpeace against the 29 December 2001 decision of the Russian government to increase the number of nuclear power reactors from 16 to 50 under the federally targeted program "Energy Efficient Economy." Greenpeace had argued that the increase in the number of power reactors could damage Russian national security. Greenpeace also stated that according to Article No. 8 of the law On the Use of Energy, the development of targeted programs for energy is within the competence of the Federal Assembly and not the Russian government. Furthermore, such legal acts should undergo an environmental assessment according to Article No. 11 of the law On Environmental Assessment. Representatives from Minatom, the Ministry of Nature and the Ministry of Economic Development argued that the resolution had been adopted according to the 1998 federally targeted program, which had received a positive assessment from environmental specialists and permits the construction of new power facilities.

- "Rossiya. Postanovleniye pravitelstva ob uvelichenii kolichestva yadernykh reaktorov zakonno," IA Byuro pravovoy informatsii, 3 April 2003 in Byulleten po atomnoy energii, June 2003; ne 2003 issue of Byulleten po atomnoy energii reported that physicists from Rostov State University had joined a research group at Volgodonsk NPP. At the result of the joint work, a portable diagnostic vibration-measuring unit was developed and employed at the NPP. This is the first time that the NPP's thermal circuits, which ensure the reactor's stability and safety, have been thoroughly tested. The new tool will allow NPP personnel to analyze corrosion and detect flaws before it is too late to repair them without shutting down the NPP; -G. Belotserkovskiy, "Rossiya. Teper AES rzha ne sest," Parlamentskaya gazeta, 2 April 2003 in Byulleten po atomnoy energii, June 2003.

11 June 2003

MINATOM TO BUILD NOVovorONEZH NPP UNIT 6

According to Russian Minister of Atomic Energy Alexander Rumyantsev, Novovoronezh NPP Unit 6 will be built, reported Interfax on 11 July 2003. Rumyantsev added that the reactor project had been prepared, the license for reactor construction had been issued, and the only remaining hurdle was obtaining the necessary funding. As of July 2003, the cost of Unit 6 construction was estimated at \$1-1.2 billion. According to Rumyantsev, Rosenergoatom and the Voronezhskaya Oblast administration plan to request that the Russian government assist in financing construction of the reactor.

- "Minatom rasschityvayet postroit shestoy energoblok Novovoronezhskoy AES," Interfax, 11 July 2003.

11 June 2003

VORONEZHSKAYA NPP NOT TO BE COMPLETED

According to Russian Minister of Atomic Energy Alexander Rumyantsev in a 11 July 2003 Interfax report, Voronezhskaya NPP will not be completed because it is cheaper to build a new NPP at a new site. Construction of

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Voronezhskaya NPP began in the late 1980s. A 1990 referendum resulted in the mothballing of the NPP.
-"Minatom rasschityvayet postroit shestoy energoblok Novovoronezhskoy AES," Interfax, 11 July 2003.

17 June 2003

ROSENERGOATOM BUILDS SATELLITE COMMUNICATION SYSTEM TO INCREASE NPP SAFETY

On 17 June 2003, Interfax reported that Rosenergoatom is building its own satellite communication system to increase the safety of Russian NPPs. The system will allow the constant monitoring of NPPs. The Central Satellite Communication Station is located at the Rosenergoatom Crisis Center, while satellite communication stations have been built at nine of ten existing NPPs (Novovoronezh, Balakovo, Kalinin, Smolensk, Kursk, Beloyarsk, Kola, Volgodonsk, and Leningrad). These stations still have to receive operating licenses, a procedure that was underway as of June 2003. Plans call for construction of a similar station at Bilibino NPP by 2004 and the upgrading of NPP telephone data terminal equipment. At present, Bilibino NPP is connected through several types of communication equipment: tropospheric, satellite (with the use of low-altitude satellites), and wire, which cannot be used for data transmission or holding video conferences.

-"Rosenergoatom razvivayet sistemu sputnikovoy svyazi dlya povysheniya urovnya bezopasnosti AES," Interfax, 17 June 2003.

26 June 2003

NPP CONSTRUCTION AT ENERGY COMPANY EXPENSE UNLIKELY

According to a 26 June 2003 Interfax report, the Russian Ministry of Economic Development and Trade has deemed Minatom's proposal to withhold payment of dividends to the Unified Energy System (RAO YeES Rossii), and use the released funds to pay for NPP and other state construction projects, imprudent. First Deputy Minister of Economic Development and Trade Andrey Sharonov said that he believes that any joint stock company that does not pay dividends will cause its decapitalization, making it unattractive to shareholders and potential investors.

-"Minekonomrazvitiya schitayet netselesoobraznym dostrivat AES za schet sredstv RAO YeES," Interfax, 26 June 2003.

22 July 2003

ROSENERGOATOM TO INVEST NEARLY \$2 BILLION IN CONSTRUCTION OF BALAKOVO NPP UNITS 5 AND 6

On 22 July 2003, Interfax reported that Rosenergoatom will invest nearly \$2 billion in the construction of VVER-1,000 reactors at Balakovo NPP Units 5 and 6. Up to 10% of the promised funds will be spent on developing infrastructure and social services for the nearby residential area. The beginning of Unit 5 construction is planned for 2004. It is scheduled to begin operations in 2008. Unit 6 is scheduled to be put into operation in 2010.

-"Rosenergoatom' vlozhit v sooruzheniye vtoroy ocheredi Balakovskoy AES 58 mlrd. rubley," Interfax, 22 July 2003.

4 August 2003

ROSENERGOATOM TO INVEST \$509.9 MILLION TO FINISH KALININ NPP UNIT 3

According to a 4 August 2003 Interfax report, Rosenergoatom plans call for investing 15.5 billion rubles (nearly \$510 million as of 4 August 2003) in 2002-2003 to complete the construction of the VVER-1,000 reactor at Kalinin NPP Unit 3. In 2002, 4.5 billion rubles were spent, while in 2003 more than 11 billion rubles are to be expended.

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Ten percent of the total investment will be on social services in the region, according to an agreement reached between Rosenergoatom, Minatom and the Tverskaya Oblast administration. Commencement of Unit 3 operation is planned for 6 December 2003, and connection to the regional energy system is planned for 2004.[1,2,3] Earlier, the NPP operation date was set for March 2003.[4] Unit 3 will operate on a new TBCA fuel, which will be loaded into the reactor at the end of 2003. Unlike other fuel assemblies, with service lives of 3-4 years, the new fuel will enable the unit to operate 4-5 years.[5,6] Unit 3, which is 90% complete, needs just over 100 million rubles (about \$3.2 million as of 26 March 2003) more to begin operations.[1,6]

Sources:

[1] "Rosenergoatom investiruyet v dostroyku 3-go energobloka Kalininskoy AES 15.5 mlrd. rubley," Interfax, 4 August 2003.

[2] "Ekologi dali polozhitelnoye zaklyucheniye na proyekt stroitelstva novogo bloka Kalininskoy AES," Interfax, 13 July 2003.

[3] "Energoblok No. 3 Kalininskoy AES budet pushchen v dekabre 2003 goda," Atom Pressa, No. 1-2 (528-529), January 2003.

[4] "New unit for Kalinin," *Nuclear Engineering International*, No. 576, Vol. 47, July 2002.

[5] "Minatom i administratsiya Tverskoy oblasti zaklyuchili soglasheniye o sotrudnichestve," Interfax, 16 July 2003.

[6] "Zagruzka topliva v novyy blok Kalininskoy AES mozhet proizoyti v kontse 2003 goda - Minatom," Interfax, 26 March 2003.

29 September 2003

ROSENERGOATOM TO PROVIDE MORE THAN \$131.1 MILLION BY 2005 FOR NPP SAFETY

According to a 29 September 2003 Interfax report, Rosenergoatom will allot more than 4 billion rubles (over \$131 million as of 29 September 2003) by 2005 to improve safety at Russian NPPs. This money will fund the upgrading of existing systems as well as the introduction of new technologies. In 2002, Rosenergoatom spent 2 billion rubles (about \$65.6 million) on its safety program.

- "Rosenergoatom do 2005 goda napravit boleye 4 mlrd rubley na sovershenstvovaniye sistem bezopasnosti AES," Interfax, 29 September 2003.

3 October 2003

ROSENERGOATOM TO ALLOCATE ABOUT \$197 MILLION IN 2004 FOR KURSK NPP UNIT 5 CONSTRUCTION

On 3 October 2003, Interfax reported that Rosenergoatom plans to allocate 6 billion rubles (about \$197 million as of 3 October 2003) in 2004 to complete Unit 5 at Kursk NPP. Earlier, Minatom Deputy Minister Andrey Malyshev stated that only 1.5 billion rubles (about \$49.3 million), instead of the planned 5 billion rubles (about \$164.2 million) had been spent in 2003 on Unit 5. Malyshev also added that \$13 billion rubles (about \$426.9 million) would have to be invested in 2004 for Unit 5 to begin operating in 2006. For more information on Unit 5 see the 7/17/2003 entry, below.

- "Rosenergoatom v 2004 godu nameren vydedit na dostroyku 5-go energobloka Kurskoy AES 6 mlrd. rubley," Interfax, 3 October 2003.

22-29 October 2003

FRAMATOM TO BUILD LIQUID RADWASTE STORAGE FACILITY AT KURSK NPP

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On 27 October 2003, ITAR-TASS reported that France's Framatom would participate in building a liquid radioactive waste storage facility at Kursk NPP. Plans call for construction to be completed by 2005. The project must first be assessed by oversight agencies and obtain a license from Gosatomnadzor.

-German Solomatin, "Franko-germanskaya firma primet uchastiye v stroitelstve kompleksa khraneniya zhidkikh radioaktivnykh otkhodov na Kurskoy AES," ITAR-TASS, 27 October 2003; in *Yadernyy Kontrol*, No. 40, 22-29 October 2003.

4 November 2003

ROSENERGOATOM TO EQUIP RUSSIAN NPPs WITH RADWASTE PROCESSING UNITS BY 2007

On 4 November 2003, Interfax reported that Rosenergoatom plans to build radioactive waste processing units at all Russian NPPs by 2007. One unit has already been built at Balakovo NPP. Most are supposed to be built by 2004-2005, with the final one to be constructed at Beloyarsk NPP in 2007. Each NPP will have 5-7 such units to process different kinds of radioactive waste (liquid, solid, intermediate-level, high-level, etc.). The project is being implemented under a Rosenergoatom program aimed at enhancing the safety of nuclear fuel and radioactive waste treatment. About 8 billion rubles (nearly \$267 million as of 4 November 2003) are planned for this project in 2003 alone.

-"Rosenergoatom planiruyet k 2007 godu zavershit stroitelstvo na AES ustanovok po pererabotke radioaktivnykh otkhodov," Interfax, 4 November 2003.

8 December 2003

LARGE-SCALE CONSTRUCTION OF FAST NEUTRON REACTORS TO BEGIN AFTER 2030

In a 1 December 2003 interview with Interfax, Minatom Intergovernmental Cooperation and Information Policy Directorate Head Nikolay Shingarev stated that large-scale construction of fast neutron reactors would begin after 2030. Minatom First Deputy Minister Mikhail Solonin, however, said that the decision would depend on the financial resources of the electricity industry and the cost of uranium. In 2002, the cost of construction and technical maintenance for the BN-800 reactor was 400 million rubles (about \$13.5 million as of 8 December 2003), while in 2003 the cost reached 900 million rubles (about \$30.4 million). Plans call for allocating over 1 billion rubles (about \$33.8 million) for BN-800 in 2004; the reactor is supposed to be completed by 2010. As of January 2003, Beloyarsk NPP has one operating fast neutron reactor, the BN-600. Neither the BN-600 nor the BN-800 reactors are serial reactors. Shingarev also mentioned other fast neutron reactor projects, the Brest-300 and Brest-1200, that Russia has already developed.

-"Masshtabnoye stroitelstvo reaktorov na bystrykh neytronakh nachnetsya posle 2030 goda - Minatom RF," Interfax, 1 December 2003; "Minatom RF nameren postroit seriyyny reaktor na bystrykh neytronakh," Interfax, 8 December 2003.

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2002

29 January 2002

CONSTRUCTION OF BALAKOVSKAYA NPP UNITS 5 AND 6 TO GO AHEAD

On 29 January 2002 Interfax reported that a declaration on the installation of Balakovskaya NPP units 5 and 6, with a capacity of 2 million MW, had been signed. According to Deputy Minister of Atomic Energy Bulat Nigmatulin, about \$2 billion have already been invested in reactor construction at Kalininskaya, Kurskaya, Rostovskaya and Balakovskaya NPPs. Dmitriy Ayatskov, Governor of Saratov oblast, says that tens of millions of dollars are needed to complete these mothballed plants.

- "Podpisana deklaratsiya o vvode v ekspluatatsiyu vtoroy ocheredi Balakovskoy AES v Saratovskoy oblasti," Interfax, 29 January 2002.

13 February 2002

EUROPEAN COMMISSION PROMISES €10 MILLION FOR KOLA NPP

On 13 February 2002 Interfax reported that the European Commission was prepared to grant €10 million (\$8.8 million as of 2/13/2002) in order to continue construction of a facility to process liquid radioactive waste at the Kola nuclear power plant. The contract is due to be signed in March 2002 with the Finnish subcontractor Teollisuuden Voima Oy (TVO), and the complex is due to open in 2005.

- "EC To Grant Kola Nuclear Power Plant EUR 10 Mln," Interfax, 13 February 2002.

21 February 2002

KARELIYA PROTESTS DECISION TO BUILD NPP THERE

The inclusion of Kareliya in federal NPP construction plans has aroused indignation both from public organizations and the local government, Interfax reported on 21 February 2002. In December 2001 the Russian government adopted the decree "Introduction of Changes and Addendums to the Federal Energy-Efficient Economy Program for 2002-2005 and up to 2010," which included a plan to build 4 reactors with a capacity of 700MW each in Kareliya. The first reactor was scheduled to begin operation in 2007. Earlier work on technical and economic feasibility studies was cancelled in 1990 by a decision of the Presidium of the Supreme Soviet of Kareliya based in accord with public opinion.

According to Kareliyan Governor Sergey Katanandov, this decision was not discussed or coordinated with the government of Kareliya. He expressed readiness to organize a referendum on the matter. The Russian government should have presented the project concept to the public, researched public opinion and discussed it with executive and legislative bodies, as well as provided guarantees for public safety, said Vladimir Lavrentev, deputy chairman of the legislative assembly of Kareliya. In the opinion of Karelenargo Director Vladimir Semenov, the region already has the powerful Leningrad and Kola NPPs nearby. Instead, new hydroelectric power plants should be built. The Karelian Greens Association, a local environmentalist group, also protested against NPP construction.

- "Gendirektor Karelenargo vystupayet protiv stroitelstva v Karelii atomnoy elektrostantsii," Interfax, 21 February

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2002; "'Assotsiatsiya zelenykh Karelii' protiv stroitelstva v respublike atomnoy elektrostantsii," Interfax, 21 February 2002; "Karelskiye deputaty vozmushcheny resheniyem o stroitelstve AES na territorii respubliki," Interfax, 13 February 2002.

8 May 2002

PLANS FOR CONSTRUCTION OF NPP IN ARKHANGELSK REGION

The 15th issue of *Yadernyye materialy* describes plans to build an NPP in Arkhangelsk region, according to which the first power reactor will be launched by 2010.[1,7] This would be the eleventh NPP in Russia.[5] *Yadernyye materialy* also states that a low-power nuclear heating and power plant will be built in Severodvinsk by 2006.[1,7]

On 30 November 2001, Minister of Atomic Energy Aleksandr Rumyantsev and Arkhangelsk Governor Anatoliy Yefremov signed a declaration of intend regarding construction of the central heating and power plant in Arkhangelsk region.[2,3] The project will cost some \$668 million and the date of completion is 2010 at the earliest; the Russian government has already included the project in its 50-year program for the strategic development of nuclear energy.[2] Specialists from NIKIET and Minatom will proceed to develop technical and economic studies related to the project; about \$15.1 million have already been spent on design and exploration work.[3]

No decisions have been made on a number of reactors at the new heating and power plant. The plant will probably have two 300MW reactors but their number may increase to four.[2] According to *Pravda Severa*, they are likely to be four VK-300 reactors. A prototype VK-300 has been employed in Dmitrovgrad in Ulyanovsk region for 35 years. According to Yuriy Kuznetsov, spokesman of the Scientific and Research and Construction Institute of Engineering Technology, the reactors are absolutely safe and can produce enough heat and electricity for Arkhangelsk, Severodvinsk and Novodvinsk and export power as well.[3,4] If the project is approved, the first Arkhangelsk NPP reactor will be launched in 2007, and the second in 2008. The first reactor of the Severodvinsk heating and power plant will be launched in 2011 and the second in 2013. The construction site has yet to be chosen . Likely locations are Zharovikha, a site prepared for nuclear plant construction in the 1980s, or the village of Rikasikha, 20km from Arkhangelsk.[3,4]

Ten years ago there was an attempt to build a NPP in Arkhangelsk. However, work was halted due to environmental protests.[4,5,6] Yefremov says that power supply in the region has reached a critical stage, due to the 80% depreciation of much of the equipment of the three existing heating and power plants (one in Arkhangelsk and two in Severodvinsk). In addition, the two main heating and power plants use fuel oil, which is increasingly expensive.[2,6]

According to *Izvestiya*, the estimated cost of the NPP project is \$1.6 billion. [4] About \$8 billion have been earmarked in the federal budget to support the development of new power plants, including Arkhangelskaya and Severodvinskaya NPPs.[1,7]

Sources:

[1] Nikolay Gavrilov, "Yadernyy lizing v massy," *Yadernyye materialy*, No. 15, 8 May 2002, p. 8.

