

Ukraine Nuclear Fuel Cycle Chronology

Last update: April 2005

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.

2003-1993

1 August 2003

KRASNOYARSK ADMINISTRATION WILL NOT ALLOW IMPORT OF UKRAINE'S SPENT FUEL UNTIL DEBT PAID

On 1 August 2003, UNIAN reported that, according to Yuriy Lebedev, head of Russia's International Fuel and Energy Company, which is managing the import of spent nuclear fuel to Krasnoyarsk Kray for storage, the Krasnoyarsk administration will not allow new shipments of spent fuel from Ukraine for storage until Ukraine pays its \$11.76 million debt for 2002 deliveries.

—"Krasnoyarskiy kray otkazhetsya prinitat otrabotannoye yadernoye toplivo iz Ukrainy v sluchaye nepogasheniya 11.76 mln. dollarov dolga," UNIAN, 1 August 2003; in Integrum Techno, www.integrum.com.

28 February 2002

RUSSIAN REACTOR FUEL DELIVERIES TO COST \$246 MILLION IN 2002

Yadernyye materialy reported on 28 February 2002 that Russian Minister of Atomic Energy Aleksandr Rumyantsev and Ukrainian Minister of Fuel and Energy Vitaliy Gayduk signed an agreement under which Ukraine will buy reactor fuel worth \$246 million from Russia in 2002. Ukraine will pay for the fuel in regular installments of \$22.2 million.

—"Rossiya postavit yadernoye toplivo," *WPS Yadernyye materialy*, No. 7, 28 February 2002.

23 March 2002

UKRAINE TO BEGIN LOADING VVER-1000 REACTORS WITH US-PRODUCED FUEL IN 2003

On 23 March 2002, Ukrainian Minister of Fuel and Energy Vladimir Lushkin announced that Ukraine intends to begin loading one of its VVER-1000 reactors with US-made fuel in 2003. The five-year project will be carried out with the assistance of Westinghouse, which, in accordance with the US-Ukraine Nuclear Fuel Initiative signed in June 2000, was selected to provide Ukraine with fuel, training, and technology to re-fit its reactors to fuel assemblies of US manufacture. The process of re-fitting Ukrainian VVER-1000 reactors to accept US-made fuel

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assemblies is already ongoing and is expected to be completed in 2003.

—Vitaliy Matarykin, ITAR-TASS, 23 March 2002; in "Ukraine to Load Nuclear Plant with Fuel from Non-Russian Source in 2001 [sic]," FBIS Document CEP20020323000043.

15 August 2002

FUEL PRODUCTION AGREEMENT APPROVED

On 15 August 2002, the government of Ukraine approved an agreement on developing a joint venture incorporating Ukrainian, Russian, and Kazakhstani firms for the purpose of manufacturing nuclear fuel. It is hoped that the joint venture will enable Ukraine to reduce its nuclear fuel expenditures by 25%. The joint venture was registered in October 2001. Enerhoatom signed contracts with the joint venture for fuel supplies even before the agreement was approved. Zaporizhzhya NPP is to be the first to receive the new fuel. Firms involved in the venture include the Ukrainian State Property Fund, Kazakhstan's Kazatomprom, and Russia's TVEL.

—ITAR-TASS, 15 August 2002; in "Ukraine approves agreement on producing nuclear fuel," FBIS Document CEP20020815000386. UNIAN, 23 September 2002; in "Ukraine begins diversification of nuclear fuel supplies," FBIS Document CEP20020923000196.

10 February 2001

UKRAINIAN RADA COMMITTEE CHAIRMAN ON UKRAINIAN NUCLEAR FUEL CYCLE EFFORTS

On 10 February 2001 *Zerkalo nedeli* published an article by the Supreme Rada Fuel and Energy Complex, Nuclear Policy and Safety Committee Chairman, Aleksandr Gudyma, outlining his views on Ukraine's need to develop a domestic nuclear fuel cycle. Gudyma considers ensuring Ukraine's energy security, which he defines as not relying on any single country to supply more than 30 percent of its of energy needs, as one of the key aspects of Ukrainian national security. Unfortunately, according to Gudyma, Ukraine is far from achieving that goal, since it is so heavily dependent on Russia in this area. This includes nuclear energy, which Gudyma considers to be the "backbone" of Ukraine's energy system. Not only is Russia the sole source of Ukraine's nuclear fuel, but it is also the recipient of Ukraine's spent fuel, and the provider of 85 percent of equipment used at Ukrainian power plants. This state of affairs gives Russia considerable means of influence over Ukraine. Although Ukraine's government issued a number of directives concerning the development of domestic fuel cycle beginning in 1993, the project has not yet begun to be implemented. Gudyma partially ascribes the slow pace of this effort to a strong pro-Russian lobby in virtually every one of Ukraine's governments. Other causes of Ukraine's failure to develop a domestic fuel cycle include underfinancing of the program. While the Nuclear Fuel Cycle Fund (NFCF) was to collect a portion of the income from power generated by nuclear fuel received as payment for nuclear warheads transferred to Russia, in actuality it received only a fraction of funds it was supposed to receive. Even though Ukraine's government has taken measures to ensure that nuclear power plants' indebtedness to the NFCF is erased by 2004, the fund will receive only a small fraction of the funds it was intended to receive (estimated at about \$800 million) due to the devaluation of the hryvne. Gudyma considers the original figure of \$800 million more than adequate for the purpose of developing domestic fuel production, basing this estimate on South Korea's successful \$400 million effort to construct a fuel assembly plant. Gudyma also criticizes Ukraine's slow progress in expanding uranium ore mining operations in Ukraine. While the plans to expand uranium mining have been criticized on the grounds of cost (Ukrainian uranium would cost approximately \$40-42/kg, as opposed to \$18/kg for uranium supplied by

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Russia), Gudyma predicts that the current uranium glut will be over in a few years, leading to high uranium prices. Gudyma also points to the Russian strategic energy plan which also predicts higher uranium prices in the future and treats uranium mining as profitable up to \$80/kg. Given these factors, Gudyma considers the creation of a domestic fuel cycle, including fuel assembly manufacture, to be in Ukraine's national interest and within Ukraine's technical and financial capabilities, particularly if it uses the experience of other Central European countries in such areas as spent fuel storage.

—Aleksandr Gudyma, "Realii i perspektivy yaderno-toplivnogo tsikla Ukrainy," *Zerkalo nedeli*, 10 February 2001, p. 9; in WPS Yaderniye Materialy, 7 March 2001.

11 March 2001

ENERHOATOM PLANS TO BUY \$209.9 MILLION IN NUCLEAR FUEL FOR 2001

Interfax reported on 11 March 2001 that Enerhoatom plans to buy \$209.9 million in nuclear fuel from Russia's TVEL for 2001. Nuclear fuel will be bought for all 13 operating NPP units in Ukraine at the same level as last year. Enerhoatom President Nur Nihatulin stated that the payments to TVEL will begin in March at a monthly rate of \$21 million. Nihatulin further added that the Russian price of nuclear fuel is 30% lower than the world market price. Enerhoatom reported that in 2001 Ukraine also plans to export spent nuclear fuel worth \$73.9 million to Russia. The spent fuel will be transported to Mayak Production Association in Chelyabinsk and the Mining and Chemical Combine in Zheleznogorsk. Last year spent fuel amounting to \$46.6 million was transported from Ukraine to Russia. According to Nihatulin, Ukraine pays Russia approximately \$370 for 1kg of exported spent fuel, and construction of spent fuel storage facilities in Ukraine would reduce these export costs by 9-10 times.

—Interfax, 11 March 2001; in "Ukraine to Transport Spent Nuclear Fuel Worth \$73.9 Million to Russia by Year-End," FBIS Document CEP20010312000079. "V tekushchem godu Ukraina vyplatit Rossii 209 mln. dol. za svezheye yadernoye toplivo," UNIAN, No. 9, 26 February-4 March 2001.

5 July 2001

TRILATERAL AGREEMENT ON FUEL FABRICATION SIGNED

On 5 July 2001 *Kommersant* reported that Kazakhstan's Kazatomprom, Russia's TVEL, and Ukraine's Energoatom signed an agreement to establish a joint venture to produce nuclear fuel elements for Ukrainian nuclear power plants.

—"Bratya Nigmatulliny obyedyayut energetiku," *Kommersant*, 5 July 2001; in Integrum-Techno, www.integrum.com.

18 February 2000

UKRAINE TO BUY NUCLEAR FUEL DIRECTLY FROM TVEL

Ukraine will purchase its nuclear fuel directly from the Russian company TVEL. According to Deputy Prime Minister Yuliya Tymoshenko, by eliminating middlemen, the change will bring down fuel costs by 30 percent.

—Ukrainian New Channel Television, 18 February 2000; in "Fuel purchases from Russia to cut out middlemen," 25 February 2000, Lexis-Nexis Academic Universe, web.lexis-nexis.com.

March 2000

TVEL BEGINS FUEL DELIVERIES TO UKRAINE

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At the end of March 2000 Enerhoatom made an advance payment of approximately \$23 million dollars for nuclear fuel to the Russian company TVEL. According to UNIAN, the payment was made thanks to a commercial loan from Prominvestbank. However, Interfax reported on 25 April 2000 that the payment became possible after the Krivorozhstal steel works signed a futures contract for electricity supplies with Enerhoatom. Enerhoatom then opened a line of credit at Oshchadbank and paid TVEL. Under its agreement with Enerhoatom on 2000 fuel deliveries, TVEL will provide fuel on the condition that payments are made in cash and that thirty-five percent of the total cost will be paid up front. The deliveries are to be made to three reactors.

—Natalia Kozlova, ITAR-TASS, 10 April 2000; in "Russia Begins Deliveries of Nuclear Fuel to Ukraine," FBIS Document AFP20000409000223. UNIAN, 1 April 2000; in "Ukrainian Nuclear Plant Receives Loan for Fuel Purchase," FBIS Document CEP20000401000067. "Russia Delivers Nuclear Fuel to South Ukrainian Nuclear Plant," Interfax, 25 April 2000.

2 April 2000

BILL FOR RUSSIAN NUCLEAR FUEL SUPPLIES PAID IN FULL

Deputy Prime Minister Yuliya Tymoshenko stated on 2 April 2000 that Ukraine had fully paid Russia for nuclear fuel. This will allow NPPs with units currently idle to begin power generation. According to Ms. Tymoshenko, cash payments from customers increased because Enerhoatom has done away with barter and related business practices and has cut power supplies to businesses with delinquent accounts.

—Novy Kanal Television, 2 April 2000; in "Ukraine Pays Russia in Full for Nuclear Fuel Supplies," FBIS Document CEP20000402000036.