[2] Ivan Moseyev, "Minatom uteshil Arkhangelsk," *Delovoy Peterburg*, 4 December 2001.

[3] Nadezhda Breshkovskaya, "Arkhangelsk pomenyal gaz na atom," *Pravda Severa*, 1 December 2001.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



[4] Viktor Filippov, "Smirnyy atom. Sorvano reshenie o sozdanii novoy atomnoy stantsii," *Izvestiya*, No. 215, 21 November 2001, p. 2.

[5] "Minatom planiruet postroit AES v Arkhangel'skoy oblasti," *Yadernaya Rossiya Segodnya*, 24 October 2001.

[6] "V Arkhangel'ske resheno vozobnovit stroitel'stvo atomnoy elektrostantsii," Interfax, 21 October 2001.

[7] "Pervyy energoblok Arkhangel'skoy AES budet postroen k 2010 godu," Interfax, 23 April 2001.

17 May 2002

CONSTRUCTION OF RUSSIA'S LARGEST NPP TO RESUME IN BASHKIRIYA

According to a 17 May 2002 article in *Trud*, in Spring 2002 the Russian Ministry of Atomic Energy and the government of Bashkiriya agreed to resume and complete the construction of a nuclear power plant in Agidel, in northwest Bashkiriya, by 2020.[1,2,3] It is expected to be the largest NPP in Russia after it becomes operational.[2] According to Interfax, the NPP will have four new 1,000MW VVER power reactors.[4] According to *Izvestiya*, however, there will be two 1,000MW and two 1,500MW reactors.[5] These third-generation reactors feature a defense-in-depth protection system. Robert Nigmatulin, a State Duma deputy from Bashkiriya, explained that there are several systems to prevent decay heat from building up in the reactor, including an emergency core cooling mechanism whereby excessive heat would "flood the plant with water," causing reactor function to cease.[1,4] The first reactor will be put into operation in 2010 at a cost of \$750 million.[5] According to *Trud*, it is cheaper to complete the unfinished power plant than build a new one. The building of a new reactor would cost \$1 billion; completion of the old one is half as expensive.[1]

The completed NPP will provide jobs for 14,000 people, the entire adult population of Agidel. The first reactor alone will provide 5,000 jobs.[1] The NPP will also increase local taxes, help Bashkiriya eliminate the power deficit it would otherwise face in 2010, and provide Udmurtiya, Chelyabinsk and other neighboring regions with cheap electricity.[1,4,6] The local government has promised residents who live close to the NPP a 50% reduction in heat and electricity rates.[5]

The construction of Bashkirkaya NPP was ceased 10 years ago because of the Chernobyl accident and environmental protests.[2,4] Then, in 1998, the State Assembly of Bashkiriya denounced the ten-year old Supreme Council of Bashkiriya resolution halting construction. This denunciation caused the Russian Ministry of Atomic Energy and Unified Energy System of Russia to renew their interest in the NPP.[1] During the 1980s, \$800 million were spent on construction of the plant. Of that sum, \$550 million were spent on building a new city, Agidel, for future NPP employees.[5] Most of the funds to cover the cost of NPP construction will be provided by the federal budget.[1] The government of Bashkiriya also intends to invest \$500 million into the completion and launching of the first power reactor. It has already invested \$500 million to lay down the foundation for the first and third reactors.[3]

Sources:

[1] Sergey Kudryashov and Shamil Valeev, "Vtoraya zhizn goroda bezrabortnykh," *Trud*, No. 82 (24040), 17 May 2002, p. 3.

[2] "Vozobnovlyayetsya stroitel'stvo Bashkirkoy AES," *Ural Press Inform*, www.uralpress.ru, 29 August 2001.

[3] "Bashkiriya namerena vlozhit \$500 mln. v dostroyku i pusk pervogo bloka AES," Interfax, 2 October 2001.

[4] "Dostroyka bloka Bashkirkoy AES budet stoit poryadka polumilliarda dollarov," Interfax, 12 February 2002.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



[5] Irina Bobkova and Indira Kvyatkovskaya, "Desyat let spustya. V Bashkirii vozobnovlyayetsya stroitelstvo AES," *Izvestiya*, No. 021, 6 February 2002, p. 6.

[6] "V Ufe obsuzhdeny voprosy vozobnovleniya stroitelstva Bashkirskoy AES," *Ural Press Inform*, 10 May 2001.

1 July 2002

KOLA CONSTRUCTION PUT ON HOLD UNTIL 2010

On 1 July 2002, Rosenergoatom halted construction on the second phase of the Kola nuclear power plant. The decision was justified on the grounds that the region's electricity needs are being met and no increase in demand for electricity is predicted until 2010-2015. Furthermore, Finland's decision to build its own power plant will cut into the demand for power from the Kola plant. The regional administration's press service also cited an economic crisis at Minatom and Rosenergoatom as a reason for the halting of construction.

-Interfax, 18 July 2002 in "Second Stage of Murmansk Nuclear Plant Construction Put on Hold," FBIS Document CEP20020718000269.

10 September 2002

SAFETY AT RUSSIAN NPPs

On 5 September 2002, Rosenergoatom president Oleg Sarayev said that IAEA experts had found Russian nuclear energy to be one of the safest in the world after Japan and Germany.[1] According to Vladimir Vorobyev of the Central Scientific Research Radiotechnical Institute (TsNIRTI), Russia has created a unique alarm system for NPPs. The system instantly reacts when coolant overheats. The sensitive sensors are not located inside the pipes, something he said foreign firms have yet to achieve. The system also provides constant monitoring of other cooling systems, pipes and materials as well as pressure, temperature, humidity and pipeline fractures in emergencies.[2]

Rosenergoatom plans to invest a total of 2 billion rubles (about \$63.2 million as of 5 September 2002) into the safety of Russian NPPs, said Rosenergoatom technical director Nikolay Sorokin. Minatom is in charge of distributing these funds. However, according to the Rosenergoatom press service, 4.3 billion rubles (about \$136 million as of 5 September 2002) are to be invested in NPP safety in the next two years.[3,4] According to Rosenergoatom head Sarayev, Russia's 10 nuclear power plants produced 120 billion MW in 1992, 135 billion MW in 2001, and planned to produce 144 billion MW in 2002.[1]

Sources:

[1] Elena Fedorova, "Po otsenke ekspertov MAGATE, rossiyskaya atomnaya energetika vkhodit v 'troyku' naiboleye bezopasnykh v mire," *RIA Novosti*, 5 September 2002; in "Rossiyskaya atomnaya energetika priznana odnoy iz samykh bezopasnykh," *Yadernaya Rossiya Segodnya*, www.pircenter.org, 6 September 2002.

[2] Anatoliy Yurkin, "V Rossii sozdana unikalnaya sistema mgnovennoy podachi signala trevogi pri vozniknovenii neshtatnykh situatsiy v atomnykh reaktorakh," *ITAR-TASS*, 6 September 2002; in *Yadernaya Rossiya Segodnya*, www.pircenter.org, 10 September 2002.

[3] "'Rosenergoatom' planiruyet vlozhit v bezopasnost AES 2 mlrd. rubley," *Interfax*, 5 September 2002.

[4] Vladimir Golovchanskiy, "V blizhayshiye dva goda na sovershenstvovaniye sistemy zashchity rossiyskikh AES budet napravleno svyshe chetyrekh milliardov rubley," *ITAR-TASS*, 6 September 2002; in "Bezopasnost AES budet sovershenstvovatsya," *Yadernaya Rossiya Segodnya*, www.pircenter.org, 10 September 2002.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



10 September 2002

NPP TO BE BUILT IN ULYANOVSKAYA REGION

On 10 September 2002, Ulyanovsk Deputy Governor Evgeniy Nikiforov officially announced that an NPP may be built in Ulyanovskaya oblast. The statement was made at a meeting of the working group, which was preparing a joint declaration with Minatom on construction of the NPP. The regional administration considers the NPP construction a "highly attractive" project. Currently the region has to buy up to 70% of its power at the expensive federal wholesale power market.

Nikolay Shingarev, head of Minatom's Administration and Ministry Protocol Directorate, says that the project is in the discussion stage. Minatom favors the idea of building a new NPP, but all the funds available in the near future have already been allotted to other projects. According to Minatom, the construction of one power reactor costs \$800 million on average. An NPP only becomes profitable after two or more power units are operational.

-Shikur Shabayev, "Ulyanovskaya administratsiya vystupayet za stroitelstvo na territorii oblasti AES," ITAR-TASS, 10 September 2002; in "V Ulyanovskoy oblasti budet postroyena AES," *Yadernaya Rossiya Segodnya*, 10 September 2002.

12 September 2002

VOLGODONSKAYA NPP EXPECTS LICENSE FOR SECOND REACTOR

Volgodonskaya NPP (Rostovskaya NPP until 4 September 2002) expects to receive a license from Gosatomnadzor in November 2002 to build a second reactor, said Andrey Platonov, NPP chief engineer, during an International Atomic Energy Agency seminar in Volgodonsk on 9-13 September 2002.[1,5] According to Interfax, about \$600 million are needed to assemble and modify the second reactor, which is 45% complete.[1] Rosenergoatom estimates the construction of the second reactor will cost 6 billion rubles (about \$188 million as of 16 November 2001). Energostroy, the prime contractor, estimates costs at 300 million rubles a month (about \$9 million a month) for construction and assembly work in the next year.[2]

Construction of the second reactor, with a capacity of 1,000MW, is to be completed in 2005, said Aleksandr Polushkin, a Rosenergoatom assistant executive director, on 16 November 2001.[1,2,3] Earlier plans called for Unit 2 to be put into trial operation in 2004.[2,4,5] Although the initial plan was to build four reactors, an environmental assessment restricted it to two reactors only.[5] Polushkin also added that "the look of the reactor compartment could be changed" to take advantage of the newest technical designs. A decision to build a cooling tower may be also made. The construction of a cooling tower would increase the cost of the reactor. The estimated capacity of the current water-cooling pond is enough to handle a load of 3,700MW. It can handle four reactors in simultaneous operation if the load of one of the reactors is decreased 30% during the summer heat.[2] According to Polushkin, radionuclide contamination of the area around the NPP during the launch of the reactors may be much higher than experts predict. Nevertheless, the contamination will not extend beyond the 5km zone around the NPP.[4]

Volgodonskaya NPP construction began in October 1979. It was ceased and mothballed on 29 August 1990. In February 2000 a government environmental impact assessment concluded that the NPP project met the requirements of Russia's environmental legislation. In May Gosatomnadzor issued a license to continue the

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construction of the first VVER-1,000 reactor, which was put into 100% operation at the end of 2001.[1,2,5] Since 6 November 2001, when it was connected to the Unified Energy System, Volgodonskaya NPP produced more than 3.3 billion MW/hr. According to Informcenter Deputy Director Vladimir Khozhakov, the 15 day full-scale testing of the first reactor was successfully completed on 26 November 2001. NPP production should exceed 4 billion MW/hr by the end of 2002.[3] Rosenergoatom plans to build two more reactors if granted a license. If there is no negative impact on the environment during the operation of the first two reactors, Volgodonskaya NPP Assistant Director Gennadiy Salov expects to receive such a license.[5]

Sources:

- [1] "Volgodonskaya AES rasschityvayet v noyabre poluchit litsenziyu Gosatomnadzora na stroitelstvo 2-go energobloka," Interfax, 12 September 2002.
- [2] "Stroitelstvo vtorogo bloka Volgodonskoy AES planiruyetsya zavershit v 2005 godu," Interfax, 16 November 2002.
- [3] "Zaversheny ispytaniya Volgodonskoy AES v rezhime opytно-promyshlennoy ekspluatatsii," Interfax, 26 November 2002.
- [4] "Rosenergoatom prinyal resheniye o stroitelstve dvukh energoblokov Volgodonskoy AES," Interfax, 16 November 2002.
- [5] "Stroitelstvo dvukh energoblokov Volgodonskoy AES zavisit ot ekologicheskoy ekspertizy," Interfax, 25 September 2002.

17 September 2002

NUCLEAR ENERGY WORKERS JOIN FEDERATION OF INDEPENDENT TRADE UNION STRIKE

According to *Atompressa*, the Federation of Independent Trade Unions together with craft unions organized a protest action on 17 October 2002. The protest decision was supported by the Russian Trade Union of Workers of Nuclear Energy and Industry who staged a strike in front of the State Duma. They demanded the restoration of the mandatory medical insurance system, abolishment of the uniform tax, support for children's sports programs, and financing of children's recreational programs.

-*"Atomshchiki prinyali uchastiye v aktsii FNPR," Atompressa*, No. 38 (515), October 2002.

19 September 2002

CONSTRUCTION OF NPPs IN THE FAR EAST UNLIKELY

On 19 September 2002, RIA Novosti reported that construction of NPPs in the Far East is unlikely according to participants of the 16-20 September 2002 conference entitled "Ecological Problems in Nuclear-Powered Submarine Dismantlement and the Development of Nuclear Power in the Region," held in Vladivostok. While Minatom experts argued in favor of an NPP, most conference participants concluded that the southern Far East, Yakutiya and Kolyma will no longer face a power deficit after the completion of the Bureyskaya, Vilyuyskaya and Sredne-Kanskaya hydroelectric plants. In fact, discussions of possible exports of excess power to China, Northern and Southern Korea are already under way.

-Anatoliy Ilyukhov, "Veroyatnost stroitelstva atomnykh elektrostantsiy na rossiyskom Dalnem vostoke slishkom mala, schitayut uchastniki Vladivostokskoy konferentsiyi po atomnoy energetike," RIA Novosti, 19 September

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2002; in "Na Dalnem Vostoke ne budut stroit AES," *Yadernaya Rossiya Segodnya*, www.pircenter.org, 20 September 2002.

22 October 2002

KALININSKAYA UNIT 4 MEMORANDUM OF INTENT SIGNED

On 22 October 2002 Russian Minister of Atomic Energy Aleksandr Rumyantsev and Tver oblast governor Vladimir Platov signed a Memorandum of Intent to Build a Fourth Reactor at Kalininskaya NPP.[1,2] The construction of the 1,000MW reactor is part of Russia's Strategy for Nuclear Power Development in the first half of the 21st century. According to RIA Novosti, it should be completed by 2009.[2] According to Nuclear.ru, it will be completed by 2008.[1]

As of October 2001, Kalininskaya Unit 3 was under construction and will be commissioned in 2003.[2,3] According to Rumyantsev, power generation at Kalininskaya NPP will double after the commissioning of the two reactors, with a total capacity of 2,070MW.[2] As of October 2001, 1 billion rubles (nearly \$34 million as of 1 October 2001) had already been allotted and another 3.1 billion rubles (about \$105 million as of 1 October 2001) are to be provided by the end of 2001 to complete the construction of the third reactor.[3]

As of October 2001, Kalininskaya Unit 2 was in operation; it has a capacity of 1,025MW. Unit 1 was undergoing scheduled repairs, which were to be completed by the end of August 2001. As of August 2001, the irradiated nuclear fuel had been unloaded and the reactor was prepared for assembly.[4]

Sources:

[1] "Ministr RF po atomnoy energii A. Rumyantsev i gubernator Tverskoy oblasti V. Platov podpisali 'Deklaratsiyu o namereniyakh po sooruzheniyu energobloka No. 4 na Kalininskoy AES', Nuclear.ru, <http://www.nuclear.ru>, 22 October 2002.

[2] RIA-Novosti, 22 October 2002; in "Another power unit to be built at Russian nuclear plant," FBIS Document CEP20021022000053.

[3] "Na tretyem energobloke Kalininskoy AES uvelichilis tempy finansirovaniya stroitelnykh rabot," *Atompressa*, No. 38 (465), October 2001, p. 3.

[4] "Vvod v promyshlennuyu ekspluatatsiyu energobloka No. 3 Kalininskoy AES namechen na 2003 god," *Atompressa*, No. 33 (460), August 2001.

25 October 2002

MINATOM STRENGTHENS NPP PROTECTION

Minatom has decided to implement new measures aimed at strengthening the security of facilities that handle nuclear, chemical and radioactive materials, Interfax reported on 25 October 2002. Deputy Minister of Atomic Energy Anatoliy Kotelnikov will head a new staff charged with the prompt implementation of these measures.[1]

Earlier measures include the federal target program "Remediation of the Consequences of Radiation Accidents Until 2010," decreed by the Russian government in September 2001.[2] The same month, a training exercise was held at Volgodonskaya (Rostovskaya) NPP. The purpose of the training was to improve emergency response of special services together with police, Ministry of Internal Affairs troops and Russian Emergency Ministry

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subdivisions to terrorist acts at NPPs. As a result of the training, specific measures to improve anti-terrorist activity were developed.[4,5]

Interfax also reported that Russia participated in an international training exercise on reacting to nuclear accidents, called JINEX 1, in May 2001. The purpose of the training was to test new ways of reporting emergency situations, emergency measures and the ability of international and national organizations to promptly provide mass media with information. The Minatom Situational and Crisis Center took part in the training, which was led by the IAEA.[5]

Sources:

[1] "Minatom usilivayet mery zashchity yadernykh ob'yektov," Interfax, 25 October 2002.

[2] "Pravitelstvo Rossii postanovilo utverdit federalnuyu programmu po preodoleniyu radiatsionnykh avariiv," Interfax, 13 September 2001.

[3] "Na yuge Rossii prokhodyat ucheniya FSB po preduprezhdeniyu teraktov na atomnykh ob'yektakh," Interfax, 12 September 2001.

[4] "Na Volgodonskoy AES proshli ucheniya 'Atom-2001'," Interfax, 14 September 2001.

[5] "Minatom RF izveshchayet ob okonchaniy mezhdunarodnykh ucheniy po reagirovaniyu na yadernyye avariiv," Interfax, 23 May 2001.

1 November 2002

BILIBINO NPP SERVICE LIFE TO BE EXTENDED

A meeting on extending the service life of Bilibino's reactors was held on 1 November 2002 at the NPP under the leadership of Deputy Minister of Atomic Energy Andrey Malyshev. An autonomous diesel power plant is to be built to provide the industrial site with power during the eventual decommissioning of Bilibino. In addition, a program of social and economic assistance for NPP personnel is foreseen. As of November 2002, Units 1 and 4 are operating with a total load of 19MW. Units 2 and 3 are being repaired.

-*"Bilibinskaya AES gotovitsya k prodleniyu sroka ekspluatatsii," Vostok-Media, 1 November 2002.*

4 November 2002

NUCLEAR FACILITY SECURITY QUESTIONED

According to Sverdlovsk Oblast governor Eduard Rossel, nuclear facilities in the Urals lack proper security. If they were to be seized by terrorists, there would be millions of hostages, he points out. He has instructed several analysts to prepare a report on the level of security at sensitive facilities in the Oblast. Vladimir Sliviyak, co-chairman of the environmental group "Ekozashchita" (Ecodefense) has also stated that Minatom nuclear facility security is not effective. This contradicts Minatom's assertion that the security level is high enough. However, Novaya gazeta recently received a letter from Igor Karpov, chief engineer of one of Kursk NPP's reactors, in which he stated that it would be no surprise to find Kursk NPP employees with faked diplomas. In order to get a job at the NPP, one just needs to pay about \$2,000, he added.

-*Yekaterina Ignatova, "Okhrana yadernykh ob'yektov nenadezhna," 4 November 2002 in Novaya gazeta online edition.*

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22 November 2002

ROSENERGOATOM RECEIVES LICENSE FOR VOLGODONSKAYA UNIT 2

On 22 November 2002 Rosenergoatom received a license from Gosatomnadzor to build a second reactor at Volgodonskaya NPP. The license will expire on 1 December 2007. According to Gosatomnadzor experts, the new VVER-1,000 reactor meets the requirements of all current regulatory documents. The conclusions of 67 experts were solicited to determine the safety of the second reactor, which is 45% complete and is scheduled to become operational in November 2005. The cost of the second reactor is about 25% less than the first one because the NPP will share many facilities with the other reactor. Moreover, the upper reactor block, steam generators, turbine, generator and accumulator to cool down the reactor core in case of emergency are ready and in storage at the manufacturing plants. Some of the equipment will need parts and reconstruction. A container for the emergency supply of boric acid was assembled and installed in the second reactor compartment in October 2002. Unit 1 became operational at the end of 2001 and has produced 6,773 billion MW since the beginning of 2002.

- "Rosenergoatom poluchil litsenziyu na sooruzheniye 2-go energobloka Volgodonskoy AES," Interfax, 2 December 2002, "Poluchena litsenziya Gosatomnadzora Rossii na sooruzheniye energobloka No. 2 na Volgodonskoy AES," Nuclear.ru. 28 November 2002.

24 November 2002

NIZHEGORODSKAYA NPP WILL NOT BE COMPLETED

According to Minatom Head Alexander Rumyantsev in a 24 November 2002 Regions.Ru report, the construction of Nizhegorodskaya NPP will not be completed. Its construction was halted more than a decade ago. The sale of the mothballed NPP equipment is being considered. Seversk (Tomsk-7) and Severodvinsk (Arkhangelsk Oblast) have been mentioned as possible purchasers. The decision will depend on if a new NPP will be built in these locations. Rumyantsev stated that the plan to build an NPP in Tomsk-7 is likely to be halted. Priority will instead be given to reconstruction of a coal-fired heating plant. In Severodvinsk, the primary plan is to build a floating NPP.

- "Nizhegorodskaya oblast. Oborudovaniye nedostroyennoy AES budet prodano," Regions.Ru, 24 November 2002.

26 November-2 December 2002

MORE THAN \$33 TRILLION TO BE INVESTED IN RUSSIA'S NUCLEAR POWER INDUSTRY THROUGH 2020

According to Minatom Head Alexander Rumyantsev, more than 1 trillion rubles (about \$33 trillion as of 2 December 2002) of investment will be needed in addition to budget funds to develop Russia's nuclear power industry through 2020. Rumyantsev stated that 162 billion rubles (about \$5 billion) are needed to upgrade equipment at existing NPPs, while 152 billion rubles (about \$4.8 billion) are needed for infrastructure construction and up to 750-760 billion rubles (about \$23.5-23.9 billion) to develop the nuclear power industry. According to Rumyantsev, the key tasks of the nuclear power industry include increasing NPP safety, extending the service lives of existing power units through upgrades, and exploring new technologies in power production by developing new thermonuclear reactors, which he said were environmentally safe.

- "Glava Minatoma schitayet, chto dlya razvitiya atomnoy energetiki do 2020 goda krome byudzhetykh sredstv ponadobitsya boleye 1 trln rubley investitsiyi," Unian, No. 047 (239), 26 November-2 December 2002.

9 December 2002

PARTIAL PRIVATIZATION OF NPPs MOOTED

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In an interview on 9 December 2002, Rosenergoatom Director Oleg Sarayev said that the partial privatization of NPP equipment would increase efficiency due to the profit motive. According to him, the 50-55% of NPP equipment that is related to safety will remain state-owned. The rest could be privatized. The earnings from privatization would be used to build new NPPs or finish NPPs under construction, which are 65-75% complete.

-Interview with Rosenergoatom Director Oleg Sarayev, Radio Station Ekho Moskvyy, www.echo.msk.ru, 9 December 2002; Informatsionnoye Agenstvo Ekho Moskvyy, 9 December 2002 in "Russia: Nuclear boss says partial privatization would raise efficiency of plants," in FBIS Document CEP20021212000041.

26 December 2002

FUTURE PRIMORSKAYA AND DALNEVOSTOCHNAYA NPP OFFICES CLOSED

On 26 December 2002, Vladivostok News reported the Minatom decision to close two offices for future NPPs in the Russian Far East: Primorskaya and Dalnevostochnaya. The decision to disband the Dalnevostochnaya NPP office was made by a Minatom representative, whereas the Primorskaya NPP office was closed by the decision of its director, Gennadiy Lipatnikov. The main reason to postpone the construction of the NPPs is the lack of funding. Environmental specialists also doubt that foreign investment can be attracted for construction of Primorskaya NPP. For earlier information on the Primorskaya NPP see the 2/2001 entry, below.

-"Atomy - net... deneg," Vladivostok, No. 1287, 26 December 2002; in Integrum Techno, www.integrum.ru.

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2001

February 2001

PRIMORSKAYA NPP FEASIBILITY STUDY RESUMES

In a February 2001 press release, Minatom touted the idea of constructing an NPP in Primorskiy kray. The Strategy for the Development of Nuclear Power in the First Half of the 21st Century, approved by the Russian government in May 2000, included plans for construction of a Primorskaya NPP.[1] While earlier plans called for two VVER-640 reactors at Primorskaya NPP, current plans call for construction of at least one VVER-1000 reactor.[2] The construction of one VVER-1000 is estimated to cost \$2 billion, while two reactors would cost \$2.5 billion. In March 2001 Gennadiy Anatolevich Lipatnikov, director of the Primorskaya NPP, said that the project feasibility study (originally begun in 1995 but discontinued after the Russian financial crisis of 1998) and expert appraisal are scheduled to be completed in four years, with construction taking a further eight years. Lipatnikov says that the project has Minatom's full support, and has received some Minatom funding. However, the Ministry of the Economy has lobbied against the project, resulting in no federal funding for the project in 2000. Completion of the feasibility study will require both Minatom and federal funding. Minatom has included the Primorskaya NPP in the list of projects for which it will seek foreign funding.[3] According to one source, the Canadian firm I.C.A. has agreed to serve as the project's financial coordinator.[4] Russia's energy systems press service lists two sites that are currently under consideration for NPP construction: Novotroitskaya and Arsenevskaya, which both appear to be located near Arsenev, Yakovlevskiy rayon, Primorskiy kray, while Lipatnikov refers to sites in both Dalnerechenskiy rayon and Yakovlevskiy rayon.[3,5]

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



Sources:

- [1] "Minatom predlagayet postroit AES na Dalnem Vostoke," Izvestiya online edition, 13 February 2001, www.izvestia.ru.
- [2] "Minatom RF obsudit perspektivy stroitelstva AES v Primore na vyyezdnom zasedanii," Interfax, 19 February 2001.
- [3] "Gennadiy Lipatnikov: Bez AES my zaglokhnem," Zolotoy rog, 29 March 2001; in Integrum Techno, www.integrum.ru.
- [4] "V Primore vozobnovilis raboty po tekhniko-ekonomicheskomu obosnovaniyu stroitelstva v kraye atomnoy elektrostantsii," Finansovo-Informatsionnaya Sluzhba; in IA InterTEK; in Integrum Techno, www.integrum.ru.
- [5] "Primorskaya AES budet stroitsya s uchetom seysmobeзопасnosti," IA InterTEK, 13 March 2001; in Integrum Techno, www.integrum.ru.

6 February 2001

EBRD FINANCING OF LENINGRAD NPP SAFETY PROJECTS

On 6 February 2001, Interfax reported the European Bank for Reconstruction and Development had finished financing 16 projects aimed at increasing the safety of Leningrad NPP. Since 1993 EBRD had provided funds totaling some €30 million (about \$28.2 million as of 6 February 2001), which were spent to increase nuclear, technical, radiation, fire and physical safety at the Leningrad NPP. As of February 2001, 11 projects had been implemented. The remaining five projects are to be completed by the end of 2001. The NPP safety work through 2004 are preliminary estimated at \$220 million. The majority of these costs will be covered by Leningrad NPP. -"EBRD zavershil finansirovaniye proyektov po povysheniyu bezopasnosti LAES," Interfax, 6 February 2001.

5-11 February 2001

FIRST RUSSIAN RADIOACTIVE WASTE METAL PROCESSING FACILITY TO BE COMPLETED AT LENINGRAD NPP

According to a 5-11 February 2001 report in Unian, the construction of the first Russian radioactive waste metal processing facility, Ekomet-S, is being completed at Leningrad NPP in Sosnoyy Bor, Leningrad Oblast. A total of about \$10 million was invested in the facility. As of February 2001, about 2,000 tons of metal had been melted down. The facility's estimated recycling output is up to 5,000 tons of metal per year. The output of the first production line is about 2,500 tons of metal. The facility will recycle radioactive metal from Leningrad NPP, which will be then sent in the form of metal blanks for further meltdown at other iron-and-steel plants in northwestern Russia.

-"V Rossii nachalas realnaya utilizatsiya radioaktivnykh promyshlennykh otkhodov," Unian, 5-11 February 2001.

23 March 2001

PROTEST AGAINST ROSTOV NPP

As of 23 March 2001, just days before the Rostov NPP was scheduled to begin feeding electricity into the local power grid, there were ongoing protests against the plant. Picketing by representatives of environmental organizations has been spearheaded by the Don Community Group against the Launch of Rostov NPP. This group has led protests against the plant for quite some time, including a protest in December 2000 outside a meeting of the Rostov legislature, at which the demonstrators demanded the ouster of those deputies who had not kept election promises to block the launch of Rostov-1. Aleksandr Popov, chair of the oblast legislature, had even

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written a book in 1996 in which he said that he would insist on a popular referendum before agreeing to the operation of Rostov NPP.

"Na Rostovskoy AES nachat energeticheskiy pusk pervogo bloka," Interfax, 23 March 2001; Irina Pertseva, "Pered nachalom zasedaniya zakonodatelnogo sobraniya," Zelenyy mir, No. 3-4, 2001 (28 February 2001), p. 5.

6 May 2001

ROSTOV NPP OPERATION

On 5 June 2001 Interfax reported that a meeting of Russian NPP directors would soon be held at the Rostov NPP. The meeting site was chosen in part to emphasize Rosenergoatom's confidence that Rostov-1 will soon begin industrial operation.[1] In mid-May Rosenergoatom postponed bringing Unit 1 up to 75% capacity in order to correct several problems identified by Gosatomnadzor and environmental protection bureaus, as well as to complete the heat-insulation of pipes in the machinery compartment.[2] On 25 May 2001, the State Acceptance Commission under Deputy Minister of Atomic Energy Yevgeniy Reshetnikov signed an act allowing Rostov-1 to begin testing at 75% capacity.[3] Gosatomnadzor issued Rostov-1 an operating license on 19 January 2001; the plant began supplying electricity to the North Caucasus Unified Power Grid on 30 March 2001.[4,5] Rostov-1 is supposed to be brought up to 100% capacity in July or August, and begin full industrial operation in October.[2] The Russian Ministry of Atomic Energy (Minatom) has earmarked 2.5 billion rubles (nearly \$86 million as of 5 June 2001) for the completion of preparations at Rostov-1, including 500 million (about \$17 million) for social projects in the 30km zone around the plant (including construction of gas pipelines between local towns, a sports complex, and water pipelines).[1] In addition to funding these projects, in an agreement with the Rostov Oblast administration, Minatom promised to charge all electricity customers in the Don region half-price.[6] Minatom reportedly plans to dedicate 680 million rubles (over \$23 million) in 2001 to the construction of Rostov-2.[1] This is consistent with Rosenergoatom Deputy Chairman Yuriy Kopyev's November 2000 statement that construction of Rostov-2 would restart in 2001 and be completed in five years.[7] However, it conflicts with other reports that Minatom will fund construction of reactors at the Kalinin and Kursk NPPs before continuing work on Rostov-2.[1] As of March 2001, Rostov-2 was reportedly 40% complete.[8] Approximately 4.5 billion rubles will have to be spent to finish Rostov-2.[9]

Sources:

[1] Olga Shevel, "Na Rostovskoy atomnoy schitayut milliardy," Vremya-MN, 5 June 2001.

[2] Olga Shevel, "Rostovskaya AES nikak ne nabirayet oboroty," Vremya-MN, 16 May 2001.

[3] "Na pervom bloke Rostovskoy AES nachinayetsya novyy etap ispyatniy," Interfax, 28 May 2001.

[4] Ye. Ostritsova: "The Rostov AES as the Guarantor of Stable Power for Southern Russia," *Atompressa* No 14 (441) April 2001, pp. 1-2; in "Imposing Conference Prepares to Start Up 1st Power Unit of Rostov AES," FBIS Document CEP20010423000307.

[5] Sluzhba informatsii RoAES, "RoAES prinyimayet pozdravleniya," *Atompressa* No. 15 (442), 2001.

[6] Aleksandr Shapovalov, "Rostovskaya atomnaya stantsiya vstupayet v stroy deystvuyushchikh," *Nezavisimaya gazeta*, 24 February 2001, www.ng.ru.

[7] *NUCNET News*, 277/00, 15 November 2000; in "News Briefing," Uranium Institute, 22 November 2000.

[8] "Energopusk Rostovskoy AES namechen na konets marta," Interfax, 17 March 2001.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



[9] "Pervyy bok [sic] Rostovskoy atomnoy stantsii budet podklyuchen k elektroseti 27 marta," Interfax, 17 March 2001.

July 2001

KURCHATOV INSTITUTE CONDUCTED ILLEGAL EXPERIMENTS AT RUSSIAN NUCLEAR POWER PLANT

The Russian Federal Security Service established that from 1992 to 1998 Kurchatov Institute scientists and Novovoronezh nuclear power plant (NPP) specialists conducted unauthorized experiments at one of the NPP's reactors. These experiments could have led to a major accident at the power plant. According to the television station TV6, the work was financed by a well-known Western firm. Kurchatov Institute scientists designed steel containers, which then were covertly placed into one of the NPP's reactor cores for irradiation, without the knowledge and consent of the power plant's management. The illegal activities were discovered in 1999 when the reactor was stopped for maintenance. The steel containers were partially destroyed as a result of being inappropriately placed into the reactor core. Metal fragments from the containers got into reactor's first circuit, which could have led to a serious accident. Novyye izvestiya reported on 2 July 2001 that the case was dismissed by law enforcement agencies because, according to investigators, these activities did not constitute a crime under Russian law. The newspaper suggested that lobbying by Minatom contributed to the dismissal.