5 June 2000

UNITED STATES TO HELP UKRAINE REDUCE DEPENDENCE ON RUSSIAN NUCLEAR FUEL

On 5 June 2000, during President Bill Clinton's visit to Kiev, the United States and Ukraine signed an agreement on implementing the Ukraine Nuclear Fuel Qualification Project intended to help Ukraine establish additional sources of nuclear fuel. The project will enable Ukraine to certify the reliability and safety of non-Russian fuel for its VVER-1000 reactors, helping reduce its dependence on nuclear fuel deliveries from Russia. The estimated cost of the US contribution of equipment, technology, and technical assistance is \$30 million. The project will be funded by the US State Department's Agency for International Development, with Westinghouse Electric Co., whose fuel will be certified for use in Ukrainian reactors, being the primary contractor. The US contribution will include the transfer of nuclear fuel and reactor core design technologies to the Center for Reactor Core Design at the Kharkiv Institute of Physics & Technology, as well as the transfer of nuclear safety and licensing expertise. Ukrainian contributions are to consist of personnel, materials, and supplies. The first Ukrainian NPP slated to receive Westinghouse fuel is the South Ukraine NPP, scheduled to receive six test assemblies in 2003, and a reload of 42 assemblies in 2005.

—"Kuchma i Klinton privetstvuyut nachalo realizatsii na Ukraine proyekta kvalifikatsii yadernogo topliva," Interfax, No.4, 5 June 2000. "U.S.-Ukraine Agreement Aimed at Ending Ukrainian Dependence on Russian Fuel," *NuclearFuel*, www.mhenergy.com, Vol.25, No.12, 12 June 2000.

7 June 2000

ENERHOATOM'S PLANNED FUEL PURCHASES FROM TVEL TO TOTAL \$204 MILLION IN 2000

Ukraine's Enerhoatom has paid the Russian company TVEL \$52.8 million for nuclear fuel since the beginning of the

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year, according to Deputy Prime Minister Yuliya Tymoshenko. Of this sum, \$26 million were transferred in January 2000, \$11.1 million in March, and \$15.7 in the first half of June. Overall, Ukraine plans to purchase \$204 million worth of nuclear fuel from TVEL in 2000. Enerhoatom is also seeking to enlist the support of Ukrainian banks in financing the nuclear fuel purchases from TVEL, and invited 10 banks to compete for the right to provide financial support. According to Volodymyr Pyshnyy, the general director of the Zaporizhzhya nuclear power station, nuclear fuel shortages resulted in a shortfall of 3 billion kilowatt/hours in January through May 2000. In the first five months of 2000, the Zaporizhzhya-1 and Zaporizhzhya-6 units were off line for 65 and 49 days, respectively, due to fuel shortages. The total energy production losses caused by inactive reactors sustained by Ukrainian nuclear power stations reached 5.8 billion kilowatt/hours between January and May of 2000, of which 3.7 billion kilowatt/hours were attributed to nuclear fuel shortages. However, Deputy Prime Minister Tymoshenko denied the reports that reactor shut-downs were unplanned or caused by fuel shortages.

—"Ukraina zaplatila v 2000 godu rossiyskomu AO 'TVEL' \$52.8 mln za yadernoye toplivo-Vitse-premyer Timoshenko," Interfax, No.4, 7 June 2000. "'Energoatom' nameren privilech banki k finansovoy podderzhke za rossiyskoye yadernoye toplivo," UNIAN, No.20, 15-21 May 2000. "Na Ukraine nezaplanirovannyye prostoi dvukh blokov Zaporozhskoy AES sostavili 114 sutok," Interfax, No.3, 2 June 2000. "Otsutstviye topliva i nezaplanirovannyye prostoi priveli k nedoproizvodstvu elektroenergii ukrainskimi AES v yanvare-maye," Interfax, No.4, 23 June 2000.

12 July 2000

UKRAINE TO ENTER JOINT VENTURE WITH RUSSIA AND KAZAKHSTAN

During a news conference in Almaty on 12 July 2000, Ukrainian Ambassador to Kazakhstan Evhen Kartashov stated that Ukraine intends to take part in establishing a joint venture with Russia and Kazakhstan for nuclear fuel element production. Kartashov said that Kazakhstan has already conducted talks on the subject in Ukraine and began similar talks in Russia on 11 July 2000, but that the process of setting up the joint venture was proceeding only with great difficulty. If the joint venture is established, the Kazakhstani Ulba Metallurgical Plant (UMZ) would produce fuel pellets, which would then be processed by Russian enterprises. Ukraine would produce the zirconium cladding for the pellets, although Kartashov did not indicate which Ukrainian enterprises would be involved. The joint venture will also entail exchanging shares among the participating enterprises. UMZ already transferred 34% of its shares to the Russian company TVEL and received an equivalent amount of shares in TVEL, giving it a voice in Russian nuclear industry operations.

—Interfax-Kazakhstan, 12 July 2000; in "Ukraine to take Part in Russo-Kazakh Nuclear Fuel Joint Venture," FBIS Document CEP200007130000192.

18 July 2000

ENERHOATOM-TVEL PREPAYMENT AGREEMENT EXTENDED UNTIL END OF YEAR

On 18 July 2000 Interfax reported that the Enerhoatom-TVEL agreement on prepayments for nuclear fuel deliveries from Russia has been extended until the end of 2000. The agreement between the Russian Ministry of Atomic Energy and Ukrainian Ministry of Fuel and Energy stipulates that Enerhoatom provide a 35% prepayment for nuclear fuel it purchases from TVEL. That rate was scheduled to go up to 50% as of 1 July 2000. In the first half of 2000 Enerhoatom paid TVEL \$63.7 million, out of the \$242 million necessary to provide Ukrainian NPPs with fuel

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for the entire year. TVEL representatives have remarked that so far this year Enerhoatom has been making both prepayments and regular payments for nuclear fuel deliveries regularly and without delays.

—"NAEK 'Energoatom' v pervom polugodii zaplatil za rossiyskoye yadernoye toplivo \$63.7 mln.," Interfax, No.1, 13 July 2000. "Agreement on Energoatom Nuclear Fuel Delivery Prepayment Extended till End of Year," Interfax, No.3, 18 July 2000.

7 August 2000

ZIRCONIUM PRODUCTION TO BE REVIVED

The government of Ukraine is planning to revive zirconium production at the Zirkoniy State Research and Production Enterprise, according to a report in the 7 August 2000 issue of *NuclearFuel*. Zirkoniy was created in the Dnipropetrovsk Oblast in 1998 to take place of Pridneprovsk Chemical Plant workshops and manufactured zirconium dioxide for a US company until the end of 1999, when its contract was completed. The initial impetus behind creating Zirkoniy came from the 1994 governmental program for developing Ukraine's nuclear industry; however, only 10% of that program has been implemented to date. Since the beginning of 1999, the zirconium plant operated for only about two months, and it completed its last order in March 2000, when it produced 500kg of metallic zirconium. Due to lack of funding, the plant has not been repaired or upgraded in recent years, and as of August 2000 its workers were owed back pay for the last 20 months. As a result, over 100 workers, many of them highly skilled, have left the plant, out of approximately 600 engaged in actual production. Given the scale of the plant's problems, Ukrainian officials fear that even the government's plans to revive Zirkoniy are belated, and that the failure to rescue Zirkoniy will increase Ukraine's dependence on imported nuclear fuel.

—"Plan to Revive Zirconium Plant in Ukraine May Be Too Late," *NuclearFuel*, 7 August 2000, pp. 15-16.

28 August 2000

ADDITIONAL FUNDS FOR DOMESTIC NUCLEAR FUEL PRODUCTION

On 28 August 2000 the Ukrainian government signed a decree ordering the transfer of energy market funds to the Fund for the Creation of Nuclear Fuel Production. This special fund to develop domestic nuclear fuel production infrastructure had remained dormant up to this point. The monthly payment amount is expected to be 22.5 million hryvnias (about \$4 million as of 28 August 2000); the first payment has already been forwarded to the fund. As of August 2000, Ukraine does not have facilities to produce its own nuclear fuel and it would take large amounts of money to establish them. Specialists at the Russian Ministry of Atomic Energy estimate that the investment necessary to develop the capacity to produce 1 MT of nuclear fuel would be comparable to the cost of building a nuclear power reactor.

—Roman Khrapachevskiy, "Uranium Fever," *Izvestiya*, 31 August 2000; in "Ukrainian Government Plans for Nuclear Fuel Production," FBIS Document CEP20000831000197.

30 August 2000

UKRAINE TO SELL URANIUM CONCENTRATE IN EUROPE

According to Interfax, Ukrainian Deputy Prime Minister Yuliya Tymoshenko asked the Ministry of Fuel and Energy to look into the possibility of selling uranium concentrate to Europe. The uranium will come from the Eastern (Skhidnyi) Mining and Conversion Combine (also known as Vostgok). State Directorate for Nuclear Energy Deputy Director Anatoly Chernov told Interfax that the Ukrainian government intends to set up negotiations on Ukraine's

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accession to Euroatom. Currently Ukraine ships uranium to Russia's TVEL for \$18 per kg, while production costs \$40 - \$41 per kg. Uranium concentrate trades at \$31-\$35 per kg on the world market.

— Interfax, 30 August 2000; in "Ukraine to sell uranium concentrate in Europe," Lexis-Nexis Academic Universe, web.lexis-nexis.com.

4 October 2000

ENERHOATOM GUARANTEES SUFFICIENT NUCLEAR POWER THROUGH WINTER

At a 4 October 2000 meeting at the Ministry of Fuel and Energy, Enerhoatom President Yuriy Nedashkovskiy issued assurances that Ukrainian NPPs would operate at 85% capacity through the winter of 2000-2001. This would satisfy 34% of Ukraine's total power needs. Since the beginning of 2000, Ukrainian NPPs have operated at only 60% capacity due to unplanned repairs and delays in fresh nuclear fuel deliveries from Russia. As of 27 September 2000, Ukraine had paid for nuclear fuel for all but three of 14 operational power reactors. However, Enerhoatom still needs funds for necessary repairs and for paying off the fuel debt. Reorganization in the energy sector has also caused several problems, including delays in shipping spent fuel to Russia; as of 19 August 2000, only one of seven shipments had been sent. By 20 September 2000 Enerhoatom had paid \$125 million towards the \$214.7 million owed for fresh fuel bought this year.

—"Energoatom' garantiruyet rabotu AES zimoy na moshchnosti 10 tys Mvt, chto sostavit 34% maksimalnoy potrebnosti Ukrainy," Interfax, 4 October 2000. *Zerkalo nedeli*, 19 August 2000; in "Ukraine: energy situation worsening ahead of cold seasons," FBIS Document CEP20000824000255. "AES Ukrainy polnostyu gotovy k zimmemu periodu - ekspert," Interfax, 27 September 2000.

13 January 1998

UKRAINE ANNOUNCES COMPLETE FUEL CYCLE AMBITIONS

Ukraine has enough uranium and zirconium ore to produce its own nuclear fuel, Deputy Energy and Power Engineering Minister Mykola Friedman stated at an international conference entitled "The Energy Security of Ukraine." Ukraine's intention to establish a complete nuclear fuel cycle involves several measures, including the creation of a large concern to unite nuclear enterprises, the enhancement of personnel training, and construction of a site for radioactive waste storage.