-Aleksandr Khrolenko, "'Mirnyy' atom ne terpit khalatnosti," *Krasnaya Zvezda*, No. 33, 20 February 2001 in Database of Russian Newspapers, <http://news.eastview.com>; TV6, 1 February 2001 in "Russian security service investigates secret experiments at nuclear power plant," FBIS Document CEP20010209000380; Valeriy Mirolevich, "Krokodily voobshche-to letayut-2," *Novyye Izvestiya*, No. 21, 2 July 2001 in Universal Database of Russian Newspapers, <http://news.eastview.com>.

9 July 2001

MOSCOW AND ROSENERGOATOM PLAN TO SUPPLY MOSCOW REGION DIRECTLY WITH NPP POWER

Moscow authorities and Rosenergoatom have set up a joint working group to develop a project to build a 750KW power line from an NPP, Rosenergoatom Executive Director Yuriy Yakovlev announced at a press-conference on 6 July 2001. Yakovlev was unable to answer questions regarding the cost of the project. Moscow authorities are interested in bypassing Mosenergo and developing an alternative power supply. (This is the first joint project between Rosenergoatom and a regional government.)

-"Moskva i Rosenergoatom gotovyat proyekt postavok v region elektroenergii AES," Interfax, 9 July 2001.

6 September 2001

CONSTRUCTION OF NOVOVORONEZHSKAYA NPP UNIT 6 POSTPONED UNTIL 2019

Construction of Novovoronezhskaya NPP Unit 6 has been postponed from 2002 to 2019, said Valeriy Zhbannikov, NPP chief engineer, on 6 September 2001. Earlier plans called for Unit 6 to begin operation in 2012. According to Voronezhskaya oblast Deputy Governor Aleksandr Tsapin, Rosenergoatom also plans to build a seventh reactor at the plant. The total power of the two new reactors will be 2,000MW.

Rosenergoatom had planned to invest 850 million rubles (about \$26.9 million as of 6 September 2001) into the construction of Unit 6 in 2002. Another 750 million rubles (about \$25 million as of 21 November 2001) were set aside in the federal budget for 2002, said Tsapin. However, the plans have since changed and the construction will

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be financed after units 3 and 4 stop operating in 2019. According to Zhbannikov, Rosenergoatom's policy is to lower costs and use energy that requires low financial expenditures.

According to Interfax, Novovoronezhskaya NPP produced nearly 8.7 billion kWh during the first 10 months of 2001 using 64.8% of its installed power resources. This is 12% less than in January-October 2000. The reason for the shortfall was the shut-down of units 3 and 5 for scheduled preventive maintenance.

-"Stroitelstvo 6-go bloka Novo-Voronezhskoy AES otlozhenno do 2019 goda," Interfax, 6 September 2001;
 "Vydeleniye sredstv na stroitelstvo blokov Novovoronezhskoy AES namecheno na 2002 god," Interfax, 21 November 2001.

3 October 2001

CONSTRUCTION OF YUZHNO-URALSKAYA NPP TO RESUME IN 2004

Construction of Yuzhno-Uralskaya NPP will resume in 2004 and is scheduled to be completed by 2015, Yuzhno-Uralskaya NPP director Vladimir Morozov told Interfax on 3 October 2001.[1] Earlier, on 24 September 2001, Interfax reported that the construction of the NPP might resume in 2005, with construction expected to take a total of 12 years (8 years for the first reactor).[2] Plans call for the construction of three 800MW reactors. The cost of the first reactor is 2.828 billion rubles (about \$96 million as of 3 October 2001). The estimated construction cost of each subsequent reactor is 1 billion rubles (about \$34 million as of 3 October 2001). The construction costs will be covered by the federal budget. However, the exact funding amount has not been determined yet. According to Minatom, 1.5 billion rubles (about \$51 million as of 3 October 2001) will be allocated in 2004 from the federal budget for construction of 6 NPPs in Russia, including Yuzhno-Uralskaya NPP.[1,2] By 24 September 2001, 270 million rubles (about \$9 million as of 24 September 2001) had been spent.[2]

Yuzhno-Uralskaya NPP will have BN fast neutron reactors, which will be used to burn excess military plutonium.[2] According to Mayak director Vitaliy Sadovnikov, the launch of the NPP will create a closed nuclear cycle, whereby waste from Mayak will serve as fuel for Yuzhno-Uralskaya NPP, while NPP waste will be recycled at Mayak.[3] State Duma Deputy Mikhail Yurevich thinks that construction of the NPP is not advisable. In his opinion, the regional power crisis could be resolved if the hydro-electric power plant in the oblast were used to its full capacity. At present only 20% of its power is used.[4] If the NPP is not built, two artificial cooling ponds, B-11 and B-12, will be used to keep radioactive waste from Mayak from spreading.[3]

Sources:

[1] "Stroitelstvo Yuzhno-Uralskoy AES vozobnovitsya v 2004 godu," Interfax, 3 October 2001.

[2] "Stroitelstvo Yuzhno-Uralskoy AES mozhet vozobnovitsya v 2005 godu," Interfax, 24 September 2001.

[3] "Stroitelstvo Yuzhno-Uralskoy AES mozhet byt vozobnovleno, schitayet Klebanov," Interfax, 12 February 2001.

[4] Roman Gribanov, "M. Yurevich protiv AES," Chelyabinskiy rabochiy, 21 February 2002.

12 October 2001

CONSTRUCTION RESUMES ON BN-800 FAST REACTOR AT BELOYARSK

Construction will resume in late 2001 on the BN-800 fast reactor at the Beloyarsk nuclear power plant (NPP) after a decade-long delay, Interfax reported on 12 October 2001.[1] Construction of the reactor began in 1987, but was stopped in 1988 after "vigorous protests" from local citizens. President Yeltsin ordered that construction be

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resumed in 1992, but lack of funding prevented the order from being carried through.[2] The Beloyarsk reactor will be the first reactor based on the BN-800 design. The BN-800 reactor is a larger, updated version of the BN-600 fast neutron reactor at the Beloyarsk nuclear power station. The BN-800 will burn MOX fuel containing reactor- and weapon-grade plutonium, according to Bellona.[3] Resuming construction of the Beloyarsk BN-800 reactor is part of a Minatom plan to increase use of fast reactors.[3] According to Beloyarsk NPP Director Oleg Sarayev, the BN-800 "signals a fundamentally new stage in the development of nuclear power engineering, the stage of fast reactors." Few fast reactors have been built to date because the electricity produced by these reactors costs 2-2.5 times that of thermal reactors. Fast reactors require expensive corrosion-resistant construction materials and liquid sodium as coolant, which are reflected in energy prices.[4] Reactors such as the BN-800 are becoming more desirable in Russia, because they are "safer than their predecessors, far less polluting and capable of processing wastes dangerous to the environment," according to Interfax.[1] In the 2001 budget, 320 million rubles (\$10.8 million as of 12 October 2001) were allocated to the BN-800 reactor. In 2002 the Russian nuclear energy concern Rosenergoatom will provide over 1 billion rubles (\$33.9 million as of 12 October 2001) to continue construction. The reactor will cost \$1.2 billion to complete,[1] and it is scheduled to be completed in 2009. Rosenergoatom Technical Director Boris Antonov believes, however, that the timetable is "overly optimistic." [2]

Sources:

[1] "New BN-800 Fast Neutron Power Block Planned at Beloyarsk Nuclear Plant," Interfax, 12 October 2001.

[2] Gennadiy Voskresenskiy, "Success at Beloyarsk Nuclear Power Station Proves Value of Fast Neutron Reactors," Vek, 3 August 2001, in "Russian Energy and Metals Roundup," FBIS Document CEP20010807000354, 14 February 2001.

[3] Vladislav Nikiforov, "Second Breeder Reactor to Be Built at Beloyarsk NPP," *Bellona Foundation*, www.bellona.no, 14 February 2001.

[4] Regions.ru, 10 August 2001; in Judith Perera, *Nuclear News*.

November 2001

SECURITY BREACH AT RUSSIAN NUCLEAR POWER PLANT

In November 2001, the Federal Security Service discovered a serious security breach at one of the nuclear power plants in the Central Federal Okrug. According to *Nezavisimaya Gazeta*, during a security checkup operation officers of the Federal Security Service managed to enter the plant's reactor room without any significant difficulties. The newspaper article does not disclose which plant it was.

-Sergey Grigoryev, "Gryaznyye tantsy na atomnoy stantsii. Minatom v skandale," *Nezavisimaya Gazeta*, 14 December 2001; in Universal Database of Central Russian Newspapers, <http://news.eastview.com>.

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2000

31 March 2000

EXPANDED MINATOM COLLEGIUM EXAMINES NPP ENERGY PRODUCTION, SAFETY

During the Expanded Minatom Collegium, which Snezhinsk (Chelyabinsk-70) hosted on 31 March 2000, President

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Elect Vladimir Putin, Minister of Atomic Energy Yevgeniy Adamov, and other specialists from Russian nuclear research institutes discussed energy production, safety, and funding at Russia's NPPs. (For details, see the 31 March 2000 entry in the Weapons Facilities and Closed Cities Developments section.) During the open session of the collegium, Putin noted that nuclear energy could become the top priority for further development of the Russian fuel and energy complex; he cited Russia's "unlimited" supply of natural uranium as an advantage enjoyed by Russian NPPs. Adamov predicted that in the next five years, Russian nuclear engineers could increase electricity exports fivefold and electricity production by 80 percent. Although Minatom has drawn up plans to further develop nuclear power engineering, the lack of investment funds has limited Russia's ability to implement these programs. Director of Elektrostal's Machine Building Plant (MSZ) Valeriy Mezhujev reported that NPPs paid cash for less than ten percent of the total balance due for fuel rods manufactured at MSZ; the remaining debt was settled via barter arrangements and mutual debt offsets. Gosatomnadzor Chairman Yuriy Vishnevskiy stated that the nuclear energy sector must undergo modernization and security upgrades. In response to calls for the expansion of nuclear power production, he cautioned that it would be very difficult to increase productivity using existing equipment and retain the relatively high safety level at the NPPs.

-Vladislav Pisanov, "Vozmite primer s Gazproma," Trud, 4 April 2000; Larisa Aydinova, Valeriy Virkunets, and Gennadiy Voskresenskiy, "My obrechny razvivat yadernyy kompleks," Vek, No. 14, 7-13 April 2000, p. 8; Elena Mazanova, "Snezhinskiy forum," Gorodskoy kuryer, www.sarov.nnov.ru, 6 April 2000.

April 2000

1999 RESULTS: NUCLEAR COMPLEX EARNINGS UP; NPPs PRODUCE 120 BILLION KWH

In April 2000 Minatom announced that Russia's nuclear complex production was worth 18 billion rubles (about \$630 million as of 12 April 2000) in 1999, an increase of 23% since 1998 (in prices indexed for inflation). Investment totalled 10.6 billion rubles (about \$371 million as of 12 April 2000). Export earnings added up to \$1.9 billion, including \$74 million from NPP electricity exports. Minatom enterprises paid the federal government \$1.9 billion in 1999, which equals one quarter of all federal revenues resulting from foreign economic dealings for the year. The high earnings level allowed Minatom to increase salaries by up to 2,200 rubles (about \$77) per month throughout the industry. Nuclear power generation has also been rising: Russia's NPPs produced 120 billion kWh in 1999, up 16% from 1998 levels; this is the highest production level since 1991. Further, Minatom expects the NPPs to produce 130 billion kWh in 2000.

-Mikhail Klasson, "Minatom otchitalsya za proshlyy god," Vremia MN, <http://news.mosinfo.ru>.

April 2000

MINATOM INVESTMENT PLANS DEPEND ON TARIFF INCREASES, SPENT FUEL IMPORTS

On 18 April 2000 at a meeting of the board of the Union of Nuclear Power Engineering Territories and Enterprises held at the Federation Council, Deputy Minister of Atomic Energy Bulat Nigmatulin stated that the service life of first-generation NPPs at Novovoronezh, Kola, Leningrad and Kursk must be extended in order to meet increasing Russian electricity needs. He said that the modernization of NPPs "corresponded to world practice." Minatom intends to produce 30% of Russia's power by 2005, and up to 40% by 2010. However, Nigmatulin said that unless NPP electricity rates were doubled, the NPPs would go bankrupt. An increase in NPP electricity output would require the completion of NPPs under construction. Construction has fallen behind due to financing difficulties.

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However, Minatom hopes to earn \$20 billion importing foreign spent fuel for reprocessing.

- "Minatom RF otstaivayet neobkhodimost prodleniya srokov sluzhby AES pervogo pokoleniya," Interfax, 18 April 2000; Yekaterina Kats, "'Yevgeniy Adamov igrayet 'ponyatiyami'," *Segodnya*, 12 April 2000, <http://news.mosinfo.ru>.

April 2000

GOSATOMNADZOR QUESTIONS NPP SAFETY, SAYS \$624 MILLION NEEDED FOR SAFETY RESEARCH IN 2000

On 18 April 2000 at a meeting of the board of the Union of Nuclear Power Engineering Territories and Enterprises held at the Federation Council, Gosatomnadzor Chairman Yuriy Vishnevskiy said that 18 billion rubles (nearly \$624 million as of 18 April 2000) must be spent in 2000 for research on increasing NPP safety. He said that NPPs not undergoing safety upgrades should be shut down. A recent inspection of Novovoronezh NPP Unit 3 indicated that the reactor vessel was "no stronger than a sheet of paper." However, as of April 2000 no full-scale study was being done on projects to increase reactor safety. On 22 April Vishnevskiy, speaking at the Duma, reported that NPP violations increased by 30 percent in 1998, fell slightly in 1999, but were already up in the first quarter of 2000 (10 violations as compared to eight in the first quarter of 1999). He also said that Russia had surpassed the US and France in the number of incidents per year. In contrast, Minister of Atomic Energy Yevgeniy Adamov recently emphasized Russia's positive safety record, stating that Russian NPPs had fewer automatic shut-downs than other nations' NPPs. Duma Deputy Ivan Nikitchuk (Communist), however, said that there is growing pressure on NPP directors to scale down and postpone repairs of power units. He said further that Adamov's cadre policy vis-a-vis Rosenergoatom was to blame for many of the NPP difficulties, pointing out Adamov's 1998 appointment of Leonid Melamed, a man without the necessary clearance to work at NPPs, to head Rosenergoatom, and his January 2000 replacement by Yuriy Yakovlev.

- "Atomshchikam Rossii nuzhno 18 mlrd. rubley dlya obsledovaniya bezopasnosti AES v 2000 godu," Interfax, 18 April 2000; Yekaterina Kats, "On the Threshold of a New Chernobyl; Gosatomnadzor Believes Rosenergoatom to Be 'Empty Place'," *Segodnya*, 22 April 2000 in "Gosatomnadzor Chief Warns of Safety Violations," FBIS Document CEP20000424000203; Yekaterina Kats, "'Yevgeniy Adamov igrayet 'ponyatiyami'," *Segodnya*, <http://news.mosinfo.ru>, 12 April 2000.

14 April 2000

DUMA PASSES LAW INCREASING FINES FOR BREAKING NUCLEAR POWER LAWS

On 14 April 2000 the Duma passed the law On organizations' administrative responsibility for violating legislation on nuclear energy use. The law provides for fines of 150 to 500 times the minimum wage, as well as other measures. The law was first passed by the Duma on 4 November 1998, but was subsequently rejected by Yeltsin on 26 November 1998.

- "Gosduma uzhestochila zakon ob atomnykh predpriyatiyakh," Praym-TASS, 14 April 2000 in [Gazeta.ru](http://www.gazeta.ru), www.gazeta.ru.

3 June 2000

UNDERGROUND NPPS PROPOSED FOR KALININGRAD OBLAST, THE KOLA PENINSULA, AND PRIMORSKIY KRAY

According to *Kaliningradskaya Pravda*, the Kurchatov Institute is seeking a suitable site in Kaliningrad Oblast to construct an underground nuclear power plant. The newspaper notes that there has been no public discussion of

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the plan. In a related development, the Union of Russia and Belarus Executive Council has drafted a program to build five underground thermal NPPs in Belarus and two in Russia in Snezhnogorsk (Murmansk Oblast) and in Bolshoy Kamen (Primorskiy Kray) between 2001 and 2005. Additional underground NPPs may also be built in Chukotka, Kamchatka and Sakhalin. The subterranean thermal nuclear electric power plant (PTAES) project was jointly developed by Minatom and Shipbuilding Agency enterprises. The Baltic Shipyard is manufacturing the underground NPPs in cooperation with other St. Petersburg enterprises. UK-900 reactors, similar to those in icebreakers, will be used. The nuclear waste generated by the new underground NPPs is to be processed in Chelyabinsk (Mayak) and the recovered fuel will be used in RBMK-type reactors. For previous underground NPP plans, see the 8/30/96 development under NPP developments.

-"Underground nuclear power plant proposed for Kaliningrad," Bellona, www.bellona.no; Sergey Anisko, "Nuclear Power Stations Will Be Hidden from Human Eyes," *Segodnya*, 03 June 2000 in "Belarus, Russia Planning Joint Underground Nuclear Power Stations," FBIS Document CEP20000605000171; Vadim Sekhovich, "Atom Under Feet. Subterranean Nuclear Electric Power Plants Could Emerge in Belarus," *Belorusskaya delovaya gazeta*, 31 May 2000 in "Belarus: Russia Nuclear Power Aid Offer," FBIS Document CEP20000602000114.

July 2000

ROSENERGOATOM AND UNIFIED ENERGY SYSTEM SIGN NEW PAYMENTS AGREEMENT

After a series of talks in July 2000, Rosenergoatom head Yuriy Yakovlev and Anatoliy Chubays, head of Unified Energy System (RAO YeES Rossii), concluded a new payments agreement. YeES Rossii had failed to adhere to an earlier agreement, signed in February 2000, which obligated the energy company to increase cash payments to Rosenergoatom, while Rosenergoatom was to increase electricity production. As of July 2000, Rosenergoatom production accounts for 38 to 40 percent of the electricity sold via the Federal Wholesale Market for Electricity and Generating Capacity (FOREM). However, as of the end of June 2000 YeES Rossii owed Rosenergoatom 13 billion rubles (about \$463.8 million as of 5 July 2000), nearly 2 billion rubles (about \$71 million) more than on 1 January 2000. The lack of payments reportedly threatens NPP safety and could lead to the shutting down of some reactors, which would then lead to power cut-offs in whole regions. In the new July 2000 agreement, therefore, YeES Rossii promised gradually to increase the cash portion of its payments to Rosenergoatom from 50 percent to 65 percent. YeES Rossii agreed to pay Rosenergoatom 700 million rubles (about \$24.9 million as of 5 July 2000) in July, while in December 2000 it will pay 1.7 billion rubles (about \$60.6 million as of 5 July 2000). According to Minister of Atomic Energy Yevgeniy Adamov, these funds will enable Rosenergoatom to pay 40 percent of its debt for nuclear fuel and 15 to 20 percent of its debts to its auxiliary organizations. Chubays also committed YeES Rossii to paying 100 million rubles (about \$3.6 million as of 5 July 2000) toward the construction of the new Rostov NPP. The new NPP will cost 4.5 billion rubles (about \$160.5 million as of 5 July 2000). (For more information on Rostov NPP, see the Rostov-na-Donu NPP section).

-Andrey Makeyev, "Chubays poobeshchal vyplatit dolgi atomshchikam," *Nezavisimaya Gazeta*, <http://news.mosinfo.ru>, 5 July 2000.

5 December 2000

INCREASED RADIATION LEVELS DETECTED NEAR NOVOVORONEZH NPP

On 5 December 2000, Interfax reported that radiation monitoring in the exclusion zone surrounding the

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Novovoronezh nuclear power plant revealed a localized site with radiation exceeding natural levels. The Russian Emergencies Ministry reported that heightened radiation was recorded near a drainage canal from Unit 1 (VVER-210 reactor, operational 1964-1988) and Unit 2 (VVER-365 reactor, operational 1969-December 1990). The area was surrounded with barbed wire and warning signs. Air, water, and soil samples were taken to investigate the cause of the increase. The power plant contains two operational first-generation VVER-440 reactors (Units 3 and 4) and one operational VVER-1000 reactor (Unit 5).

- "Bliz nerabotayushchikh energoblokov Novovoronezhskoy AES vvyavlen povyshenny uroven radiatsii," Interfax, www.interfax.ru, 5 December 2000.

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1999

January 1999

DRAFT 1999 BUDGET INCLUDES INVESTMENT IN NEW NPPS

The draft of the 1999 Federal Targeted Investment Program includes the section "Russian Federation Nuclear Power Generation Development Program for 1998-2005 and the Period through 2010," in which 2,600 million rubles (\$124 million as of 1 January 1999) are earmarked for state investment in nuclear power generation. Among the funded projects, are Kalinin-3, Kursk-5, Rostov NPP, the South Urals NPP, the new NPP at the Northwest Scientific-Industrial Center for Atomic Energy, and feasibility studies for the Far East, Primorskaya, floating and other NPPs.

-Aleksy Yablokov, "Wasteful Poverty," *Novyye Izvestiya*, 27 January 1999; in "Budget Hit as 'Wasteful,' 'Militarized,'" FBIS Document FTS19990129000463.

5 January 1999

ELECTRICITY EXPORT A PRIORITY

According to Minister of Atomic Energy Yevgeniy Adamov, increasing exports of electricity generated by Russian NPPs is a priority for the Ministry but this is contingent on the improvement of the industry's infrastructure. Export power lines must be constructed and the electric current must match that of the importer. Adamov added that NPPs generate 13 percent of the energy produced in Russia, at the relatively cheap rate of 11-16 kopeks per kilowatt-hour.

- "Russia Moves to Become Leader in Nuclear Fuel Recycling" FBIS-SOV-99-005, 5 January 1999.

February 1999

DIRECT SALES OF ELECTRICITY FROM RUSSIAN NPPs TO CONSUMERS WILL NOT HAPPEN SOON

Several NPPs have requested permission to sell electricity directly to industrial consumers or individual regions, in order to eliminate middlemen and improve cash flow. See, for instance, the 2/98 entry under Kalinin NPP. The Chernomyrdin government has issued several decrees on the issue, beginning with the 16 November 1996 Decree No. 1358 On Procedures for Organizing Direct Payments in the Federal (All-Russia) Wholesale Market for Electricity and Generating Capacity, which included a list of major consumers that would make direct payments to nuclear

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power industry enterprises. The Balakovo NPP drafted nearly 10 direct contracts to sell power to enterprises that manufacture products for export, but Moscow has been slow in completing the deals. Balakovo NPP Director Pavel Ipatov says the idea of direct contracts appears to have been postponed for now, as Moscow is concentrating on working out the details of an agreement between Rosenergoatom and YeES Rossii.

-Sergey Sergiyevskiy, "Four Blocks on Line, Two in Mind: The Country's Largest Nuclear Power Plant," *Nezavisimaya Gazeta*, 4 February 1999, p. 4 in "Balakovo Nuclear Station Problems," FBIS Document FTS19990214000616; Government Decree No. 1358, O poryadke organizatsii pryamykh platezhey na federalnom (obshcherossiyskom) optovom rynke elektricheskoy energii (moshchnosti), *Rossiyskaya Gazeta*, No. 226, 26 November 1996, p. 5.

11 February 1999

RUSSIAN CABINET APPROVES DRAFT NUCLEAR COOPERATION AGREEMENT WITH OECD

Russia and the OECD aim to sign an agreement outlining their cooperation in areas such as the nuclear and radiation safety of civilian nuclear facilities, nuclear energy use, nuclear fuel cycle activities, and the decommissioning of nuclear facilities. The draft agreement was approved by Russian government decree No. 158 on 11 February 1999. The agreement will allow Russia to participate in OECD's international projects and information exchange programs.

-"Rossiya namerena podpisat deklaratsiyu o sotrudnichestve s Agenstvom po yadernoy energii OESR," Interfax, No. 3, 15 February 1999.

27 April 1999

RUSSIAN NPPs MAY BE POOLED INTO A SINGLE COMPANY

On 27 April 1999, Russian Deputy Minister of Atomic Energy Bulat Nigmatulin proposed uniting Russian nuclear power plants under a single generating company. The new company would presumably conduct a unified nuclear policy; work on lowering electricity fees, including export prices for electricity; and consolidate investment funds. The unified company would be more competitive at the Federal Wholesale Market for Electricity and Generating Capacity (FOREM).

-Anna Bazhenova, ITAR-TASS, 27 April 1999 in "Russian Official Proposes Joint Nuclear Power Company," FBIS Document FTS19990427001715; Mariya Ignatova, Andrey Ivanov, "Nuclear Fusion. Nuclear Power Industry Unites in Order to Obtain More Money," *Izvestiya*, 29 April 1999 in "Nuclear Power Stations to Unite for Financial Benefit," FBIS Document FTS19990430000556.

25 May 1999

KURCHATOV INSTITUTE TO SELL MINI-NPPs TO KORYAK OKRUG

Kamchatka Oblast authorities intend to purchase 10 "mini" nuclear power plants designed by the Kurchatov Institute.

June 1999

CONSTRUCTION OF NOVOVORONEZH NPP-2 LICENSED

Gosatmnadzor has licensed the construction of a new nuclear power station with an improved safety system and a VVER-1000 reactor on the site of the existing Novovoronezh NPP. The main developer of the reactor is Atomenergoprojekt. The unit will take ten years to build. Financing construction is problematic. As of June 1999,

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Russian law does not permit nuclear power plants to be leased, making the attraction of Russian and foreign private capital difficult.

-ITAR-TASS; in "New Russian Nuclear Station Hits Financial Problems," FBIS Document FTS19990603001324.

9 June 1999

FEDERATION COUNCIL DECREE ON NUCLEAR POWER ENGINEERING

On 9 June 1999 the Federation Council passed the decree On the state and development prospects of nuclear power engineering in the Russian Federation. The decree includes requests that President Yeltsin issue an edict on measures to stabilize the nuclear power industry and that the government consider measures to fulfill the Program for Development of Atomic Energy in the Russian Federation in 1998-2005 and for the Period until 2010, particularly the investment projects. The decree also recommends that the government institute a new payment system between electricity consumers and producers when purchases are made via the Federal Wholesale Market for Electricity and Generating Capacity (FOREM), restructure NNP and Rosenergoatom debts to the federal government such that the moneys in question be used for investment in the nuclear power industry, and create a single generating company (see 4/27/99 item). In addition, the decree asks the government to work out legislation regulating the procedure for freezing the assets of NPPs, and recommends that the government pass the natural monopoly bankruptcy law and other laws relating to the nuclear industry. Finally, the decree suggests that regional governments create regional energy investment funds, and, together with regional energy commissions, create regional wholesale electricity markets to foster competition between electricity producers.

-Federation Council Decree No. 237-SF, O sostoyanii i perspektivakh razvitiya atomnoy energetiki v Rossiyskoy Federatsii, 9 June 1999; in "The legislation in Russia," <http://law.optima.ru>.

2 July 1999

RUSSIAN OFFICIALS: MILLENNIUM BUG WILL NOT THREATEN RUSSIAN NUCLEAR ENERGY INDUSTRY

Russian nuclear energy industry officials maintain that the "millennium bug" poses little threat to Russia's nuclear power plants. Sergey Zykov, deputy head of the International Science and Technology Center (ISTC) believes that the threat is not serious because Russian NPP safety systems depend on computers much less than western NPPs. According to Zykov, in the worst case scenario the reactors will simply stop.[1] Deputy Minister of Atomic Energy Valentin Ivanov promised that Russia's 29 nuclear reactors will be free of the Y2K problem, and there will be no accidents or environmental contamination.[2,3] Ivanov said that the relevant enterprises have received all the necessary instructions and have appointed task forces responsible for nuclear safety. According to Ivanov, control systems are not date-dependent, and only the information and safety computer networks are date-dependent. Ivanov said a total of two hundred computers are to be replaced countrywide. He mentioned that from 21 December 1999 to 10 January 2000 all unscheduled maintenance and adjustment work will be banned.[3] Yuriy Sokolov, Minatom's top official in charge of the Y2K problem, said that experts had already checked 97 percent of the date-sensitive reactor components. Ivanov considers all systems that affect critical reactor operations safe.[2] Sergey Yemelyanov, a senior Minatom official, reported that Russian nuclear energy industry related enterprises had finished initial preparations to readjust equipment and software for the year 2000. Preliminary analyses show that nuclear and other emergencies are not likely. Whatever failures may occur, they will not lead to nuclear catastrophe. The readjustment of Russian NPPs is scheduled to be completed by September 1999.[4] Minatom

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applied to the Ministry of Finance for \$1.8 million to solve the Y2K problem, although Ivanov has little hope of getting the money from the federal budget.[3] According to government estimates, \$1 billion will be needed to solve the Y2K problem. The Federal Assembly has already finished drafting a Y2K-related bill, but it did not specify sources of financing.[5] ISTC has provided \$150,000 each to the Central Scientific Research Institute for Management, Economics, and Information (TsNIIAtominform) and the Ministry of Emergencies.[6] Russia's NPPs will also receive part of ISTC's \$1.5 million allocation for Y2K compliance projects.[5]

Sources:

[1] "Millennium Bug Poses Little Threat to Russian Nuclear Plants," Agence France Presse, 2 July 1999; in Lexis-Nexis Academic Universe, <http://web.lexis-nexis.com>.

[2] Michael Wines, "Reactors Largely Free of Computers," *New York Times*, 23 June 1999, p. A-8; in Lexis-Nexis Academic Universe, <http://web.lexis-nexis.com>.

[3] Oleg Lebedev, RIA Novosti, 21 May 1999; in "Russian Nuclear Industry Not Affected By Millennium Bug," FBIS Document FTS19990521001728.

[4] Aleksandr Kuznetsov, RIA Novosti, 28 May 1999; in "Nuclear Industry Coping With Y2K Issues," FBIS Document FTS19990528001773.

[5] Aleksandr Levinskiy, "Zagranitsa snova pomogayet," *Vremya MN*, No. 118, 6 July 1999.

[6] Vladimir Maryukha, "Y2K Problem: Solution of International Experts," *Krasnaya Zvezda*, 3 July 1999, p. 1; in "Y2K Funds For Nuclear Power Plants," FBIS Document FTS19990705001233.

19 November 1999

RUSSIA CONDUCTS SAFETY EXERCISES TO PREVENT Y2K PROBLEMS

The Russian NPPs have been taking measures to avert potential safety problems that may occur if outdated computer software confuses the date 2000 with 1900, otherwise known as Y2K problems.[1] According to Rosenergoatom, inventory and testing of date-dependent equipment and computer systems at the NPPs did not reveal malfunctions which might jeopardize the units' safe operation.[2] Similarly, the US Department of Energy reported on 19 November 1999 that safety tests of communication systems at the country's NPPs indicated no disruptions.[3] However, Rosenergoatom noted that auxiliary systems, including the monitoring computers, could fail, disrupting heat and electricity supply.[4] For this reason, training sessions to eliminate accidents in the power systems connected with NPPs are being held.[4] Other exercises have focused on preparing the staff for coping with the Y2K problem and recommending means of improved coordination between the individual NPP staff, Rosenergoatom, and other centers.[5] The United States has taken steps to improve the safety of the Russian NPPs [6] and committed money to help Russia adequately prepare for Y2K.[1] In October 1999, US media reports suggested that the Y2K problem might create emergency situations at Russian NPPs. Russian Minister of Atomic Energy Yevgeniy Adamov denied these reports, saying that Minatom inspections indicate that Russian NPPs will face no safety failures.[7]

Sources:

[1] Interfax Communications and Electronics Report for 25-31 August 1999, Vol. 4, Issue 35; in "Communications & Electronics 25-31 Aug," FBIS Document FTS19990830000771.

[2] Viktor Chemodurov, "AES-2000. U.S. Expert Daniel Kouch Is Not Afraid of Spending New Year's Eve in Russia," *Rossiyskaya Gazeta*, 3 November 1999, p. 1; in "More on Kursk N-Station Y2K-Crash Exercise," FBIS Document

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



FTS19991103001120.

[3] Jonathan D. Salant, "Energy Department Says Russian Nuclear Plants Y2K-Ready," Associated Press, 19 November 1999; in Lexis-Nexis Academic Universe, <http://web.lexis-nexs.com/universe>.

[4] Oleg Lebedev, RIA Novosti, 2 November 1999; in "Work on Y2K Continues at Russian Nuclear Power Plants," FBIS Document FTS19991102001057.

[5] Oleg Lebedev, RIA Novosti, 11 October 1999; in "Y2K Exercises at Nuclear Plants End Successfully," FBIS Document FTS19991011000522.

[6] "Y2K or Not, Russian Nuke Plants Need Safety Upgrades," Environment News Service, 30 September 1999, <http://ens.lycos.com>.

[7] Anna Varshavskaya, ITAR-TASS, 25 October 1999; in "Minister: Russian Nuclear Plants Will Cope with Y2K," FBIS Document FTS19991025001044.

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1998-1997

April 1998

NEW NPP TO BE BUILT IN SMOLENSK OBLAST

A new nuclear power plant (NPP) will be built in Smolensk Oblast. By 1 July 1998, the oblast authorities and the Smolensk NPP directorate are to prepare documents on the construction of Smolensk NPP-2.

-Viktor Artemenko, "Pod Smolenskom Budet Novaya AES," Pravda-5, www.mosinfo.ru.

June 1998

NIZHNIY NOVGOROD NPP TO BE CONVERTED INTO GAS POWER PLANT

The 75 percent-complete NPP in Nizhniy Novgorod, the construction of which was frozen because of local protests, will be converted into a gas power plant. The conversion will cost \$350 million, and is scheduled to be finished in two to three years. The conversion will be carried out by the Marubeni Corporation (Japan), Gazprom, and local enterprises.

-"Nuclear Power Plant in Nizhny Novgorod to Be Converted," Bellona: Nuclear Chronicle from Russia, May/June 1998, p. 10.