—Viktor Demidenko, "Ukraine Intends To Produce Nuclear Fuel," RIA Novosti, 13 January 1998.

12 February 1999

ENERHOATOM UNABLE TO PAY FOR MAY'S NUCLEAR FUEL SHIPMENT FROM RUSSIA

The Ukrainian state company Enerhoatom is unable to pay the Russian joint stock company TVEL for May's supply of nuclear fuel. In addition, Enerhoatom was not able to pay \$5 million for February's shipment. According to an agreement between the two companies, Enerhoatom is required to pay 50 percent in advance and 50 percent within a month following each shipment.

—Kiev STV Television, 12 February 1999; in "Ukrainian Company Fails To Pay For Russian Nuclear Fuel," FBIS Document FTS19990212001189.

12 March 1999

RUSSIA CLAIMS UKRAINE OVERPRICES COMMODITIES EXCHANGED FOR NUCLEAR FUEL

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In a letter to Ukrainian First Deputy Prime Minister Volodymyr Kuratchenko, Russian Atomic Energy Minister Yevgeniy Adamov accused Ukraine of overpricing the goods supplied under contract to Russia in exchange for nuclear fuel. In the letter Adamov warned that if Ukraine's prices on goods did not become competitive, the Russian joint stock company TVEL would be "compelled to buy them in other countries." In particular, Adamov noted Ukraine's overpricing of zirconium concentrates.

—UNIAN, 10 March 1999; in "Russia Accuses Ukraine Of Overpricing In Nuclear Swap Deal," Lexis-Nexis Academic Universe, <http://web.lexis-nexis.com>.

April 1999

UKRAINIAN NUCLEAR POWER PLANTS REDUCE OUTPUT AS A RESULT OF FUEL SHORTAGES

Owing to fuel shortages, Ukrainian nuclear power plants have been forced to operate at reduced power. Since March 1999, output has been lowered at South Ukraine-2 and Zaporizhzhya-1. Zaporizhzhya-6 is the only unit operating with sufficient fuel supplies and was refueled at the beginning of April 1999. There are no fuel reserves in Ukraine for 1999, with the exception of Chernobyl's partially irradiated assemblies. The situation is caused by two factors: insufficient funds due to nonpayment of electric bills by Ukrainian customers and depletion of stocks of fuel received in past years in exchange for nuclear warheads returned to Russia. Ukraine has taken measures to cope with the situation. In March 1999, the Verkhovna Rada Committee on the Energy Sector, Nuclear Policy and Nuclear Safety approved a draft decree proposing measures to deal with the fuel crisis and calling for the establishment of a state nuclear fuel stock in the FY 2000 budget. The Verkhovna Rada also plans to propose creating a special \$80 million fund to buy nuclear fuel from Russia. Enerhoatom is meanwhile developing a program which includes continued nuclear fuel deliveries from Russia and Kazakhstan and cooperation with the US in the development of a nuclear fuel manufacturing partnership.

—UT-2 Television Network, 31 March 1999; in "Nuclear Fuel At Nuclear Plants Dwindling," FBIS Document FTS19990330001938. Alexei Breus, "Ukrainian Reactors Cut Output Because of Fuel Shortages," *Nucleonics Week*, 8 April 1999, p. 5.

29 May 1999

AGREEMENT ON PEACEFUL NUCLEAR ENERGY COOPERATION BETWEEN US AND UKRAINE ENTERS INTO FORCE

17 July 1999

DELIVERY OF NUCLEAR FUEL FROM RUSSIA TO UKRAINE DELAYED

Delivery of nuclear fuel from Russia to Ukrainian NPPs has been delayed since the fall of 1998. Russia is scheduled to deliver \$300 million worth of nuclear fuel in 1999. During the first half of 1999, however, Russia supplied only 10 percent of this amount. As a result, Enerhoatom was forced to shut down seven of its 14 nuclear reactors and terminate electricity supply to approximately 18,000 major customers.

—Viktor Yadukha, "Sevastopolskoye nebo i more vykupleny za 1,8 mlrd dollarov," *Segodnya*, 17 July 1999.

13 August 1999

UKRAINE'S FUEL DEBT TO RUSSIA REACHES \$74.66 MILLION DURING THE FIRST HALF OF 1999

According to Ukrainian Minister of Energy Ivan Plachkov, Ukraine's debt to Russia for nuclear fuel for the first half of 1999 totals \$74.66 million. As a result, Ukrainian NPPs are experiencing delays in refueling and repairs. Plachkov

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pointed out that Ukrainian consumers owe electricity producers 7 billion hryvnias (\$1.53 million) in unpaid bills, hampering the purchase of nuclear fuel.

—Natalya Kozlova, "Ukraine Fails To Pay For Russian Nuclear Fuel," ITAR-TASS, 13 August 1999; in "Ukraine Due To Pay Russia \$74 Million For Nuclear Fuel," FBIS Document FTS19990813000907.

23 August 1999

DRAFT AGREEMENT ON UKRAINIAN-RUSSIAN-KAZAKHSTANI JOINT VENTURE NUCLEAR FUEL PRODUCTION APPROVED

With Resolution No. 1474, on 13 August 1999, the Ukrainian Cabinet of Ministers approved a draft agreement on the creation of a Ukrainian-Russian-Kazakhstani joint venture VVER fuel plant in Ukraine. A 1996 Ukrainian tender commission awarded the construction of the nuclear fuel plant to the Russian company TVEL.

— Interfax, "Ukraine Business Panorama," 23 August 1999; in "Ukraine Business Panorama," FBIS Document FTS19990823000971.

26 August 1999

UKRAINE'S FUEL DEBT TO RUSSIA NOT RESOLVED AFTER PRIME MINISTERS' MEETING

At their August 1999 meeting in Moscow, Ukrainian Prime Minister Valeriy Pustovoytenko and his Russian counterpart Vladimir Putin failed to resolve the issue of Ukraine's fuel debt to Russia. Ukrainian Deputy Prime Minister Serhiy Tyhytko commented that Ukraine pays cash for deliveries of nuclear fuel from Russia, but acknowledged delays in supplying commodities in exchange for other fuel. A Russian-Ukrainian agreement on settling the fuel debt through barter was not signed at the meeting. The issues discussed by both prime ministers will be further examined at the meeting of the joint Russian-Ukrainian Commission on Economic Cooperation at the end of September 1999.

—"V. Pustovoytenko i V. Putinu ne udalos dogovoritsya po probleme uregulirovaniya ukrainskoy zadolzhennosti za energonositeli," UNIAN, No. 34, 23 - 29 August 1999.

4 October 1999

NUCLEAR FUEL SUPPLY DIVERSIFICATION: WESTINGHOUSE

The US company Westinghouse won a tender to produce nuclear fuel for Ukraine's VVER-1000 reactors. According to Zaporizhzhya Director Danko Biley, an experimental batch may arrive at the Zaporizhzhya plant in 2000-2001. According to another source, the first six containers of US fuel will be tested at the South Ukraine NPP in 2001. An expert at the Ukrainian Ministry of Energy says that producing the first experimental batch of fuel may take until 2004. Ukraine has been attempting to lower its dependence on the Novosibirsk Chemical Concentrate Plant in Russia, which is still the only facility that produces fuel for Soviet-built VVER reactors, although an effort to create new experimental fuel rods for the reactors began at Elektrostal, Moscow Oblast, Russia in 1990.

—Interfax, "Ukraine Business Panorama," 27 September-4 October 1999; in "Ukraine Business Panorama," FBIS Document FTS19991004001661. UNIAN, 29 October 1999; in "Ukraine to Try US Pilot Fuel at Nuclear Plants in 2001," FBIS Document FTS19991029001500. "Topливо dlya ukrainskikh AES," *Zerkalo nedeli*, No. 36, 11-17 September 1999, p. 14.

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October 1999

UKRAINE HOPES TO TRADE RUSSIAN BLACK SEA FLEET DEBTS FOR NUCLEAR FUEL

In October 1999, in accord with a 3 June 1999 Cabinet of Ministers decree, Minenerho began preparing a proposal to write off some of debts the Black Sea Fleet and other Russian military establishments on Ukrainian territory owe Ukraine in exchange for nuclear fuel. The first such fuel shipment would be worth \$15 million. According to the Sevastopol city administration, the Black Sea Fleet owes the city \$1.65 million, without counting its debts for electricity, for taxes, or to individual enterprises. The idea of trading for fuel is not a new one: until 1998 Ukraine was receiving nuclear fuel in exchange for the transfer of nuclear warheads from Ukraine to Russia.

—"Minenergo Ukrainy gotovit predlozheniye po postavkam yadernogo topliva iz Rossii," *Anti-Atom Press*, No. 288, October 1999, <http://cci.glasnet.ru>.

11 November 1999

RUSSIAN 'CONDITIONS' FOR NUCLEAR FUEL SUPPLIES TO UKRAINE OUTLINED, STILL NO AGREEMENT

In an 11 November 1999 article, *Nezavisimaya gazeta* reported that there is still no special bilateral agreement on the Russian supply of nuclear fuel to Ukraine, and that Russian experts do not believe Ukraine is interested in signing such an agreement. Vitaliy Konovalov, president of the Russian nuclear fuel producer TVEL, said that in 1998 Russia made several conditions for nuclear fuel deliveries to Ukraine. According to these conditions, 35 percent of the payment due for nuclear fuel must be paid in cash, while the rest of the payment can be made in kind (the provision of uranium, various metals, equipment, parts, and zirconium concentrate). TVEL does not send the fuel until the cash payment is received. The barter supplies are supposed to be sent within several months of fuel delivery. Ukraine's current fuel debt, therefore, is not large because TVEL has reduced shipments to match payments received. However, TVEL has suffered losses because Ukraine orders more fuel than it buys, leaving TVEL with unsold fuel and debts to its own suppliers. In 1998, Ukraine ordered \$250 million worth of fuel, but only purchased a little over \$50 million. Ukraine ordered \$210 million in fuel for 1999, and purchased \$90 million during the first three quarters of the year. While the 35 percent cash payment for the 1999 fuel was received before shipment, as of November 1999 the barter supplies had not been received.

—Andrey Vaganov, "Ukraine ssoritsya s Rossiyei nevygodno," *Nezavisimaya gazeta*, <http://news.mosinfo.ru>, 11 November 1999.

December 1999

MAGNITUDE OF UKRAINIAN FUEL DEBT UNCLEAR

On 12 December 1999, Interfax reported that according to Ukrainian Energy Minister Ivan Plachkov, Ukraine's debt for Russian nuclear fuel totaled \$70 million. The report further states that of the \$65 million Ukraine owed Russia in cash payments for 1999 fuel deliveries, \$45 million had been paid. As of 9 December, \$55 million of payment in kind for 1999 fuel deliveries had been made, while \$10 million more was due. (Interfax did not explain the source of the additional \$40 million debt that would produce the quoted \$70 million debt.) Payment problems have led Russia to reduce nuclear fuel shipments. However, Tetiana Amosova, vice-president of Enerhoatom, told a news conference on 25 November 1999 that the company is making payments for fuel on time. She stated that as of 15 November 1999 Enerhoatom had already paid \$71.5 million for \$88 million worth of fuel. In 1999, fuel shortages caused the output of Ukraine's NPPs to fall from 45 percent of Ukraine's electricity production to just one third.

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—Interfax, "Ukraina zadolzhala Rossii za yadernoye toplivo v 1999 godu \$70 mln," 12 December 1999. Interfax, 29 November 1999; in "Ukraine Business Panorama for 22-29 Nov 99," FBIS Document FTS19991129001599.

3 December 1999

EXPERIMENTAL FUEL PROGRAM REJECTED BY STATE ADMINISTRATION

UNIAN news agency reported on 3 December 1999 that the Nuclear Regulatory Administration (NRA) rejected a proposal by the state nuclear energy company Enerhoatom to use experimental fuel at the Zaporizhzhya NPP. The NRA cited a study by the Ministry of Emergency Situations and Consequences of the Chernobyl Disaster which stated that this type of fuel should not be used in nuclear reactors. In addition, the Russian producer of this fuel stated that experimental fuel is not used in the Russian nuclear industry. The NRA further highlighted the fact that no legal grounds exist in Ukraine for experimental fuel use because experimental fuel rods are not included in the list of fuel supplied to Ukrainian NPPs.

—UNIAN, 3 December 1999; in "Experimental nuclear fuel prohibited," Lexis-Nexis Academic Universe, <http://web.lexis-nexis.com>.

15 March 1997

CHEBROV REVEALS PLANS FOR CREATION OF NUCLEAR FUEL CONCERN

Viktor Chebrov, chairman of Derzhkomatom, announced that charter documents on the creation of a nuclear fuel concern are being developed. The goal of this company will be to provide Ukraine's nuclear power stations with nuclear fuel. According to Chebrov, however, the creation of this concern will not conflict with separate plans by Ukraine, Russia, and Kazakhstan to produce nuclear fuel for Ukrainian nuclear power plants.

—Bogdana Kostyuk, "Boi ne mestnogo znacheniya," *Zerkalo nedeli*, 15 March 1997, p. 14.

April 1997

RUSSIA, KAZAKHSTAN, AND UKRAINE TO CONSTRUCT FUEL PLANT

The governments of Russia, Kazakhstan, and Ukraine have agreed to create a joint venture to construct a nuclear fuel production plant and storage facilities in Ukraine. The plant will produce fuel for Ukraine's 11 VVER-1000 reactors. (The Russian company TVEL, which currently supplies Ukraine with VVER-1000 reactor fuel, will continue to supply fuel for Ukraine's one RBMK and two VVER-440 reactors.[2]) In addition, the joint venture will enable Ukraine to store spent nuclear fuel on-site in special containers for up to fifty years, rather than sending it to Russia for reprocessing, Ukraine's current practice. A storage facility with three experimental containers holding a total of 72 spent fuel rods will be constructed at Zaporizhzhya nuclear power plant by the firm Energodar. Following trial use of this facility, storage facilities will be constructed to house 9000 spent fuel rods. The Ukrainian cabinet approved a deadline of April 1997 for the completion of the final text of the agreement. The Kiev-based joint venture is to be established in June 1997. The Ukrainian firms Pridneprovskiy Chemical Plant in Dneprodzerzhinsk, Vostochnyy Mining and Metallurgical Combine in Zholtiye Vody, and the State Pipe Institute in Dnepropetrovsk will participate in the project. Russia, Kazakhstan, and Ukraine will have equal shares in the project. While much of the project has been planned out, the problem of funding remains.

—Oleg Kilnitskiy, Intelnews, 28 April 1997; in "Joint Venture To Establish Nuclear Fuel Processing Company," FBIS-SOV-97-118. "Ukraine, Russia, Kazakhstan to Build Nuclear Fuel Plant," *The Russian*, April 1997, p. 7.

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April 1997

UKRAINE WARNS AGAINST JOINT FUEL PRODUCTION VENTURE WITH RUSSIA AND KAZAKHSTAN

The Ukrainian Ministry of Environmental Protection and Nuclear Safety voiced its opinion to Ukrainian President Leonid Kuchma that a joint venture with Russia and Kazakhstan to produce fuel is inadvisable. The ministry suggested that Ukraine continue to buy fuel from Russia while it begins to construct its own fuel production facilities. Ukraine will need an estimated \$200 million to follow through with this plan. The ministry recommends that Ukraine seek aid from western nuclear companies and international financial organizations. The joint venture would produce a low quality fuel and would help Russia by modernizing its facilities while impeding Ukraine from developing its own production plants, according to the ministry. The ministry feels that the trilateral agreement would be disadvantageous to Ukraine and inconsistent with the country's needs and plans. In addition, domestic zirconium production may suffer. The ministry asserts that Russian zirconium is "polluted" with graphite and is therefore undesirable on the world market. It is also concerned that Russia will gain control of zirconium production and jeopardize the Ukrainian industry, which claims to have a better quality metal. Ukraine prefers to produce zirconium on its own, and this would not be possible under the joint production venture.

—Mikhail Melnik, ITAR-TASS, 4/1/97; in "Ukraine Says Joint Nuclear Fuel Production Inexpedient," FBIS-SOV-97-091. Ihor Osypchuk, "The Ukrainian Nuclear Committee 'Is Surrendering' Zirconium Production to Russian Rivals, the Ukrainian Ministry of Environmental Safety Is Warning," *Vseukrainskiye Vedomosti*, 4/9/97, p. 6; in "Ministry Warns Against Joint Production of Nuclear Fuel," FBIS-SOV-97-104.

14 August 1997

TALKS BREAK DOWN BETWEEN RUSSIA, KAZAKHSTAN, AND UKRAINE ON FUEL PLANT CONSTRUCTION

Negotiations between Russia, Kazakhstan, and Ukraine on the construction of a nuclear fuel plant broke down with no indication of when the talks might resume. According to Derzhkomatom, the talks broke down after representatives from Russia and Ukraine refused to continue discussions. In October 1995, the Russian company TVEL won the right to supply Ukraine with nuclear fuel through an international tender in which ABB Atom and Westinghouse also participated. When TVEL failed to submit the necessary paperwork in a timely manner, reports began to appear in the Ukrainian press suggesting that the second-place finisher in the international bidding, Westinghouse, might be reconsidered. However, it was reported that Westinghouse's prices are much higher and their technology works only with Westinghouse equipment. Nevertheless this option remains should the preliminary agreement for a three-sided joint venture be cancelled.

—Viktor Zamyatin, "Razdelit toplivo na troikh poka ne poluchayetsya," *Kommersant*, 14 August 1997, p. 4.

19-20 August 1997

RUSSIA AND UKRAINE COMPROMISE ON NUCLEAR FUEL PAYMENTS

Negotiations between Russia and Ukraine on the form of payment for nuclear fuel concluded successfully in early August 1997. Vitaliy Tovstonohov, the executive director of Enerhoatom, signed a protocol with the Russian company TVEL and Russia's Ministry of Atomic Energy on the payment process during his 19-20 August visit to Moscow. This new agreement replaces the 1994 US-Russian-Ukrainian Trilateral Agreement, under which Ukraine received nuclear fuel in exchange for handing over its nuclear warheads to Russia, which expired in summer 1997. Ukrainian nuclear power plants annually require \$300 million to \$350 million worth of fuel.[2,3] Under the terms

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of the new agreement, state securities will pay for 40 percent of the nuclear fuel; the Kharkiv TurboAtom and Zaporizhzhya Transformato plants will pay 30 percent in the form of barter supplies, as well as food; and cash payments will account for the remaining 30 percent. Enerhoatom and TVEL will establish a joint venture to facilitate payment.

—Lvov Infobank, 21 August 1997; in "Ukraine, Russia Sign Accord on Nuclear Fuel Supply Payment," FBIS-SOV-97-233. ITAR-TASS, 6 August 1997; in "Russia, Ukraine Agree on Payment for Nuclear Fuel," FBIS-SOV-97-218. Interfax, 29 August 1997; in "Interfax Business Report," FBIS-SOV-97-245.

September 1997

UKRAINE MAKES ARRANGEMENTS FOR 1998 NUCLEAR FUEL SUPPLY

With the expiration of the 1994 US-Russian-Ukrainian Trilateral Agreement, according to which Ukraine received nuclear fuel in exchange for handing over its nuclear warheads to Russia, Ukraine faces the problem of making nuclear fuel payments to Russia. According to Enerhoatom Acting Executive Director Vitalii Tovstonohov, failure to resolve the payment problems will create extreme hardships for Ukrainian NPPs in 1998. Since 1994, nearly 80 percent of the Russian fuel delivered to Ukraine was in compensation for nuclear warheads, and Ukraine paid Russia's TVEL for only 20 percent of the cost of nuclear fuel. As of September 1997, Ukraine's debt for nuclear fuel was under \$4 million. The National Dispatch Center is chronically indebted and owes Ukrainian nuclear power plants 1.5 trillion hryvnias (approximately \$806 million; as of 6 September 1997, 1 hryvnia = \$0.5373). Even though Russian suppliers have agreed to a 50 percent advance payment for nuclear fuel, Ukrainian nuclear power plants still must come up with a significant sum of money. (Each Ukrainian nuclear power plant must pay individually for its fuel.) The problem is further complicated by the fact that Ukrainian reactors rely solely on Russian nuclear fuel. Using Western fuel would require 100 percent advance payments and numerous time-consuming and expensive technological changes. At an August 1997 conference, directors of Ukrainian nuclear power stations and representatives of Enerhoatom and TVEL discussed such financial issues at length. While the Russian side suggested that Ukrainian nuclear power plants adjust their nuclear fuel needs according to budgetary constraints, the Ukrainian side suggested the formation of a joint venture to help pay for nuclear fuel. According to First Deputy Minister of Energy Mykola Friedman, who heads the State Department on the Problems of Nuclear Power, a joint venture between TVEL and Ukrainian producers would make it possible to arrange payments for nuclear fuel. However, Tovstonohov warned against putting too much hope in the joint venture and noted that Russian and Ukrainian legislative action is imperative to resolving this issue.

—Maya Orel, "Will Ukrainian Nuclear Power Plants Go On 'Starvation Diet' Next Year?" *Ukrayina Moloda*, 6 September 1997, p. 4; in "Daily Predicts Problems With Nuclear Fuel Supply," FBIS-SOV-97-254.