21 July 1998

RUSSIA ADOPTS NUCLEAR ENERGY DEVELOPMENT PLAN

On 21 July 1998, the Russian government signed decree No. 815, approving Minatom's "Program for Development of Atomic Energy in the Russian Federation in 1998-2005 and for the Period until 2010." Under this plan, 16 reactors will be built and nine will be decommissioned by 2010. Although other reactors will exceed their service lifetime in 2010, they will be upgraded to operate beyond their lifetime limits.[1] The main priorities will be to upgrade safety measures at existing reactors and to install new-generation VVER-640, VVER-1000, and BN-800 reactors with improved safety systems;[1,2] these will be an important factor in Russia's plans to establish a closed fuel cycle.[3] The program will be implemented along with the federal subprogram called "Environment-friendly

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Power Engineering." According to a Minatom spokesman, Russia's currently operating reactors, including graphite-moderated reactors, are to be phased out in favor of the newer reactors.[2] The program will cost approximately \$18 billion, \$10.4 billion of which will be provided by Rosenergoatom, and the rest by the federal budget.[1] Since federal funding can be unreliable, Rosenergoatom will apply for a \$290 million loan from the EU, increase revenue from export contracts, and modernize or extend the lifetime of existing NPPs and sell the electricity they produce in order to obtain additional funds.[1,4] The program is aimed at improving the "structure of Russia's power balance," ensuring Russia's power security, and expanding Russia's exports of nuclear power technology based on new-generation reactors.[3] Russian Minister of Atomic Energy Yevgeniy Adamov has suggested that that all the ministry's enterprises be united under a state-owned company (Atomprom) in order to increase the efficiency of the nuclear energy industry. This idea is supported by Russian First Deputy Prime Minister Yuriy Maslyukov.[5]
 Sources:

[1] Igor Kudrik, "Nuclear Power for the Next Century," *Bellona: Nuclear Chronicle from Russia*, September/October 1998, p. 17.

[2] Galina Baryshnikova, "Russia to Build Nuclear Generating Stations of New Generation in the Coming Years with the Employment of Reactors with an Improved Safety System," *RIA Novosti*, www.ria-novosti.com, No. 046, 29 April 1998.

[3] "Russia's new nuclear power programme approved," *Nuclear Engineering International*, Vol. 43, No. 524, March 1998, p. 6.

[4] "Pravitelstvo utverdilo programmu razvitiya atomnoy energetiki do 2010 Goda," *Yadernyy Kontrol*, No. 4, July/August 1998.

[5] Tony Wesolowsky, "Russia: Nuclear Power Plans Move Forward," *Radio Free Europe/Radio Liberty*, www.rferl.org, 22 February 1999.

October 1998

ROSENERGOATOM AND UNIFIED ENERGY SYSTEM SIGN AGREEMENT

In October 1998, Rosenergoatom, the Unified Energy System (RAO YeES Rossii), the Ministry of Fuel and Energy, and the Ministry of Atomic Energy signed an agreement on energy output, the transfer of debts and contracts, the proportion of payments NPPs will receive from YeES in cash equivalents, and energy exports. Before the agreement, NPPs sought payment from regional energy companies, while those companies were responsible for collection from power consumers. According to the agreement, debts of some consumers will be transferred directly to Minatom, while some other consumers will draw up contracts for direct payment to Rosenergoatom. The NPPs are obliged to increase production of electricity, in exchange for the above-mentioned increase in cash payments. The agreement also proposes the transfer of the Northwestern heat and power plant (TETs) to Minatom, and the possible joint administration of one or two NPPs by one or two of the regional energy companies and marketing organizations. According to Rosenergoatom Director Leonid Melamed, the agreement also envisions the introduction of a mechanism whereby enterprises under federal control will pay nuclear power stations directly. A future agreement will deal further with questions of export policy, investment, and the use of federal budget debts.

-Vladislav Maksimov, "A Meter for Two Apartments," *Ekspert*, No. 42, 9 November 1998, pp. 12-13 in "YeES, Atomic Power Industry Accord," FBIS Document FTS19981118001338; Mariya Ignatova, Andrey Ivanov, "Nuclear

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Fusion. Nuclear Power Industry Unites in Order to Obtain More Money," *Izvestiya*, 29 April 1999, p. 1 in "Nuclear Power Stations to Unite for Financial Benefit," FBIS Document FTS19990430000556.

October 1998

RUSSIA TO COOPERATE WITH JAPAN ON FBR RESEARCH

In October 1998, Russia and Japan signed an agreement in principle on joint research for the development of FBRs, especially the BN-800. Informal talks in April between Rosenergoatom Director Vitaliy Ignatenko and Yoshihiko Nakazato, Chairman of Electronic Industries Association of Japan, preceded the signing of the agreement. The research will take place in conjunction with research on the conversion of weapons-grade plutonium dismantled from Russian nuclear warheads. The program's details will be revealed in March 1999, with Tokyo to begin fulfilling its obligations on 1 April 1999. Japan will presumably help Russia with the design and construction of the BN-800 plant. Russia also needs to purchase necessary equipment for the BN-800 from the West. One of the potential sellers could be Siemens of Germany, which could assist Russia in obtaining loans from European banks. According to Akira Okayoshi, a professor at the University of Tokyo, Japan is interested in cooperating on a broad range of issues under the FBR program, including extending the life span of NPPs, developing vibration compaction technology, safety issues, and so forth.

- "The President of Rosenergoatom Requests Japanese Participation in the Construction of BN-800," Japan Atomic Energy Industrial Newsletter, 16 April 1998; Aleksandr Kopnov, ITAR-TASS, 21 October 1998 in "Russia, Japan to Jointly Develop Breeder Reactors," FBIS-SOV-98-294; "FBRs in Russia: Reporting Conference on the Situation of FBR Development in Russia," Japan Atomic Energy Industrial Newsletter, 26 March 1998.

1 December 1998

FIRST SESSION OF NUCLEAR POWER ENGINEERING CITIES AND ENTERPRISES INTERREGIONAL ASSOCIATION COUNCIL TAKES PLACE

The Nuclear Power Engineering Cities and Enterprises Interregional Association Council met for the first time, in Sosnovyy Bor. Nuclear Council representatives discussed the issue of possible future electricity shortages in Russia's central areas when first-generation reactors are decommissioned in 2001 - 2005. The Nuclear Council outlined several proposals to the Russian government for dealing with the energy crisis, including a draft program detailing emergency measures to support replacement of nuclear reactors and a request to adopt federal laws on the use of nuclear energy.

-A. Aleksandrov, "We Need to Be Worried about Tomorrow Today," *Atompressa*, No. 43, December 1998, p. 1; in "Nuclear Council of Interregional Associations Appeals to Le [sic]," FBIS Document FTS19990125000612.

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1996

January 1996

KUZNETSOV UNVEILS THREE PART PLAN

During a joint seminar in Tokyo (January 22-24) between MINATOM and the Japan Atomic Industrial Forum under

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the theme of "Future Light Water Reactors," Mr. Kuznetsov of MINATOM outlined the three stages of the authorized plan for nuclear power development in Russia. Phase One, from 1996 to 2000, includes retrofitting of operating NPPs and increasing installed capacity at NPPs with the construction of additional units. Phase two, from 2000 to 2010, includes commissioning next-generation nuclear units, developing prototype NPPs based on new designs and technologies, and decommissioning power units whose design life has been exceeded. Phase three, after 2010, includes developing large-scale nuclear engineering projects, solving problems with meeting power demand and ecological requirements, and implementing new technologies.

- "Russia's MINATOM and JAIF Hold Joint Seminar on Future LWRs," *Atoms in Japan*, Feb./Mar. 1996, pp. 22-23.

18 January 1996

ROSENERGOATOM REPORTS FEWER INCIDENTS

Rosenergoatom, an agency coordinating operations of Russian nuclear power plants, reported that the overall level of safety at nuclear facilities has improved in recent years. The number of incidents at nuclear power plants decreased threefold in 1995. However, the nuclear industry in general is facing a financial crisis. The debt of energy consumers to the industry is 2.5 billion rubles.

- "NPPs Are Better Today Than Yesterday," *Segodnya*, 1/18/96, p. 9.

22 February 1996

GOSATOMNADZOR MEETS WITH INDUSTRY OFFICIALS

Gosatomnadzor held a meeting with nuclear industry officials on the issue of nuclear power plant fire safety. Due to financial and logistical difficulties the implementation of laws "On Fire Safety" (1994) and "On Nuclear Energy Use" (1995) is hindered. The fire fighters in the nuclear industry have insufficient equipment.

- "Pozhary na AES ne isklucheny," *Nezavisimaya Gazeta*, 2/22/96, p. 6.

5 April 1996

EBRD TO PROVIDE GRANTS TO IMPROVE EIGHT REACTORS

The European Bank for Reconstruction and Development (EBRD) will provide a \$100 million grant to improve safety at eight Russian nuclear reactors, including three VVER-440s at the Novovoronezh plant and two VVER-440s at Kola.

- "EBRD Provides \$100 Million for Reactor Safety," *Post-Soviet Nuclear & Defence Monitor*, 4/05/96, p. 13.

May 1996

ROSENERGOATOM RATES NPPS

Rosenergoatom held a contest for the best Russian nuclear power plants of 1995. The winners were Balakovo, Beloyarsk, and Bilibino.

- "Pozdravlyayem Balakovskuyu, Beloyarskuyu i Bilibinskuyu AES...," *Atompressa*, 5/96, p. 4.

14 May 1996

DECOMMISSIONING OF RUSSIAN REACTORS TO START IN 2001

Kommersant reported that 11 Russian nuclear reactors will reach the end of their service lives in the coming decade and decommissioning must begin in five years. By 2020, all 29 currently operational reactors must be

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decommissioned. If Russia were to decommission all RBMK reactors ahead of schedule, as the G-7 has requested, the cost per reactor would be over \$400 million --one and a half times the cost of decommissioning a reactor on schedule.

-Aleksey Sinitskiy, "Yadernaya osen'," *Kommersant*, 5/14/96, p. 27.

June 1996

GORE-CHERNOMYRDIN STUDY

According to a study done by the Gore-Chernomyrdin commission, the Russian nuclear power industry will need a \$30 to 80 billion investment in the next ten to fifteen years. In the period from 1996 to the year 2000 the first generation nuclear power plants would have to be modernized, their capacity and network increased.

-"Za svetloe budushee nado platit," *Ekonomika I Zhizn*, 6/96, p. 2.

6 June 1996

TACIS AID TO BE CUT 20 PERCENT

Gennadiy Nefedov, deputy head of the foreign affairs department of Minatom, stated that financial aid for enhancement of nuclear power safety under the TACIS program would be cut by 20 percent.

-"Zapad snizhaet finansirovaniye rossiyskikh AES," *Segodnya*, 6/6/96, p. 1.

19 June 1996

MIKHAILOV COUNTS INCIDENTS AT NPPS

According to Minister of Atomic Energy Viktor Mikhailov, in 1995, there were only three INES-rated incidents at Russian NPPs, none of which was rated higher than 2. (See also 12/27/95 entry, which differs slightly.)

-"Bomby i megavatty: pyat' kitov, na kotorykh derzhitsya Minatom," *Krasnaya Zvezda*, 6/19/96, p. 4.

2 July 1996

YELTSIN SIGNS DECREE

Russian President Boris Yeltsin today signed a decree which calls on the government to develop and approve by 9/1/96 the framework for a federal wholesale electricity market, and to work out a procedure by which major consumers can pay nuclear power plants directly for the power used. YeES Rossii was told to pay off its debts to all NPPs and send copies of the relevant documentation to the government and Security Council.

-"Russian N-Plant Cash Crisis Deepens," NUCNET, 9/23/96.

8 July 1996

MINATOM, NUCLEAR WORKERS' UNION SEND LETTER TO LEBED

Atomic Energy Minister Viktor Mikhailov and union representative V. Startsev addressed Russian Security Council Secretary Aleksandr Lebed in an open letter asking him to take steps to ameliorate the crisis the nuclear industry is facing: to call on YeES Rossii to work out (and stick to) a debt payment schedule; to call on the Ministry of Finance to reconcile the mutual debts of the NPPs and government enterprises, agencies, and ministries; and to support Minatom's request for a forbearance on money owed to government funds. A working group of the Security Council has also recommended concrete measures to prevent delays in wage payments at NPPs, including

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requiring YeES Rossii to pay off all debts to NPPs in 8/96.

-"Sdelano mnogo, no, vse li?" *Atompressa*, No. 27, 8/96, p. 1.

24 July 1996

POWER PLANTS DEEPER IN DEBT

Izvestiya reported that a number of NPPs are engaging in acts of protest due to wage arrears. A Minatom official charged YeES Rossii, a company with a virtual monopoly on energy, with consciously aggravating the situation. According to *Izvestiya*, 85 billion rubles are needed to pay all back wages. On 7/1/96, nuclear industry union leader Vladimir Kashkin stated that consumers owe Russian nuclear power plants 6 trillion rubles. The amount of wages owed NPP workers has reached 5 billion rubles. Though there have been protests at individual power plants, the union will not take any nationwide actions until after the elections on 7/3/96.

-Yuriy Nevezhin, "Mirnyy atom nastroyen na boyevoy lad," *Izvestiya*, 7/24/96, p. 2; "Massovye aktsii protesta na AES neizbezhny, pologayet odin is liderov otraslevogo profsoyuza," INTERFAX, 7/1/96.

August 1996

GOSATOMNADZOR RELEASES 1995 ACTIVITIES REPORT

Yadernyy Kontrol published a report by Nikolay Filonov, a Gosatomnadzor official, on Gosatomnadzor's activities in 1995. The report notes that in 1995, a total of 120 incidents occurred at all Russian NPPs; the figure for 1994 was 140 incidents. Most incidents occurred at the Kola and Novovoronezh plants, and were attributed to both human error and aging equipment. The report also noted that not one Russian NPP has adequate facilities to store liquid waste in the event of an accident. In accordance with Presidential Directive No. 283, Gosatomnadzor has the authority to approve or reject applications to run nuclear and radiation-related enterprises. In 3/95, Gosatomnadzor granted temporary permission to operate Smolensk-3 and, at the time the report was written, was considering applications for operation from Balakovo-2 and -4, Beloyarsk-3, Leningrad -2 and -4, Novovoronezh-5, Kalinin-1, and Bilibino-1, -2, -3, and -4, in addition to applications to build next-generation VVER-640 reactors at Kola NPP-2 and the Scientific Research and Technological Institute in Sosnovyy Bor.

-Nikolay Filonov, "O deyatel'nosti Gosatomnadzora v oblasti yadernoy i radiatsionnoy bezopasnosti Rossii v 1995 godu," *Yadernyy Kontrol*, No. 20-21, 8-9/96, pp. 31-34.

25 August 1996

LOW ENERGY PRICES PRODUCE A SHORTAGE OF FUNDS FOR ROSENERGOATOM

Lack of funding threatens to cause the closure of some of Russia's nuclear power stations, said a spokesman for Rosenergoatom. Russia's United Power Grid (YeES) owes 5 trillion rubles (\$940 million) to Rosenergoatom, according to an OMRI report. Interfax and BBC World Service reported an estimated debt of "more than 4 trillion rubles (\$750 million)." Low energy prices paid by consumers are considered to be a major reason for the debt and for Rosenergoatom's inability to finance repair works at nuclear plants. These financial difficulties undermine Russia's plans, articulated by a Minatom official, to produce approximately 12 percent of its electricity from nuclear power plants. To maintain that 12 percent level, total nuclear capacity must be increased from the existing 22,000 MW to 28,000 MW despite the concurrent need to decommission the sources of nearly 9,000 MW of nuclear energy by 2010. Such an increase in nuclear energy capacity, which according to Minatom official requires at least 15 new plants, is unlikely due to the shortage of funding and protests of environmentalists.

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-Natalia Gurushina, "Nuclear Power Plants May Face Stoppage," *OMRI Daily Digest*, No. 165, Part I, 9/26/96; INTERFAX quoted in "Cash-Strapped Russian N-plants May Face Shutdown," *Reuter*, 8/25/96; "Funding Problems Afflict Russia's Nuclear Power Industry," *BBC World Service*, 8/27/96, in MONITOR - A DAILY BRIEFING ON THE POST-SOVIET STATES, 8/28/96.

27 August 1996

ROSENERGOATOM WARNS NPPS MAY CLOSE DOWN

Rosenergoatom announced that YeES Rossii (United Energy System of Russia) owes Russian nuclear power plants a total of 4 trillion 845 billion 746 million rubles. NPPs can no longer maintain, repair, or modernize their facilities, and Rosenergoatom says that soon, they will no longer be able to guarantee safety and will therefore have to be shut down.

-"Neplatezhi mogut privesti k zakrytiyu AES," *Finansovyye Izvestiya*, 8/27/96, p. 1.

30 August 1996

UNDERGROUND NUCLEAR POWER PLANT PROPOSED

The Krylov Central Scientific Research Center in St. Petersburg is working on a design for an underground nuclear power and heat plant, to be built near Snezhnogorsk, in the Murmansk region. According to the design, the plant will have four reactors with a combined capacity of 300 MW and will generate heat for residents of nearby towns. The plant's reactors will be modified versions of reactors found on nuclear-powered ships. Such reactors are manufactured at the Izhorsk factory in St. Petersburg.

-"Podzemnaya atomnaya," PRAVDA PYAT', 8/30/96-9/6/96, p. 6; "Viktor Mikhailov, Russian Minister of Atomic Industry: 'The Future of the Transpolar Power Industry Is Nuclear'," *Rabochaya Tribuna*, 7/26/96, p. 5, in FBIS-TEN-96-008, "Russia: Ships' Power Plants for Use in Small Nuclear Power Stations," 7/26/96.

September 1996

NEW NPP TO BE BUILT IN SOSNOVYY BOR

Gosatomnadzor has authorized Atomenergoprojekt to build a new nuclear power plant, designed by Gidropress, Atomenergoprojekt, and the Kurchatov Institute, in Sosnovyy Bor, 11 km from the Leningrad Power plant. The plant will use the new VVER-640 (a.k.a. V-407) reactor design, which has a capacity of 635 MWe, a greater number of control rods, and improved safety systems. The new plant will be managed by Rosenergoatom. Gosatomnadzor has also approved the construction of a nuclear power plant in Kola.

-"Go-ahead given for Sosnovy Bor," *Nuclear Engineering International*, 9/96, p. 8.

September 1996

ATOMENERGOPROYEKT SENDS NIZHNIY NOVGOROD NPP PROPOSAL

Atomenergoprojekt's Moscow branch has sent a proposal for the construction of a nuclear power plant to authorities in Nizhniy Novgorod.

-"Volga considers nuclear plant," *Nuclear Engineering International*, October 1996, p. 4.

1 September 1996

RUSSIANS OWE 5 TRILLION RUBLES FOR ELECTRICITY

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Rosenergoatom announced that as of 9/1/96, Russian consumers owed 5 trillion rubles to YeES Rossii, the grid company, making it impossible to guarantee nuclear power plants will be paid for the production of energy. Individual plants receive a share of the money YeES receives from consumers.

-*NUCNET News*, 449/96, 9/23/96, in Uranium Institute News Briefing 96.38-7, 9/18/96 - 9/24/96; "Russian N-Plant Cash Crisis Deepens," *NUCNET*, 9/23/96.

6 September 1996

NPP WORKERS PROTEST IN MOSCOW

On 9/5/96, labor leaders from all nine Russian nuclear power plants picketed in front of the Moscow offices of YeES Rossii to protest the nonpayment of over 130 billion rubles in back wages. Workers told *Izvestiya* that they would meet that day with Minister of Fuel and Energy Petr Rodionov. According to one worker quoted in *Izvestiya*, workers at some plants are preparing to take operational reactors off line if wages are withheld for much longer.

-Viktor Khamrayev, "Monopolizm RAO podtalkivayet rossiyskiye AES k zabastovke," *Segodnya*, 9/6/96, p. 2; Yuriy Nevezhin, "Atomshikam nekuda det'sya -- inache razbezhalis' by," *Izvestiya*, 9/6/96, p. 2.

10 September 1996

DEPUTY MINISTER OF FUEL AND ENERGY PROMISES NPPS MONEY

Deputy Minister of Fuel and Energy Viktor Kudryavyy promised NPP workers 40 billion rubles, to be taken from funding for the coal industry.

-Yuriy Nevezhin, "Golodovki na AES obespechili novomu ministru migren'," *Izvestiya*, 9/10/96, p. 2.

10 September 1996

GOSATOMNADZOR CLOSELY MONITORING PROTESTING NPPS

Nucleonics Week reported that Boris Oreshkin, deputy chief of Gosatomnadzor's Northern European District, stated that Gosatomnadzor's on-site inspectors are closely monitoring the situation at Russia's nuclear power plants, where numerous employee protests have taken place. Oreshkin stated that while there have not yet been any safety violations, should one occur at any plant, that plant's reactors would be immediately shut down.

-Ariane Sains, "Russian Regulator Says Safety not Harmed by Wage Default Protest," *Nucleonics Week*, 10/10/96, p. 13.

12 October 1996

WORKERS AT TWO RUSSIAN NPPS GO ON STRIKE

Rossiyskaya Gazeta reported that on 10/21/96, the workers of the Kalinin and Smolensk NPPs staged strikes. According to Boris Antonov, vice president of Rosenergoatom, the reactors are operating normally, and there is no threat to safety. Antonov stated that the first strike at a Russian NPP in history was begun in 8/96 at the Bilibino NPP. (See also Bilibino Developments, Kalinin Developments, Smolensk Developments.)

-Andrey Kirillov, "Vot i yadershchiki stolknulis' s ugrozoy zhizni...," *Rossiyskaya Gazeta*, 10/23/96, pp. 1, 3.

15 October 1996

PAYROLL PROMISE REPORTED BROKEN

According to Trud, Rosenergoatom promised to pay NPP workers their June wages on 10/15/96, but did not do so.

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Trud reported that employees at the Novovoronezh, Kola, and Smolensk plants had not received wages since June, and employees at the Balakovo, Beloyarsk, Bilibino, and Kursk plants had not received wages since July; workers are owed a total of 131.3 billion rubles. This report conflicts with a report by *Nezavisimaya Gazeta*, which states that Russian NPP workers were given their wages for May on 10/10/96, leaving an outstanding balance of 119.31 billion rubles. Yet another report, in *Nucleonics Week*, stated that on 9/1/96, YeES gave nuclear plants 18.6 billion rubles in order to cover April and May back wages; however, YeES was supposed to pay 82.1 billion rubles. -Fedor Yemchenko, "Chain Reaction of Protests," TRUD, 10/22/96, in "Tired, Underfed Staffers Threat to Nuclear-Station Safety," FBIS-SOV-96-206, 10/22/96; Andrey Vaganov, "Nuclear Power Stations Are on the Verge of Bankruptcy. In addition to Financial Problems, the Rosenergoatom Concern Could End Up Losing the System to Supervise the Operation of Its Stations," *Nezavisimaya Gazeta*, 10/17/96, p. 1; Ann MacLachlan, "Russian Plant Workers Talk Strike as Government Fails to Pay Debts," *Nucleonics Week*, 10/3/96, pp. 7-8.

17 October 1996

ROSENERGOATOM MAY BE FORCED TO MOVE

According to *Nezavisimaya Gazeta*, the government has adopted a draft decree that will move the Federal Energy Commission into the building that houses Rosenergoatom. Rosenergoatom president Erik Pozdyshev stated that this measure, if carried out, will reduce NPP supervision to its pre-Chornobyl state. Rosenergoatom's building is equipped to receive information on all Russian power plants (not just nuclear,) and also serves as the Central Control Post of Russia's Integrated Power Grid. If Rosenergoatom were forced to leave the building, it would lose its ability to regulate and monitor the country's nuclear power plants in an organized fashion for an undetermined period of time. Russian Atomic Energy Minister Viktor Mikhailov has appealed to the government to look for another site for the Federal Energy Commission. Pozdyshev stressed the importance of monitoring nuclear power plants in light of the current unrest among NPP employees.

-Andrey Vaganov, "Nuclear Power Stations Are on the Verge of Bankruptcy. In addition to Financial Problems, the Rosenergoatom Concern Could End Up Losing the System to Supervise the Operation of Its Stations," *Nezavisimaya Gazeta*, 10/17/96, p. 1.

13 November 1996

CENTRAL CHERNOZEM REGION FACING FUTURE ENERGY CRISIS

Pravda reported that the Central Chernozem region will face a severe energy crisis when the Kursk and Novovoronezh NPPs come to the end of their service lives in the next few years. These two NPPs produce up to 75 percent of the Central Chernozem region's electricity. As there are no power plants to replace Kursk and Novovoronezh, the region--one of Russia's most important industrial and agricultural regions--will face a severe power shortage, adversely impacting the Russian economy as a whole.

-Moisey Gelman, "Kurskaya duga rossiyskoy ekonomiki," *Pravda*, 11/13/96, pp. 1-2.

15 November 1996

MINATOM: 1ST GENERATION REACTORS TO GO BY 2005

According to Minatom, Russia will decommission all first-generation and some second-generation nuclear reactors by 2005. They will be replaced by more modern VVER and BN reactors. The plant most affected by this decision is the Leningrad (Sosnovyy Bor) NPP, which has 4 RBMK-1000 reactors. In addition, two VVER-440 reactors at

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Novovoronezh will be shut down, and reactors at the Kola and Kursk stations will also be replaced. Despite the economic crisis in Russia, and resultant delays in the construction of new reactors, Minatom intends to keep to the 2005 deadline.

-"Coming to the end of their service...," *Sovetskaya Rossiya*, 11/16/96, p. 2, in "All 1st, Some 2nd Generation Reactors to Be Replaced by 2005," FBIS-SOV-96-224, 11/16/96; "Yadernyye reaktory pervogo pokoleniya budut vyvedeny iz ekspluatatsiya k 2005 g.," *Segodnya* (On-line edition), No. 212, 11/16/96.

10 December 1996

SWISS-RUSSIAN REACTOR SAFETY SEMINAR IN MOSCOW

Pravda reported that representatives from Switzerland's Paul Scherrer Institut, Russia's Kurchatov Institute, and Russia's Scientific Research and Design Institute of Power Engineering (NIKIET) met in Moscow for a seminar on RBMK reactor safety. The Paul Scherrer Institut has been involved in a number of projects, all financed by the Swiss government, to increase safety at Russian RBMK reactors, including safety upgrades at Smolensk-3 and Novovoronezh-5.

-"RBMK stanut bezopasneye," *Pravda*, 12/10/96, p. 4.

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1995

1995

RUSSIAN NUCLEAR POWER PRODUCTION DECREASED 1993-1995

Russian nuclear power production was 99.3 TWh in 1995, down from 124 TWh in 1993.

-Working Document to the Scientific and Technological Options Assessment Panel of the European Parliament, "Nuclear Safeguards and Nuclear Safety in the East," November 1996, p. 71.

9 January 1995

RUSSIAN NUCLEAR POWER INDUSTRY \$300 BILLION IN DEBT

TVEL Director General Leonid Proskuryakov said that Russia's nuclear power industry is \$300 billion in debt and, despite government efforts, payment has been received only for approximately 3-5 percent of nuclear fuel delivered during the past several months.

-INTERFAX, 1/9/95; in "Official Notes Nuclear Plants' Money Problems," FBIS-SOV-95-006, 1/9/95.

10 January 1995

REPORTED VIOLATIONS AT MAYAK AND TOMSK-7 REACTORS

A report in NOVAYA YEZHEDNEVNAYA GAZETA said that safety requirements had been violated at Mayak's (Chelyabinsk-65) Ruslan and AF-2 reactors and at Tomsk-7's ADE-2, ADE-4, and ADE-5 reactors.

-Vladimir Kuznetsov and Anatoliy Shramchenko, "'Peaceful Atom?'" *Novaya Yezhednevnyaya Gazeta*, 1/10/95, p. 2; in "Analyst on Poor Record of Nuclear Supervision Committee," FBIS-SOV-95-013-S, 1/10/95.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



27 February 1995

RUSSIA, EU SIGN MEMORANDUM ON SAFETY ENHANCEMENT

Minatom head Viktor Mikhailov and EU Commission member Hans van den Broek signed a memorandum in Brussels calling for safety improvements at Russian nuclear power plants. The agreement is a part of the TACIS nuclear assistance program.

-INTERFAX, 3/1/95 in "Moscow, EU to Cooperate More on Nuclear Safety," JPRS-TEN-95-005, 3/1/95; also, "Nuclear Liability Pact Signed by Russia, European Commission," *Post-Soviet Nuclear & Defense Monitor*, 3/14/95, p. 7.

March 1995

US FIRM AND MINATOM AGREE TO DEVELOP A PLAN FOR USING WEAPONS-GRADE PLUTONIUM IN REACTORS

US General Atomics and Minatom reportedly agreed to work on a development plan for gas-cooled reactors that could use weapons-grade plutonium as fuel. Both parties agreed to spend \$1 million on the project which is expected to last 18-24 months.

-SPENT-FUEL, 3/13/95, p. 2; in "General Atomics of...," *The Uranium Institute*, 95/11, p. 1.

March 1995

TWENTY-NINE OPERATIONAL REACTORS AT NINE NPPS

Armen Abagyan, General Director of the All-Russian Institute of Nuclear Power Plant Operations, stated that at present, Russia is operating 29 reactors at 9 NPPs. Of the 29 reactors, 12 are first generation reactors. Russia has plans to shut down its first generation reactors at the beginning of the next millennium.

-"Fate of Nuclear Power Plants at the Turn of the Century," *Rossiyskaya Gazeta*, 4/28/95, p. 8.

March 1995

RUSSIAN NUCLEAR POWER PLANTS 1.78 TRILLION IN DEBT

Approximately 1.780 trillion rubles has not been paid to Russian nuclear power plants over the past two years. Russian nuclear power plants produced 98 TWh of electricity in 1994, down 30 percent from the year before. Total electric consumption in 1994 was 876 TWh.

-"Smolensk Shutdown Looms As Fuel Supply Dwindles," *Nuclear News*, 3/95, p. 46.

April 1995

GOSATOMNADZOR: NO INCIDENTS DECREASED SAFETY

Gosatomnadzor reported that there were no incidents that lead to a decrease in levels of nuclear and radioactive safety. However, there were two cases of capacity decreases on individual units, and eight instances of emergency protection systems going off on research reactors. Equipment failure was registered at the Beloyarsk and Kola nuclear power plants as well as on the research reactors in Dimitrovgrad and Dubna. The reason for the malfunctions at the Obninsk BR-10 research reactor was due to a fluctuation in the external current. The second research reactor at Obninsk was removed from operation until reasons for the emergency protection system going off could be found.

-"In April of 1995...," *Yadernyy Kontrol*, 6/95, p. 11.

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17 May 1995

PLAN TO BUILD NPP IN SEVERSK

A commission of nuclear scientists, representatives from the Minatom, and the local administration decided to carry out a plan to build a nuclear power plant in Seversk (formerly Tomsk-7). There is a possibility that naval reactors would be used.

- "From the Ship to Nuclear Power Plant," *Krasnoye Znamya*, 5/17/95, p. 2.

June 1995

SUBMARINE-TYPE REACTORS TO BE INSTALLED IN NEW PLANTS

The administration of the Altay Region plans to install two nuclear power reactors designed for nuclear submarines at the two planned small power plants at Kulunda and Rubtsovsk. The producers of the reactors are ready to sponsor the construction of the two plants.

- "Nuclear Power Reactors Designed for Nuclear Submarines...", *Yadernyy Kontrol*, 6/95, p. 11.

9 June 1995

EBRD TO GRANT RUSSIAN PLANTS ECU 76 MILLION

Minatom Minister Mikhailov, Gosatomnadzor Chairman Vishnevsky, and Ron Freeman of the European Bank for Reconstruction and Development (EBRD) signed grant agreements, providing ECU 76 million to upgrade nuclear plants at Leningrad, Kola, and Novovoronezh. Leningrad will get ECU 30 million; Kola and Novovoronezh, ECU 45 million; and Gosatomnadzor, ECU 0.9 million. A study of the safety and economic necessity of the Russian VVER-230 and RBMK reactors will be undertaken by Russian officials with Western cooperation.

- "EBRD Signs Agreements on Russian Reactors," *Nuclear Engineering International*, 8/95, p. 6.

July 1995

FIFTY EIGHT DISTURBANCES IN FIRST HALF OF 1995

During the first six months in 1995, 58 disruptions in the operation of nuclear power plants were registered. This represents a substantial decrease compared to the same period in 1994.

- "Gosatomnadzor on The State of Nuclear Safety in The Russian Federation in The First Half of 1995," *Yadernyy Kontrol*, 11/95, p. 11.

6 July 1995

RUSSIAN-FRENCH UPGRADED VVER DESIGN COMPLETE

It was reported that the Russian design and engineering association (MOHT) and Electricite de France (EDF) completed their project to design a program to upgrade the Russian VVER-1000 reactors. The V320 model of the VVER-1000 is currently in operation at Balakovo 1-4 in Russia. A total of 14 V320s are in operation in FSU and East European countries, 19 are under construction, and plans to construct 22 reactors have been canceled.

- Ann MacLachlan, "EDF And Russian Institutes Issue VVER-1000 Upgrade Reference," *Nucleonics Week*, 7/6/95, p. 16.

7 July 1995

GOSATOMNADZOR SAYS SAFETY CONDITIONS DETERIORATING

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Experts from Gosatomnadzor pointed out that the issue of deteriorating safety conditions at Russian nuclear power plants based on data from 1994 and first half of 1995 needs to be brought to the attention of the Russian Security Council. Planned maintenance of nine power units was postponed due to delays in payments; the maintenance was eventually conducted under unsatisfactory conditions. Maintenance and reconstruction work on four power units at Balakovo, Novovoronezh, and two Kalinin power plants was postponed until 1995.

-*Izvestiya*, 7/7/95, p. 1.

8 July 1995

EBRD, RUSSIA SIGN GRANT AGREEMENT

The European Bank of Reconstruction and Development (EBRD) signed an NPP safety aid agreement with Russia granting about \$100 million for "urgently needed short-term safety upgrades" to Leningrad (RBMKs), Novovoronezh (VVERs) and Kola (VVERs) power plants through 1997. The Leningrad plant will receive \$30 million, Rosenergoatom will receive \$45 million, Gosatomnadzor will receive \$.9 million.