13 October 1997

COMPLETE ZIRCONIUM PRODUCTION CYCLE PLANNED

In an additional attempt to create a complete nuclear fuel production cycle, the Ukrainian state enterprise "Zirconium" will move to the supervision of the Ministry of Energy. The enterprise, previously part of the Prydniprovsk chemical industrial complex, makes intermediate-grade zirconium products, which are shipped to Russia and refined for nuclear fuel rod cladding. Establishing a full zirconium production cycle would bring Ukraine

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one step closer to its goal of achieving a complete nuclear fuel production cycle.

—"Ukraine: New Move to Full N-Fuel Cycle," ENS NucNet, 13 October 1997.

November 1997

UKRAINE APPROVES NUCLEAR FUEL JOINT VENTURE WITH RUSSIA

The Ukrainian State Property Fund approved statutory documents to create a joint venture between Ukraine and Russia to pay for fuel for Ukrainian nuclear power plants. The founders of the joint venture, called TVEL-Energiya, are Russia's TVEL and Inkombank, the Ukrainian-Andorran joint venture AMP, VA-Bank in Ukraine, and the Ukrainian State Property Fund, which represents the interests of Enerhoatom (the national nuclear energy company). TVEL will hold a 35 percent stake in the new joint venture, while Inkombank will get a 10 percent stake, resulting in a 45 percent stake for the Russian partners. On the Ukrainian side, the remaining 55 percent is divided as follows: AMP will hold a 15 percent stake, VA-Bank a 10 percent share, and the Ukrainian State Property Fund will take 30% of the venture. TVEL-Energiya will have \$1 million in charter capital and will facilitate payment for nuclear fuel by allowing payment deferrals of 180 days. Annual nuclear fuel requirements cost Ukrainian NPPs \$350 million, with an additional \$100-\$150 million required annually for spent nuclear fuel to be shipped and buried in Russia. Before the joint venture, each Ukrainian nuclear power plant had to find its own way of paying for fuel deliveries, a problem exacerbated by the fact that consumers pay for only six percent or less of their electricity in Ukraine. TVEL also proposed the creation of an insurance fund as an offshoot of the joint venture to provide payments and a fuel reserve. The Russian side would provide nuclear fuel worth \$100 million and then create a matching insurance fund of \$100 million. The insurance fund would pay for subsequent nuclear fuel supplies by accumulating money owed for electricity and also by collecting money derived from exports to Russia.

—"A New JV With Russia," *Eastern Economist*, 17 November 1997, p. 14. Intelnews, 28 September 1997; in "Ukrainia [sic], Russia Planning Nuclear Fuel Joint Venture," FBIS-SOV-97-271. "Ukraine and Russia Establish New Fuel Venture," *Financial Times East European Energy Report*, Issue 73, October 1997. Interfax, 7 October 1997; in "Interfax Business Report," FBIS-SOV-97-280. "Ukraine and Russia Form Joint Venture to Pay For Russian Fuel," *Nuclear Fuel*, 6 October 1997, pp. 10-11.

21 January 1996

CZECH FIRM APPLIES TO BUILD PLANT IN ZHOVTI VODY

The Czech firm Skoda-Pilzen filed an application to take part in an international tender for the construction of a nuclear fuel production plant in Zhovti Vody. Minister of Environmental Protection and Nuclear Safety Yuriy Kostenko traveled to the Czech Republic to determine Czech capability to manufacture nuclear fuel for Ukrainian power plants.

—Infobank, Intelnews, 21 January 1996.

5 February 1996

RUSSIAN CONCERN TVEL WINS TENDER TO BUILD A PLANT IN ZHOVTI VODY

The Russian concern TVEL won the Ukrainian government tender to build a nuclear fuel plant in Zhovti Vody, Ukraine. The deal is subject to guarantees from the Russian government on stable prices for uranium and uranium concentrates and confirmation by the Ukrainian government. If the deal goes through, TVEL will invest \$100 million in the construction of the plant. If the guarantees do not come through in three months, the tender

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committee will likely sign the contract with Westinghouse Electric, S.A., which placed second in the tender. The other bidders were ABB and European VVER fuels. The proposed plant, which could be operational in four years, will produce fuel rods for VVER-1000 reactors by converting UF₄ to UF₆, and UF₆ to UO₂ powder for the pressing and sintering of pellets. Uranium for the rods will be enriched in Russia.

—Matthew Kaminski, "TVEL Wins Ukraine Contract," *Financial Times*, 5 February 1996. "Russia Wins Fuel Plant Tender," *Nuclear Engineering International*, March 1996, p. 7. Peter Coryn and Ann MacLachlan, "Russia's TVEL Beats Westinghouse In Ukrainian Fuel Fabrication Bid," *Nuclear Fuel*, 12 February 1996, pp. 6-7. "News Service," Infobank, 6 February 1996; in "Russian Concern to Provide Nuclear Fuel," FBIS-SOV-96-025.

1 April 1996

UKRAINE HAS NOT RECEIVED ANY NUCLEAR FUEL RODS FROM RUSSIA

According to Derzhkomatom's Nur Nihmatullin, Ukraine has not received any nuclear fuel rods from Russia in 1996. Nihmatullin said that they have used Ukraine's fuel reserves to keep its nuclear power plants operational.

—"Hrushevsky Street News," *Eastern Economist*, 8 April 1996, p. 26.

11 June 1996

UKRAINIAN GOVERNMENT'S NUCLEAR FUEL DEAL WITH RUSSIAN CONCERN TVEL

In the second week of June the Russian government confirmed its approval of preferential prices for uranium supply and enrichment services to Ukraine, a condition set forth by the Ukrainian government to confirm the Russian concern TVEL as the partner for a planned Ukrainian nuclear fuel fabrication venture. When TVEL provisionally won the Ukrainian government tender in February, it was announced that TVEL would invest in the construction of a fuel production plant in Ukraine (see entry from 2/5/96). According to later reports, however, TVEL was not planning to build a plant in Ukraine. Rather, it proposed that Ukraine invest in modernization of existing production capacities in Russia (to double production at the Elektrostal fuel assembly plant near Moscow, and to replace obsolete equipment at the Novosibirsk concentrates plant, and to modernize the zircalloy complex at Chepetsk). TVEL also proposed that Derzhkomatom buy a portion of stock in Russian enterprises, and that TVEL invest in Ukraine. However, TVEL's plans envisage no transfer of manufacture to Ukraine. Thus, Ukraine would retain only uranium mining and zirconium manufacture, that is, only those facilities already existing in Ukraine. Bids submitted by the US companies Westinghouse and ABB had provisions for technology and equipment transfer to Ukraine, thus addressing the aim of Ukraine to develop indigenous fuel manufacturing using domestic sources. However, all of Derzhkomatom's representatives at the tender voted for TVEL, while the overwhelming majority of the others voted for Westinghouse. Derzhkomatom favors a decision in favor of Russia's TVEL reportedly because is beneficial for Ukraine due to Russia's lower fuel prices. Derzhkomatom estimated that it will allow Ukraine to save up to \$2 billion through the year 2010. But Russian fuel is also 8% less efficient than fuel produced by Westinghouse. Experts evaluate the annual profit to Ukraine under the Russian proposal at \$90 million, whereas with the Westinghouse option it would have been \$120 million. Derzhkomatom has come under sharp attack from the Rada Committee on Nuclear Policy and Radiation Safety for its decision in favor of TVEL. Minister of Environmental Protection and Nuclear Safety Yuriy Kostenko also spoke against buying less efficient Russian fuel, and in favor of buying fuel from Westinghouse.

—INTERFAX, 6/21/96; I. Osypchuk, "Our Nuclear Scientists Have Played Up To Greenpeace. This Unprecedented

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Case Will Go Down In History. The Ukrainian State Nuclear Committee and the Greens Do Not Want To Organize Production of Fuel For Nuclear Power Plants in Ukraine. Why?" *Vseukrainskiye Vedomosti*, 6/11/96, p. 6, in "Ukraine: Investing in Russian Nuclear Fuel Sector Assessed," FBIS-SOV-96-117, 6/11/96; Peter Coryn, "Moscow Confirms Discounts in Ukrainian Fuel Supply Deal," *Nuclear Fuel*, 6/17/96, pp. 13-14.

13 June 1996

UKRAINIAN DEBT FOR RUSSIAN NUCLEAR FUEL HAS INCREASED

Since the beginning of 1996, Ukraine has accumulated about \$13 million in debt to Russia for nuclear fuel deliveries, even though Ukrainian nuclear power plants have significantly reduced their fuel purchases. As of 6/13/96, the power plants reportedly have spent \$100 million less on Russian nuclear fuel than had been planned. —Alex Brall, "Chernobyl-1 Threatened with Lack of Fuel, November Closure," *Nucleonics Week*, 6/13/96, pp. 15-16.

21 June 1996

UKRAINE TO BE FULLY SUPPLIED WITH NUCLEAR FUEL BY RUSSIA IN 1996

According to Ukrainian Minister of Environmental Protection and Nuclear Safety Yuriy Kostenko, Russia will fully supply Ukraine with nuclear fuel in 1996 as compensation for nuclear weapons removed from Ukrainian territory. Kostenko emphasized that Ukraine has still not established the National Nuclear Energy Development Fund, which would finance the creation of Ukraine's own nuclear fuel cycle. According to Kostenko, Ukraine's dependence on Russian fuel, which is reportedly 25% less efficient than other fuel available on the world market, hinders the development of the Ukrainian nuclear sector, making it very unprofitable. Kostenko supported the idea of purchasing nuclear fuel from the US company Westinghouse.

—"Ukraina poluchit ot RF v 1996 godu yadernoye toplivo dlya AES v polnom obyeme--Ministr ekologii respubliki," INTERFAX, 6/21/96.

25 June 1996

RUSSIAN CONCERN TVEL WILL SUPPLY FUEL TO UKRAINIAN NUCLEAR POWER PLANTS

At a meeting at the South Ukraine NPP, Russian suppliers and Derzhkomatom reached an agreement on supplies of Russian nuclear fuel to Ukraine. According to the Derzhkomatom press office, the agreement sets forth ways of cooperation with the Russian Atomic Energy Ministry and terms of nuclear fuel supplies to Ukraine for the next ten years. Under the agreement, the Russian TVEL concern will act as fuel supplier and chief consultant on fuel use at Ukrainian nuclear power plants. It will also be fully responsible for the quality of the product. Russia and Ukraine agreed on the need to optimize prices for supplies of fresh fuel, and to improve its quality.

—INTERFAX, 6/25/96, in "Ukraine: Agreement Reached with Russia on Nuclear Fuel," FBIS-SOV-96-124, 6/25/96.

4 July 1996

UKRAINIAN OFFICIALS DISCUSS FUTURE OPTIONS OF NUCLEAR FUEL SUPPLY FOR UKRAINIAN POWER PLANTS

According to Ukrainian Minister of Environmental Protection and Nuclear Safety Yuriy Kostenko, the nuclear fuel which Ukrainian power plants receive from Russia is 25 percent less efficient than foreign fuel sold at almost the same price. This implies that Ukraine receives 25 percent less electric energy for the same money. Kostenko suggested that since the reactors built in Ukraine can use only fuel produced in Russia, Ukraine should consider a switching to other type of reactors, namely CANDU reactors produced in Canada. According to Kostenko, this

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option, considering the CANDU reactor's design, would make it possible for Ukraine to use unenriched uranium, which is abundant in the country. However, the Deputy Chairman of the Ukrainian State Atomic Energy Committee Vasyl Kotko disagreed with Kostenko by saying that the Ukrainian government would need to allocate at least \$3 billion to build a CANDU reactor, to develop essential infrastructure, as well as to train personnel necessary for maintaining this reactor type. According to Kotko, it will take approximately 10 years for Ukraine to resolve the problem of Ukraine's dependence on Russian fuel supply.

—Nina Klymkovska, "The Quality of Russian Fuel is the Same as its Price," *Kyivskiye Vedomosti*, 7/4/96, p. 7, in FBIS-SOV-96-131, 7/4/96.

13 August 1996

UKRAINIAN NUCLEAR POWER PLANTS OWE RUSSIAN PRODUCERS FOR 7/96-8/96 FUEL SUPPLIES

According to the Ukrainian state nuclear energy committee, Ukrainian nuclear power plants have paid their Russian suppliers only 10.7 % of the 7/96-8/96 nuclear fuel debt.

—INTERFAX (Moscow), 8/13/96, in "Nuclear Plants Underpay Russian Suppliers," FBIS-SOV-96-157, 8/13/96.

23 September 1996

TVEL TO STOP PRODUCING FUEL ASSEMBLIES FOR UKRAINE

The Russian concern TVEL will stop producing nuclear fuel assemblies for Ukrainian nuclear power plants until Ukraine pays in full for the Russian nuclear fuel it has already received. According to TVEL officials, Ukraine has paid only ten percent of the \$25 million that Ukrainian power plants owe for Russian nuclear fuel delivered in 1996. TVEL supplies nuclear fuel primarily to the Chornobyl NPP. It is expected that Ukraine's debt to TVEL could reach \$30 million by the end of 1996.

—UX WEEKLY, 9/23/96, in UI NEWS BRIEFING, 96.39-17, 9/24/96-10/1/96. UNIAN, 10/3/96, in "Russia: Chernobyl Nuclear Plant's Debt for Russian Fuel Worsens," BBC Monitoring Service, 10/11/96.

27 December 1996

RUSSIA, UKRAINE, KAZAKHSTAN ENTERING FUEL AGREEMENT

Segodnya reported that Russia, Ukraine, and Kazakhstan are in the process of drawing up an agreement to create a facility for producing fuel assemblies for Ukrainian nuclear power plants. Participants from the three countries will have equal shares in the facility.

—"Budet sozdano SP po proizvodstvu yadernogo topliva dlya AES Ukrainy," *Segodnya*, 12/27/96, p. 1.

January 1995

UKRAINE WILL CONTINUE TO PURCHASE ENRICHED URANIUM FROM RUSSIA

Representatives from the Atomic Energy Ministries of Russia and Ukraine reached an agreement under which Ukraine will continue to purchase enriched uranium in the form of fuel assemblies from Russia.

—Correspondence with Ukrainian nuclear official, January 1995.

31 January 1995

UKRAINE'S STOCKPILE OF NUCLEAR RESOURCES WILL LAST FOR 150 YEARS

Mykhailo Pavlovskiy, Chair of the Verkhovna Rada Commission for Nuclear Policies and Nuclear Security, stated

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that since Ukraine possesses large uranium and zirconium reserves, it should work to develop its own nuclear fuel cycle. Ukraine's stockpile of the necessary resources should last for 150 years.

—UNIAN (Kiev), 31 January 1995; in "Commission Chairman Urges Nuclear Energy 'Concept'," FBIS-SOV-95-021, 31 January 1995.

12 February 1995

TO CREATE A CLOSED FUEL CYCLE WILL COST UKRAINE \$1.5 BILLION AND WILL TAKE 10-12 YEARS

First Deputy Chairman of Derzhkomatom Nur Nihatullin told INTERFAX that Ukraine is planning to enlist international assistance in its quest to develop a fuel fabrication facility in Ukraine. Companies from France, the United States, Germany, and Russia are competing for the contract. Mykhailo Umanets, Chairman of Derzhkomatom, stated that it should be possible for Ukraine to develop fuel production capabilities within five to six years. It would take Ukraine 10-12 years to create a complete closed fuel cycle, which would cost at least \$1.5 billion. Umanets suggested that fuel fabrication should take place at Zhovti Vody or at Dniprodzerzhynsk. A prominent Ukrainian physicist supports Ukraine's development of an indigenous fuel fabrication capability. Viktor Zelenskyi, of the Kharkiv National Institute of Physics and Technology, stated that all Ukraine needs from the West is financial assistance; he believes that if Ukraine uses Western processing technology, the fuel it would produce would be superior to Russia's.

—Interfax, 12 February 1995; in "Four Foreign Firms to Bid for Factory Project," FBIS-SOV-95-029, 12 February 1995. Victor Zamyatin, "Lots of Plans, but Not Enough Capability," *Kommersant-Daily*, 22 February 1995. "Ukraine Should Produce Nuclear Fuel," *Ukrainian Weekly*, 12 February 1995, p. 2.

13 February 1995

KIEV MAINTAINS THAT RUSSIAN NUCLEAR FUEL RODS ARE LOW-QUALITY

Ukraine is seeking suggestions from the international community as to how to lessen its dependence on Russian nuclear fuel rods, which Kiev maintains are low-quality. The 14 nuclear reactors in Ukraine provide up to 46 percent of the country's electricity supply during the winter.

—"Ukraine Wants to Build Nuclear Fuel Plant," Reuters, 13 February 1995.

20 March 1995

UKRAINE HOPES TO SPEND \$1.2 BILLION ON DEVELOPING NUCLEAR INDUSTRY

Ukraine hopes to spend \$1.2 billion to develop its nuclear industry in order to supply nuclear fuel rods for its reactors. On 20 March 1995, a closed tender was announced by the State Committee on the Use of Atomic Energy. Plans currently are to build a fuel fabrication factory in Zhovti Vody.

—INFO-TASS, 3/20/95; "Nuclear Energy Safety Challenges in the Former Soviet Union: Panel Report," Center for Strategic and International Studies, Washington, DC, 1995.

April 1995

DOMESTIC FUEL CYCLE WILL MEET 40-45% OF UKRAINIAN NEEDS

The Ukrainian government approved a plan to meet 40-45% of its fuel needs through a domestic fuel cycle. This would entail a threefold increase in domestic uranium mining and milling, the creation of a conversion facility, the manufacture of intermediate zircaloy products, and the construction of a fuel fabrication plant. Ukraine will

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continue to rely on foreign uranium enrichment.

—Source Book: *Soviet-Designed Nuclear Power Plants in Russia, Ukraine, Lithuania, Armenia, the Czech Republic, the Slovak Republic, Hungary, and Bulgaria*, 1996, p. 137.

12 April 1995

UKRAINE SEEKS JOINT VENTURE PARTNER FOR FABRICATING FUEL PELLETS AND RODS

A resolution "On the Creation of a Nuclear Fuel Cycle in Ukraine" was adopted by the government and currently Ukraine is seeking a joint-venture partner for the fabrication of fuel pellets, rods, and assemblies.

—Viktor Demidenko, ITAR-TASS, 21 April 1995; in "Ukraine to Organize Nuclear Fuel Production," FBIS-SOV-95-078.

28 April 1995

CREATION OF NUCLEAR FUEL CYCLE WILL PRODUCE THREEFOLD INCREASE IN URANIUM MINING

The State Committee for the Use of Atomic Energy (Derzhkomatom) has a general program for a nuclear fuel cycle, as outline in the April 12 resolution, "On the Creation of a Nuclear Fuel Cycle." This provides for a threefold increase in uranium mining over the next several years. The Zhovti Vody Ore Enrichment Combine (ZVOEC) has been a supporter of the closed fuel cycle, which would equate to increased production, modernization, and profits for them. ZVOEC sold \$13 million worth of natural uranium concentrate in 1994, the larger part of which was sold abroad). Anatoliy Chernov, Deputy Chair of Derzhkomatom, said that Ukraine's mines can supply Ukraine's 14 reactors plus the 5 planned for construction with enough raw material for nuclear fuel for 100 years. The program also envisions production of zirconium pipes for fuel assemblies in Dniprodzerzhynsk (mining of zirconium has already begun in Vilnohirsk) and construction of a plant producing fuel assemblies close to Zhovti Vody.

—Olena Zvarych, "For Ukraine to Have its Own Nuclear Fuel, We Have to 'Activate the Process.' The Uranium Industry: Can Reality and Projects be Compatible?" *Ukrayina moloda*, 28 April 1995, p. 4; in "Uranium Mining, Nuclear Fuel Cycle Viewed," FBIS-TAC-95-014-L.

8 May 1995

UKRAINE HOPES TO DEVELOP FUEL FABRICATION CAPABILITY OF 600 METRIC TONS A YEAR

Derzhkomatom developed a nuclear fuel program that was adopted on 4/12 by the Rada and has been tasked by President Kuchma to set up a fund explicitly for this purpose as well as seek out international partners for the project, which will cost an estimated \$1 billion. By 2003, the amount of uranium mined and milled in Ukraine is to triple as is the quality of the uranium; Ukraine plans to spend a total of \$611 million by 2010 on these efforts. Plans for the construction of a hexafluoride (UF₆) conversion plant are to be completed by 1999. Ukraine seeks to develop a fuel fabrication capability of 600 metric tons per year.

—Peter Coryn, "Ukraine Approves Outlines of Nuclear Fuel Industry Plan," *Nucleonics Week*, 25 May 1995, pp. 19-20.

25 May 1995

UKRAINE SEEKS AID TO DEVELOP INDIGENOUS FUEL PRODUCTION

Ukraine is seeking to secure \$1 billion in foreign aid for the development of an indigenous fuel rod production capability. The project would take 15 years and would enable Ukraine to make 45 percent of the fuel rods used in the five nuclear power stations in Ukraine. This project would provide jobs for 25,000-30,000 people and be 30

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percent cheaper than purchasing the fuel rods from Russia, which costs Ukraine \$300 million each year.

—"Ukraine's Coming Crisis," *Foreign Report*, 25 May 1995.

June 1995

FIRST VERSION OF PROGRAM TO DEVELOP NUCLEAR CYCLE PREPARED

Scientific, technical, and economic assessments have been made by leading Ukrainian authorities and the first version of the "Program for Nuclear Cycle Development in Ukraine" has been prepared.

—CISNP discussion with Ukrainian nuclear official, June 1995.