-*"Euro Bank Sign Aid for Russian Safety," NUCLEAR EUROPE WORLDSCAN*, 7-8/95, p. 95.

August 1995

AT RUSSIAN NPPS, 7,698 INCIDENTS IN THREE AND A HALF YEARS

It is reported that between 1992 and May 1995, there were 7,698 "incidents" at Russia's 12 nuclear power plants, of which over 24 were considered serious.

-Nikolayi Nor-Mesek, "Defective Nuclear Plants, Ignorant Personnel, Many Deaths," *Welt Am Sonntag*, 8/6/95, p. 11; in "'Catastrophic' State of Nuclear Plants Detailed," FBIS-SOV-95-152, 8/6/95.

1 August 1995

US SENATE ALLOCATES FUNDS FOR SOVIET-DESIGNED REACTORS

The US Senate passed an Energy and Water Development Appropriations Act (H.R. 1905), allocating \$70 million to the Department of Energy to enhance the safety of Soviet-designed reactors. However, the House version of the act did not include such funding. The Senate also allocated \$10 million to the Industrial Partnering Program (IPP) for cooperation between national labs, academic institutions, and industries. The House did not provide funding for the IPP.

-*"Senate OK's Funds for Nuclear Safety Improvements," Post-Soviet Nuclear & Defense Monitor*, 8/7/95, p. 1.

24 August 1995

UNDERGROUND NUCLEAR REACTORS APPROVED

It was reported that President Yeltsin's Council for Scientific and Technical Policy approved a plan to build underground nuclear thermoelectric power reactors, which are based on the design of naval propulsion reactors. The first reactor will probably be constructed at Krasnoyarsk-26.

-Boris Konovalov, "Russian Panel Okays Building New Underground Power Reactors," *Nucleonics Week*, 8/24/95, pp. 14-15.

September 1995

DUMA TO HOLD HEARINGS ON NPP SAFETY

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Duma Ecology Committee hearings were scheduled for 10/95, "On Ensuring the Safety of Nuclear Power Plants on the Territory of the Russian Federation."

-*Kuranty*, 9/20/95; in "Deplorable Situation at Nuclear Power Plants Highlighted," FBIS-TEN-95-015, 9/20/95.

3 October 1995

NINETY-FIVE OPERATIONS VIOLATIONS IN 1995

A total of 95 violations in nuclear power plant operation have been registered in 1995. According the international INES scale only three were defined as "accidents" constituting level one and above. These statistics represent a substantial comparative decrease in the number of accidents: nine similar cases in 1994, 29 in 1993 and 32 in 1992.

-"Nuclear Power Plants Will Increase Energy Output," *Finansovyye Izvestiya*, 10/5/95, p. 2; *Kommersant-Daily*, 5/16/96, p. 5.

9 November 1995

RUSSIA TO BUILD FIVE NEW POWER PLANTS

Rosenergoatom President Vitaliy Lebedenko told Interfax that Russia plans to construct five new power stations, including two in the Far East, one in the Urals, and two in European Russia. Construction has already begun at one of the Far East plants.

-Scott Parrish, "Russia Plans to Build Five New Nuclear Power Stations," *OMRI Daily Digest*, 10 November 1995, p. 2.

21 November 1995

YELTSIN SIGNS NUCLEAR POWER LAW

President Yeltsin signed the law "On the utilization of nuclear power," passed by the Duma on 11/20/95. The new law contains regulations on protecting health, the environment, and property, and is intended to improve safety standards of nuclear power use.

-*Itar-Tass World Service*, 11/21/95; in "Yeltsin Signs Law on Utilization of Nuclear Power," FBIS-SOV-95-224, 11/21/95.

29 November 1995

NPP WORKERS THREATEN SHUTDOWNS

ITAR-TASS reported that unless they receive overdue wages, nuclear power plant workers will shut down the plants. Union officials said that warning protests are scheduled. According to the deputy head of Rosenergoatom, overdue wages are estimated at 2.5 trillion rubles (\$555 million) and the average period of non-payment is about three months.

-Penny Morvant, "Workers Threaten to Shut Down Nuclear Plants," *OMRI Daily Digest*, 11/30/95, p. 2.

30 November 1995

NPP EMPLOYEES STAGE PROTESTS

Vladimir Startsev, Head of the Central Committee of the Nuclear Industry Labor Union, stated that employees of all Russian nuclear power plants held demonstrations on 11/30/95. The employees raised issues regarding unloading

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the reactor cores and the cutting of their production capacity. Due to deteriorating economic conditions employees of the atomic industry can no longer guarantee the safety of the reactors. Wages have not been paid for two months. Nuclear power plants exchange technical services by means of barter.

-Sergey Leskov, *Izvestiya*, "In a Fear of a New Chernobyl Russian Nuclear Employees Hold a Demonstration," 11/30/95, p. 1.

21 December 1995

EBRD TO DISBURSE FINAL CREDITS

EBRD will conclude the disbursement of the 76 million ECU credit to modernize Russian nuclear plants. The credit was agreed upon by the Russian government and the EBRD in 7/95.

-"Leningrad Nuclear Plant Gets Insured Against Unpleasant Surprises," *Finansovyye Izvestiya*, 12/21/95, p. 2.

27 December 1995

FOUR INCIDENTS REGISTERED ON INES SCALE

In 1995, four incidents (one incident of the second level and three incidents of the first) at Russian nuclear power plants were registered on the seven-point international scale of nuclear emergency situations.

-*Pravda*, 12/27/95, p. 2; "NPPs Are Better Today Than Yesterday," *Segodnya*, 1/18/96, p. 9; "Russian Nuclear...," *Zelenyy Mir*, No.4, 1996, p. C-3.

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1994

21 March 1994

MALAKHIT DEVELOPS NEW UNDERGROUND REACTOR

The Malakhit design bureau, based in St. Petersburg, has developed a new underground nuclear reactor capable of producing 220 MWe. The new plant is capable of working for 50 years. The reactor uses module-type generators and liquid-metal coolant to protect the reactors against radioactive leaks. This enterprise used to produce reactors for nuclear submarines.

-Nikolay Krupenik, ITAR-TASS, 3/21/94; in "New Generation Nuclear Power Plant Developed," FBIS-SOV-94-055, 3/22/94, pp. 24-25.

7 April 1994

RUSSIA'S NPPS PROVIDE 12 PERCENT OF ENERGY PRODUCTION

Russian nuclear power reactors reportedly provide 22,000 Mwe, which is about 12 percent of Russia's energy production total.

-*Izvestiya*, 4/7/94; in "Nuclear Power's Share to Increase to 20 Percent," FBIS-SOV-94-068, 4/8/94, p. 32.

23 April 1994

NUCLEAR POWER PLANTS REQUESTED IN FAR EAST

According to Anatoliy Zemskov, a spokesman for Rosenergoatom, the regions of Sakhalin, Kamchatka, Chukotka,

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and Yakutia have requested nuclear power reactors on their territories.

-INTERFAX, 4/23/94; in "Official Says Chernobyl-Type Accident Impossible," FBIS-SOV-94-079, 4/25/94, pp. 41-42.

23 April 1994

KHABAROVSKENERGO DIRECTOR DENIES NPP PLANS EXIST

Director General of the Khabarovskenergo joint-stock company Nikolay Balyukin reportedly stated that no plans currently exist for the construction of either underground or surface nuclear power stations in the Khabarovsk Kray. Balyukin was reacting to reports that indicated that Russia and Japan would jointly build an underground nuclear power reactor near Komsomolsk-na-Amure.

-*Nezavisimaya Gazeta*, 4/23/94, p. 2; in "Official Denies Plans for Khabarovsk Plant," FBIS-SOV-94-079, 4/25/94, p. 42.

28 April 1994

NO DECISIONS ON FAR EAST NPP

No decision has been made concerning the construction of the Far East nuclear power station, which would have four 440 Mwe units and be located in Khabarovsk Kray and Solnechnyy Rayon.

-Vladimir Neskornomnyy, *Segodnya*, 4/28/94, p. 9; in "Kostromskaya Nuclear Power Plant Construction Threat to Volga Region," JPRS-TND-94-014, 5/23/94, pp. 30-31.

June 1994

KURCHATOV INSTITUTE DEVELOPING PROTECTION SYSTEM

The Kurchatov Institute, with specialists from the US, Germany, France, and Japan, is reportedly working on a project to make nuclear power plants "disaster-proof" by developing a multi-tier protective system that would trap radioactive emissions in the event of a disaster. The theoretical work is nearing completion and experiments using simulators could begin in 1995 or 1996.

-Veronika Romanenkova, ITAR-TASS, 6/27/94; in "Scientists Work to Improve Nuclear Safety," FBIS-SOV-94-123, 6/27/94, pp. 28-29.

6 June 1994

WITHOUT AID, SOME PLANTS MAY SHUT DOWN

Top officials at Rosenergoatom, Minatom, labor unions, plant management, and Minatom's nuclear fuel producers announced at a press conference that 560 billion rubles in emergency aid was necessary in order to prevent the shut down of several nuclear power plants.

-Ann MacLachlan, "Cash-Strapped Minatom Holds on Anticipating Promised Relief," *Nucleonics Week*, 6/16/94, p. 11.

7 June 1994

RUSSIA CONFIRMS COST FOR UPGRADING NUCLEAR INDUSTRY

Prime Minister Viktor Chernomyrdin confirmed a World Bank estimate that at least \$20 billion is needed to make the former Soviet Union's nuclear industry safe.

-Chris Blackhurst and Andrew Cavenagh, "Russia Fears Atom Plant Catastrophe," *Observer*, 6/11/94.

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10 June 1994

INTERNATIONAL RBMK PROJECT FINDINGS PRESENTED

The International RBMK Project presented the findings of its one-year investigation into the safety of RBMK reactors. The Project gathered more than 300 recommendations for ways to improve RBMK reactors. The conclusion was that the RBMKs are "not as bad as they might be, but they could be better." First-generation reactors and the Chernobyl reactors were not included in the study since when the study began, Chernobyl was set to be decommissioned. Russian and Ukrainian officials have hailed the investigation as proof that RBMK reactors need not be shut down. The international investigation found that all RBMK reactors couldn't be grouped into one category but must be considered individually because each reactor is different.

-Ann MacLachlan, "RBMK Project Concludes Reactors Aren't Awful, But Could Be Better," *Nucleonics Week*, 6/16/94, pp. 8-10.

7 September 1994

CANADA, RUSSIA TO COOPERATE ON NPP SAFETY

Canadian Ambassador Jeremy Kinsman and Minatom Minister Viktor Mikhailov signed an agreement under which Canadian nuclear experts will work in, primarily, RBMK nuclear power plants to improve the safety practices and engineering designs of the plants. The cost of the two-year program will be C\$10 million (US \$7.3 million).

-"Canada Signs Nuclear Safety Agreement with Russia," *Reuter*, 9/7/94.

December 1994

RUSSIA RESEARCHING FLOATING NPPS

Russia is conducting research on producing floating nuclear power reactors that would also desalinate water in regions of the world including the Mediterranean. The floating facilities would be KLT-40 reactors, which are used on nuclear-powered ice breakers. The reactors would be placed on an 160 meter-long barge with a APWS-40 desalination plant.

-Leonid Vexler and Yury Panov, "Russians Float Their APWS-40 Idea," *Nuclear Engineering International*, 12/94, pp. 40-41.

1 December 1994

ORDER ON PERSONNEL TESTING SIGNED

Y. Vishnevskiy, Chairman of Gosatomnadzor, signed into effect Order No. 131 on testing the knowledge of operating personnel at nuclear power plants regarding nuclear safety rules, norms, and regulations.

-*Rossiyskiye Vesti*, 3/16/95.

2 December 1994

CHECHEN LEADERS THREATEN NPP ATTACKS

Chechen leaders threatened to attack Russian nuclear power plants should Russia invade Chechnya.

-John Lloyd and John Thornhill, "Chechens Threaten Russian Nuclear Plants," *Financial Times*, 12/3/94, p. 2.

8 December 1994

THIRD-GENERATION REACTOR DESIGN TO BE FINISHED SOON

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Minatom First Deputy Minister Lev Ryabev stated that Russia is about to complete the designs for a third generation of nuclear reactors that would be much safer than those of past generations. According to Ryabev, the designs had been sent to other countries that possess nuclear technologies and were subsequently approved.

-INTERFAX, 12/8/94; in "Energy Official Details Improved, Safer Reactors," FBIS-SOV-94-237, 12/8/94.

22 December 1994

US WARNS RUSSIA OF POSSIBLE ATTACKS

The US government warned Russia and other CIS states about possible Chechen commando terrorist attacks against their nuclear power reactors.

-Mark Hibbs, "US Intelligence Warns against Chechnyan Attacks on Reactors," *Nucleonics Week*, 12/22/94, p. 9.

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1993

1993

RUSSIAN ELECTRICITY CONSUMPTION DECREASES

From 1990 to 1993, Russian electricity consumption decreased by 166.4 TWh. In 1993, Russian nuclear power reactors produced 124 TWh.

-Working Document to the Scientific and Technological Options Assessment Panel of the European Parliament, "Nuclear Safeguards and Nuclear Safety in the East," November 1996, p. 71.

April 1993

US-RUSSIAN JOINT VENTURE TO DEVELOP NEW REACTOR

US General Atomics announced that it has formed a joint venture with Minatom to develop a Direct Cycle Gas Turbine Modular Helium Reactor (GT-MHR). The reactor will provide power to the Tomsk area and, according to General Atomics, it is "impractical" to make nuclear weapons from plutonium extracted from GT-MHR reactors. The project is providing employment for 200 Russian scientists and engineers. General Atomics is working directly on the project with OKBM and the Kurchatov Institute. Tomsk is the planned site to receive the first GT-MHR, while Krasnoyarsk is another possible location.

-"New Russian-US Nuclear Reactor," *Intelligence Newsletter*, 9/8/94, p. 6. See also, "GTMHR Eats Russian Plutonium," *Nuclear Engineering International*, 8/94.

June 1993

GOSATOMNADZOR ISSUES TWO REGULATORY DOCUMENTS

Gosatomnadzor released its "Requirements for [an] Organization Operating a Nuclear Power Station," which requires such organizations to "exercise control and abide by all the terms and conditions of the respective authorizations and licenses." It concurrently released a regulation "On [the] Procedure for Issue of Temporary Permits by the Russian State Nuclear Safety Committee (Gosatomnadzor) to Enterprises in the Fuel Sector for Activities Involving the Production, Handling and Uses of Nuclear Materials and Products Based Thereon."

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.



"New Government Documents on Nuclear Regulation: Tightening Control over Uses of Radioactive Materials," *Kommersant*, 6/23/93, p. 28.

9 July 1993

MIKHAILOV: "REPAIR AND REFORM" KEY TO REACTOR SAFETY

Viktor Mikhailov stated that many of Russia's older nuclear power plants would not be shut down before the end of their 30-year life spans since Russia is capable of maintaining their safety through "repair and reform." This statement contradicted President Yeltsin's earlier assurance at the G-7 meeting in Tokyo in 6/93 that eight aged nuclear power plants would be shut down before the end of 1994.

-*Asahi Shimbun*, 7/10/93.

23 September 1993

RUSSIAN, LITHUANIAN NPPS HAD OVER 200 ACCIDENTS IN 1.5 YEARS

Segodnya reported that during the past year and a half, there have been more than 200 accidents at Russian nuclear power stations and the Ignalina nuclear power station in Lithuania. Four accidents were classified as serious.

-Vladimir Kuznetsov, *Segodnya*, 9/23/93, p. 6; in "Dangerous Conditions at Russia's Nuclear Facilities Detailed," JPRS-TND-93-026, 11/24/93, pp. 52-55.

October 1993

RUSSIA, JAPAN DISCUSS CONSTRUCTING BN-800 REACTOR

A Russian delegation headed by Victor Mikhailov met with Japanese government and nuclear officials and businessmen in Tokyo and discussed the possible involvement of private Japanese companies in constructing a Russian BN-800 fast breeder reactor in Russia.

"Japanese Firms to Help Russians Build New Breeder Reactors?" *Executive News Service*, 11/9/93.

December 1993

RUSSIA, US COOPERATE ON NEW REACTOR DESIGN

The US Advanced Physics Corporation and five Russian nuclear and space firms are completing the design on a new reactor, the MARR-One, for energy production in developing countries. It is estimated that the MARR-One will be capable of producing 60 MWe. MARR-One is based on high temperature gas reactor (HTGR) technology. The Kurchatov Institute and the All Russian Institute for Technical Physics at Chelyabinsk-70 are participating in the project.

"Russian & US Experts Plan Mini-Reactor for Developing States," ENS NUCNET, 12/27/93.

December 1993

RUSSIA PLEDGES TO IMPROVE SAFETY AT OLDER REACTORS

Vice President Gore and Prime Minister Chernomyrdin signed an agreement in which Russia pledged to improve safety measures at its older nuclear reactors and to join with the US in exploring alternative energy sources.

-*New York Times*, 12/17/93.

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