June 1995

DOMESTICALLY PRODUCED FUEL IS EXPECTED TO COST 30 PERCENT LESS THAN RUSSIAN

It was reported that Ukraine continues to pursue its program to create a closed fuel-cycle and a uranium enrichment plant under its auspices. The plant will provide 40-45 percent of the nuclear fuel that Ukrainian nuclear power plants require. Domestically-produced fuel is expected to cost 30 percent less than fuel imported from Russia.

—"Ukraine," *Yadernyy Kontrol*, June 1995, p. 13.

12 June 1995

SPENT FUEL IS REPROCESSED IN KRASNOYARSK

Yevhen Mikerin, Head of the Fuel Cycle and Nuclear Weapons Production Facilities Directorate of Minatom, stated that Ukraine's claims that not enough nuclear fuel was being delivered to its power plants was false; he said that fresh fuel was being supplied at near world prices and that Russia continues to upgrade its fuel so Ukraine will receive the highest quality fuel possible. Also, the problem regarding spent fuel reprocessing has been resolved. In early June 1995, a container set out from Krasnoyarsk to pick up spent fuel that would be stored and reprocessed at the T-2 facility. Negotiations are currently underway to conclude a long-term spent fuel agreement with the South Ukraine and Zaporizhzhya plants. Reprocessing Ukraine's spent fuel is beneficial for Krasnoyarsk, which is currently experiencing financial difficulties since it shut down its plutonium producing reactors; Ukraine is reportedly paying less than world prices for this reprocessing.

—"Interview on Russia's Nuclear Reactor Sale to Iran, Ukrainian Relations," *Post-Soviet Nuclear and Defense Monitor*, 12 June 1995, p. 14.

19 June 1995

IDEA OF CLOSED FUEL CYCLE IS STILL ONLY IDEA

Derzhkomatom is the governmental body most actively pursuing the idea of a closed fuel-cycle. It is not likely to happen in the near future due to the prohibitive cost. Thus far, no concrete steps have been taken, even in term of the construction of a fuel fabrication facility; no money has been set aside for the project, but draft plans may exist. The safeguards division is responsible for licensing such activities and as yet, nothing official has developed. There has been no official decision by the President or the Supreme Rada on the creation of a closed fuel cycle. For the present, Ukraine plans to continue purchasing fuel from Russia. Ukraine is still receiving fuel shipments from Russia as stipulated by the Trilateral Statement but this provides only enough fuel for a few units of a few plants. According to Lopatin, all the nuclear power plants have sufficient fuel as well as reserves.

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—CISNP Interview with Serhiy Lopatin, Head of the Safeguards Division, Nuclear Regulatory Administration, Ministry of Environmental Protection and Nuclear Safety, Kiev, 19 June 1995.

20 June 1995

UKRAINIAN URANIUM WILL BE ENRICHED IN FRANCE, GREAT BRITAIN OR RUSSIA

Yuriy Koshyk, director of the Ukrainian Scientific Research Institute of Industrial Technology, stated that Ukraine is pursuing the capability to produce fuel rods domestically. The rationale is that Ukraine spends \$390 million annually for nuclear fuel and once five new nuclear power units are operational, the cost will increase to \$600 million. The fuel assemblies purchased from Russia are rated for only three years while fuel assemblies from other countries last for four. Construction reportedly is slated to begin in 1996 in Zhovti Vody. Ukraine plans to send its natural uranium to either France, Great Britain, or Russia for enrichment and then the enriched uranium will be made into fuel rods in Ukraine. The Ministries of Health and Environmental Protection and Nuclear Safety will be involved in the process so as to ensure that the process is as environmentally-friendly as possible.

—Tetyana Khomych, "TVELs for Nuclear Plants Will Originate in the Dnieper Region...," *Molod Ukrainy*, 20 June 1995, p. 2, in "Plans for Ukraine's Heat Elements Detailed," FBIS-SOV-95-121, 20 June 1995.

20 June 1995

FAST BREEDER REACTORS WILL COMPLETE CLOSED FUEL CYCLE

Yuriy Kostenko, Minister of Environmental Protection and Nuclear Safety, discusses in this article Ukraine's potential to complete a closed fuel cycle. Kostenko sees his "primary task" as designing fast-breeder reactors, which would "crown a closed (fuel) cycle." As an advantage to the cycle, Kostenko believes that using only uranium extracted in Ukraine will reduce the cost of electricity produced at Ukrainian NPPs. However, the lack of stationary storage sites for spent radioactive waste still stand in the way of a complete cycle. Kostenko noted that RBMK reactors produce weapons grade plutonium "in volumes larger than those produced at VVER-type reactors."

—Dmytro Lykhoviy, "Yuriy Kostenko: If the West Squeezes Us, and We Close Chernobyl Nuclear Power Plant, Assistance to Chernobyl Will Become an Illusion," *Ukraina Moloda*, 20 June 1995, pp. 3-4.

21 June 1995

DECISION TO CREATE CLOSED FUEL CYCLE UNOFFICIAL

No official decision had been taken by the President or the Verkhovna Rada regarding the creation of a closed fuel-cycle.

—CISNP Discussions with Ukrainian nuclear official, 19 June 1995.

11 July 1995

UKRAINE IS READY TO CREATE A NUCLEAR FUEL CYCLE

Nur Nihatullin, First Deputy Chairman of the Ukrainian State Committee for the Use of Atomic Energy, stated that Ukraine has everything necessary to create a nuclear fuel cycle. A conference outside of Kiev devoted to "International Cooperation in Nuclear Development" looked into international cooperation in developing safe nuclear technologies, including storing and reprocessing nuclear waste. In an attempt to further justify a Ukrainian closed fuel cycle, Nihatullin reported that storage of spent fuel is less expensive in Ukraine than in Russia.

—"Ukraine has everything to Create a Nuclear Fuel Cycle," *Holos Ukrainny*, 11 July 1995, p. 1.

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13 July 1995

UKRAINE INTERESTED IN BUILDING FACTORY FOR FUEL ASSEMBLIES

According to Yuriy Kostenko, Ukraine currently has no plans to develop a completely closed fuel cycle. Ukraine is interested, however, in building a factory for the creation of fuel assemblies, since the fuel assemblies that are purchased from Russia are 25 percent less powerful than those produced by other countries. This facility would most likely be built in Zhovti Vody, which would help ameliorate the difficult economic situation in that region. —Interfax, 13 July 1995; in "No Plans to Create Closed Cycle of Nuclear Production," FBIS-SOV-95-135.

13 July 1995

NO UKRAINIAN NUCLEAR POWER PLANTS HAVE REQUISITE ONE-YEAR SUPPLY OF FUEL

According to Yuriy Kostenko, none of the Ukrainian nuclear power plants has the requisite one year supply of fresh nuclear fuel. —"Interfax-Ukraine News," Interfax (Moscow), 13 July 1995.

28 July 1995

UKRAINE WILL CREATE ITS OWN NUCLEAR FUEL CYCLE

According to a State Committee for the Use of Atomic Energy press release, Ukraine will create its own nuclear fuel cycle to stabilize the situation in its own nuclear energy complex. Talks are underway with the French company COGEMA on the joint development of uranium deposits. Ukraine intends to increase uranium output and set up a nuclear fuel production facility. Projects for this facility have been tendered by ABB (United States), Westinghouse (United States), Siemens (Germany), Framatome (France), and the Russian Atomic Energy Ministry. —"Government to build nuclear fuel production plant," UNIAN, 28 July 1995.

August 1995

GOVERNMENT ADOPTS NATIONAL PROGRAM ON DESIGN AND CONSTRUCTION OF NUCLEAR FUEL FACILITIES

The Government of Ukraine passed a Resolution to adopt a national program on the design and construction of nuclear fuel facilities. The fuel facilities will include "a network of conversion plants, pelletizing facilities, plants to produce zirconium alloy pipes and other products, and plants for manufacturing fuel assemblies." The network will only lack enrichment and back end fuel cycle facilities. A fuel assembly manufacturing facility is planned as one of the first new units. According to the General Director of the Eastern Mining and Conversion Combine, Mykhailo Babak, the program is designed for a 15 year term through 2010; however, Ukraine hopes to be producing its own fuel assemblies by 2000.

—"Goskomatom Speaks," NUKEM, August 1995. Interview with Mykhailo Babak, "The General Director Speaks," NUKEM, August 1995, p. 13.

9 October 1995

VVER-1000 FUEL PRODUCTION ENTERPRISE SELECTS PARTNER

Mykhailo Umanets opened bids from foreign companies to select a partner for the creation of a VVER-1000 fuel production enterprise in Ukraine. Bids were received from the Russian company TVEL, the Franco-German consortium European VVER Fuels GmbH, ABB Combustion Engineering, and Westinghouse/British nuclear fuels. The winner of the tender will be determined in 2-4 months by representatives of Derzhkomatom; the Ministry of

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Environmental Protection and Nuclear Safety; the Ministries of Economy, Foreign Economic Relations, and Industry; and the Academy of Sciences. The program will require a total of \$993.5 million from 1995-2010 and will increase uranium mining and milling, establish a conversion facility, expand zirconium alloy production, and modernize zirconium tube production. Ukraine is expected to save \$100 million a year once the program is in place. Umanets reportedly boasted that the plant will enable Ukraine to produce 45% of the fuel it requires, will provide 25,000 new jobs, and will save Ukraine 30% on the costs of importing fuel from Russia.

—Peter Coryn and Ann MacLachlan, "Ukraine Begins Reviewing Bids For VVER Fabrication Plant," *Nuclear Fuel*, 23 October 1995, pp. 7-8. "Fuel Plant Planned: Ukraine," *Nuclear Engineering International*, October 1995, p. 12.

November 1995

UNITED STATES HELP UKRAINE TO ESTABLISH REGULATORY CONTROLS OVER FUEL CYCLE

There are US DOD, DOE, NRC, and State Department aid programs focused on helping Ukrainian and Russian authorities establish regulatory controls over the fuel cycle.

—"Nuclear Safety: Concerns with Nuclear Facilities and Other Sources of Radiation in the Former Soviet Union," *GAO Report to the Honorable Bob Graham, US Senate*, November 1995, pp. 15-16.

2 February 1994

SHORTAGES OF NUCLEAR FUEL COULD CLOSE DOWN SEVERAL NUCLEAR POWER PLANTS

Nuclear industry officials announced that severe shortages of nuclear fuel could close down several units at Chernobyl within a week and Ukraine's four other nuclear power plants within months. Fuel shortages have already slowed operations down; Chernobyl's Unit 3 and all of the units at Zaporizhzhya are operating at only 50 percent capacity.

—Alexander Tkachenko, "Chernobyl Could Begin Shutdown within a Week," Reuters, 2 February 1994.

23 February 1994

DIRECTIVE PROVIDES FOR COMPLETION OF NUCLEAR FUEL CYCLE

Ukrainian President Leonid Kravchuk signed a directive, "On Urgent Steps To Develop Nuclear Power And Complete The Nuclear Fuel Cycle In Ukraine." The directive provides for the introduction of four new nuclear reactors, the restart of Chernobyl's Unit 2, and the completion of the nuclear fuel cycle in Ukraine.

—UNIAN, 5 April 1994, in "Ministries Demand Cancellation of Nuclear Directive," FBIS-SOV-94-067, 7 April 1994, p. 51.

19 February 1993

UKRAINE PLANS TO CONSTRUCT ENRICHMENT AND WASTE FACILITY

Ukraine maintains that it has plans to construct its own enrichment and waste facilities and will hold an international competition for the best design.

—THE ARMS CONTROL REPORTER, Institute for Defense and Disarmament Studies, March 1993, in "Update on Former Soviet Nuclear Weapons Facilities-Enrichment: Ukraine," FBIS-SOV-93-032, 19 February 1993.

5 April 1994

SEVERAL ORGANIZATIONS DEMAND INVALIDATION OF FEBRUARY DIRECTIVE

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A number of Ukrainian governmental and non-governmental organizations, including the Ministry of Environmental Protection and the Ministry for the Protection of the Population from the Chernobyl Aftermath, signed an appeal to Kravchuk demanding the invalidation of the February directive, on the grounds that it violates the rights to ecological, radiation, and nuclear safety, and does not comply with the International Covenant on Economic, Social, and Cultural Rights.

—UNIAN, 5 April 1994, in "Ministries Demand Cancellation of Nuclear Directive," FBIS-SOV-94-067, 7 April 1994, p. 51.

15 July 1994

UKRAINE HAS POTENTIAL TO ESTABLISH OWN FUEL CYCLE

The Parliamentary Commission for Nuclear Policy and Safety conferred with other government officials today on the problem of securing a reliable supply of nuclear fuel from Russia. It was determined that Ukraine has the scientific and technical potential to establish its own fuel cycle, and that the government needs to take steps to bring the necessary resources together.

—"Ukraine: Nuclear Self-Sufficiency Planned," *Nucleonics Week*, 8/18/94, p. 14.

9 August 1994

INTERNATIONAL TENDER FOR FUEL PRODUCTION PLANNED FOR FALL 1994

Mykhailo Umanets, Chairman of the State Committee for Use of Atomic Energy, announced that Ukraine plans to produce fuel for its nuclear power plants. An international tender for the project is planned for Fall 1994. Fuel production would be undertaken at the Pridniprivsky Chemical Factory, the Skhidnyi Mining and Chemical Works, and the Pivdennotrubnyi Factory at Nikopol. Viktor Baryakhtar, Chairman of the Presidential Commission for Nuclear Policy, added that Ukraine has everything necessary to produce its own fuel, including large reserves of natural uranium and zirconium, which is used to make the fuel rod cladding that hold the fuel pellets. According to the Committee for Use of Atomic Energy's plan, Ukraine would not enrich the uranium itself, but rather would buy enriched uranium from abroad using natural uranium as payment. This enriched uranium would then be made into fuel rods.

—ITAR-TASS, 9 August 1994, in "Government Plans To Make Own Nuclear Fuel," FBIS-SOV-94-154. ITAR-TASS, 15 August 1994, in "Official On Nation's Uranium, Zirconium Supplies," FBIS-SOV-94-157. "Ukraine Intends to Produce Its Own Nuclear Fuel," *Krasnaya Zvezda*, 11 August 1994, p. 1.

19 August 1994

NO NEED FOR UKRAINE TO DEVELOP ENRICHMENT CAPABILITIES

Nikolai Steinberg contends that Ukraine does not intend to develop enrichment capability anytime in the foreseeable future. He also believes that, despite statements by some Ukrainian officials to the contrary, the development of reprocessing capability in Ukraine "is unthinkable in Ukraine's current economic situation." He notes that the world's major reprocessing centers--England, France, Japan, and Russia--already possess the capacity to reprocess the world's spent fuel and that to establish another center would be dangerous from a proliferation standpoint. Ukraine is the largest buyer of Russian uranium in the form of nuclear fuel since the United States passed anti-dumping legislation, effectively preventing Russia from selling large amounts of uranium

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in the United States.

—Interview with Nikolai Steinberg, Monterey, CA, 19 August 1994.

5 October 1994

PRESIDENT KUCHMA SPEAKS IN FAVOR OF CREATING NUCLEAR FUEL PRODUCTION FACILITY IN UKRAINE

President Kuchma, speaking at a Cabinet of Ministers' meeting spoke out in favor of creating a nuclear fuel production facility in Ukraine.

—*Holos Ukrainy*, 5 October 1994, p. 1; in "Kuchma Favors Nuclear Fuel Production," FBIS-SOV-94-195.

21 October 1994

UKRAINE REQUESTS \$150 MILLION FROM UNITED STATES TO DEVELOP CLOSED FUEL CYCLE

Oleksandr Moroz, Chairman of the Verkhovna Rada, has stated that Ukraine seeks to develop a closed fuel cycle and told Assistant Secretary of Defense (sic) Gloria Duffy that Ukraine would appreciate a US contribution of between \$120-150 million for the project. Since the United States has both the personnel and technology to develop a complete fuel cycle, its assistance would make the process less time consuming and costly for Ukraine. US officials have reportedly stated that they will consider the request.

—UkrInform, 21 October 1994; in "Moroz Meets US Official on Nuclear Industry Aid," FBIS-SOV-94-211.

28 October 1994

CONFERENCE ON NUCLEAR FUEL AND INSURANCE ISSUES ORGANIZED IN KHARKIV

The Ukrainian State Committee on the Use of Atomic Energy organized a conference on nuclear fuel and insurance issues in Kharkiv. The Kharkiv Physical-Technical Institute, the American firm Westinghouse, and Arma, the Ukrainian insurance company were co-sponsors. Twenty Ukrainian organizations took part in the conference that dealt with issues such as nuclear fuel design, the nuclear fuel cycle, and nuclear power industry insurance; this marked the first time that insurance was discussed at a meeting of this nature. Ukraine is seeking to develop a closed nuclear fuel cycle, including the construction of a nuclear fuel fabrication plant with western financial and technical assistance.

—Nucnet News, No. 519/94, 28 October 1994.

1 November 1994

UKRAINE GRANTED RIGHT TO IMPORT NUCLEAR MATERIALS

In accordance with the Russian-Ukrainian bilateral agreements--1/14/93 "On Scientific, Technical, and Economic Cooperation," and 1/3/93 "On the Reprocessing Of Nuclear Fuel," Ukraine was granted the provisional right to import nuclear materials. Ukraine had not yet signed an IAEA safeguards agreement at that time.

—Nikolai Steinberg, Presentation before the Committee on Defense and Military Policy of the Verkhovna Rada, 1 November 1994.

17 November 1994

RUSSIA PROVIDED MORE FUEL ASSEMBLIES THAN PLANNED

According to Russian authorities, Russia has more than fulfilled its obligations to Ukraine under the Trilateral Statement, by providing 249 fuel assemblies, which is more than was originally planned. Since Ukraine ratified the

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NPT, Russia has no problems related to its fuel deliveries to Ukraine. Russia and Ukraine signed an agreement in 1/93 that mandates that Russia will deliver fuel to Ukraine for two years with an automatic extension for five years as long as Ukraine is pursuing nuclear disarmament.

—Interfax, 17 November 1994; in "Nuclear Fuel Supplies to Ukraine Ready to Continue," FBIS-SOV-94-223.

24 November 1994

UKRAINE RECEIVES RUSSIAN FUEL BUT OFTEN TOO LATE

Mykhailo Umanets, chairman of the Ukrainian State Committee for the Use of Atomic Energy (Derzhkomatom), stated that Ukraine's nuclear fuel supply for the winter is provided for. Following Ukraine's ratification of the NPT, Derzhkomatom appropriated approximately 1 trillion karbovantsi (US\$7.7 million) for nuclear fuel purchases from Russia. However, Kostiantyn Hryshchenko, chief of the Directorate for Control Over Armament and Disarmament in the Ministry of Foreign Affairs, has stated that the fuel Ukraine is receiving from Russia is substandard and often delivered late.

—Alex Brall, "Ukraine to Receive Russian Fuel but Officials Criticize Quality," *Nucleonics Week*, 24 November 1994, p. 7.

1 June 1993

HIGH RUSSIAN FUEL PRICES WILL LEAD TO EXPANSION OF UKRAINIAN NUCLEAR INDUSTRY

The Ukrainian nuclear power industry is finding it difficult to afford fuel. In a speech to the Supreme Rada, Prime Minister Leonid Kuchma lamented the "near world-market prices" Russia is now charging for its nuclear fuel. This action provides impetus for both energy independence and the drive to expand the nuclear industry, since natural uranium is abundant in Ukraine and could be exploited if the industry expanded with CANDU reactors.

—*Nuclear News*, July 1993, p. 48.

July 1993

UKRAINE NEEDS REPROCESSING FACILITIES, IS UNABLE TO ENRICH URANIUM

Goskomatom Chairman Mikhailo Umanets said Ukraine needs to create a closed fuel cycle. Umanets rejected the idea of Ukraine developing the ability to enrich uranium, but stressed the need for reprocessing facilities. By 1998, he also expects Ukraine to have upgraded its zirconium production facilities at the Pridnepriivskiyi Chemical Factory at Dniprodzerzhynsk and to have a domestic uranium oxide pellet and fuel assembly production center. Currently, uranium oxide fuel production only takes place at Ust-Kamenogorsk (Kazakhstan) in the form of fuel pellets and Elektrostal (Russia) in the form of fuel rods and assemblies. Ukraine apparently has abandoned plans to develop an indigenous enrichment facility because it realized that it could not compete with Western plants due to, among other problems, a lack of expertise and high construction costs.

—Mark Hibbs, "Kiev to Finance RT-2 Construction, Take Back PU and HLW, Minatom Says," *Nucleonics Week*, 19 July 1993, pp. 12-13.

3 September 1993

RUSSIA AND UKRAINE SIGN AGREEMENT ON UTILIZATION OF NUCLEAR MILITARY SUPPLIES

"The Agreement between the Government of Ukraine and the Government of the Russian Federation on the Utilization of Nuclear Military Supplies" was signed. Article 3 outlined that Russia will supply Ukraine with fuel

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assemblies for its nuclear power plants as long as Ukraine puts its nuclear activities under IAEA safeguards. Article 4 outlines the parties responsible for the fulfillment of this agreement: for the Ukrainian side, the Ministry of Defense and the State Committee for the Use of Atomic Energy. Article 6 states that this Agreement is to stay in effect 30 years from the day of signing, unless the two sides agree in writing otherwise.

—From the text of "Soglashenie Mezhdru Pravitelstvom Ukrainy i Pravitelstvom Rossiyskoy Federatsii Ob Utilizatsii Yadernykh Boezaryadov," signed 3 September 1993.

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