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● CZECHOSLOVAKIA /13

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### A FRESH START IN THE CZECHOSLOVAK NUCLEAR INDUSTRY?

Summary: Recently, Czechoslovakia concluded an agreement with the Soviet Union on delivery of two nuclear power stations. This report surveys the difficulties Czechoslovakia experienced with Soviet assistance in the construction of her first atomic power station, which operates on the basis of natural uranium combustion. It presents the evidence available on the prospective development of nuclear power stations within the framework of the contemplated overhaul of the Czechoslovak power industry.

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On 30 April 1970, in Prague, Czechoslovakia signed an economic agreement with the USSR on the delivery of two atomic power stations of the Voronezh type. Each of these power stations will have two VVER 440 reactors, which use partially enriched uranium with approximately 3 per cent isotopes 235 as fuel. This is a so-called light-water reactor, in which light water serves as the moderator and cooling agent. In the Soviet Union, where the water is colder, one reactor produces an output of 440 MW; in Czechoslovakia, the output will amount to only 420 MW, so that the combined electric power produced by these two stations will total 1,680 MW.

According to the official commentaries, this Soviet aid is designed to help in a sector "in which Czechoslovakia has had the greatest difficulty in efficiently utilizing existing electric energy resources," as well as in the construction of new installations. The agreement on the delivery of two Soviet nuclear power stations will enable Czechoslovakia's industry to co-operate in the production of equipment for nuclear energy installations

to meet her own requirements as well as those of other countries.(1) This is again an instance of "selfless" aid from the Soviet Union, since the agreement will "pave the way for a genuine turn in the development of our nuclear energy."(2)

But neither the deliveries of these two Soviet nuclear power stations nor the optimistic plans for the future will resolve the current difficulties, nor will they reduce the gap between Czechoslovakia and the industrially-developed states in the peaceful use of nuclear energy. One must look back into the past to find an explanation of the current situation.

In March 1956 the CSSR and the USSR signed an agreement on mutual aid in the peaceful use of nuclear energy. In 1957, a group of Czechoslovak technicians went to the Soviet Union to help draft the first project for a Czechoslovak atomic power station which, officially, Soviet specialists had proposed and prepared. This was a station with a heavy water reactor, which used natural uranium as fuel and was cooled by gas -- i.e., the Czechoslovak A-1 type, which is still in the process of construction at Jaslovske Bohunice in Slovakia. In this context, it is important to note that the concept of a nuclear power station based on natural uranium as fuel was chosen for Czechoslovakia after agreement had been reached on the allotment of tasks in nuclear industry among the Comecon states.

The optimistic forecasts of the mid-1950s regarding the use of nuclear energy in the power sector are epitomized in an interview with the then Minister of Energy, Frantisek Vlasak, who said that the first Czechoslovak nuclear power station would go into operation in 1960, and that ultimately nuclear stations would provide the entire additional output of power.(3) More realistic were the assumptions that work on the construction of the first Czechoslovak nuclear power station would begin in 1958, that it would become operational during the Third Five-Year Plan (1961-1965), and that the subsequent construction of nuclear power stations would make it possible to meet the increased demand for power beginning in 1980.

Work on the construction of the first nuclear power station began on 4 August 1958, but this was a more or less symbolic start. For a number of years no real work was done; the original deadlines were gradually postponed, and construction really began only in 1964, when the project was included in the all-state plan.

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- (1) Rude Pravo, 1 May 1970.
  - (2) Radio Prague, 13 May 1970.
  - (3) Rude Pravo, 21 January 1957.

This period of indecision and wavering about the Czechoslovak energy system can be explained by the fact that the central authorities were simply following the Soviet example, since in the USSR the construction of nuclear power centers was also being delayed. The USSR, with its immense supplies of solid and liquid fuels and its vast hydroelectric potential, could well afford to wait; Czechoslovakia certainly could not.

The optimistic forecasts continued, although the date on which the first atomic power station would go into operation was postponed again and again. First it was to be in 1963, then in 1965, 1966, 1968, and 1969. By 1 January 1969, the government had issued 11 ordinances dealing with the construction of the A-1, and the CPCSSR CC Presidium had come out with three decisions of a directive character. The result was always the same: the deadline set in the preceding decision was extended;(4) in the course of time, at least five different "deadlines" for completion of the construction of the A-1 were set.

At the beginning of 1965, plans for a second atomic power station were discussed; this station was supposed to be built in the vicinity of the A-1 -- that is, also in Jaslovské Bohunice. At the beginning of 1966, it was proposed that construction begin in 1968 (that is, in the year in which the A-1 was to become operational), and be completed in 1974. In the middle of 1967, Vecerní Praha(5) even carried a report to the effect that work on "concept studies" for a third Czechoslovak atomic power station was in progress.

The first doubts about the possibility of the A-1 becoming operational in 1968 began to be voiced in the Czechoslovak information media at the beginning of 1967. In the course of 1968, it became apparent that the deadline for completion of its construction was unrealistic. One year later, in 1969, when even according to the most pessimistic forecasts the A-1 should already have begun to supply electric current to the grid, it was finally admitted that there would be at least another two-year delay, and that electric power from this source could not be expected before 1972.(6)

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(4) Planovane Hospodarstvi No.10, October 1969.

(5) 5 June 1967.

(6) Zemedelske Noviny, 21 May 1969, and Planovane Hospodarstvi No. 10, October 1969.

Along with the delays in construction of the A-1, the costs of the work were also mounting. In 1958, just before construction began, the necessary investment was estimated at 1,000 million Kcs;(7) later, the figures 2,000 million or even 2,400 million Kcs were mentioned as the probable cost. However, in 1968 it was estimated that the first Czechoslovak atomic power station will actually cost 3,000 million Kcs,(8) and apparently even this amount will not cover the final bill.

There are several reasons for the delays and the high costs. First there was the fact that until 1962 or 1963 doubts were continually expressed as to whether or not this project was really expedient. The impression prevailed that Czechoslovakia would be able to produce sufficient electric power even without atomic power stations -- that is, from her coal fields or by increasing her fuel imports. Between 1961 and 1963, the authorities even contemplated stopping construction of the A-1. In practical terms, this procrastination caused a delay of five years.

To this must be added difficulties of a technical nature. There were elements not yet experimentally tested in the project. Many problems also arose in the research, development, and production of completely new technological equipment, which presented a major challenge to the technical side of the work. Of importance in the negative sense was the delay in the delivery of components produced both domestically and abroad. Soviet assistance was not forthcoming to the expected degree (this applied both to documentation and to material assistance). It appears that the Soviets purposely left the Czechoslovak technicians to solve the various problems connected with the construction because it was not, and still is not, in Soviet interest that Czechoslovakia become independent of Soviet supplies for the operation of atomic power stations.

The result of all this was that doubts arose as to the validity of the whole concept of building an atomic power station on the basis of natural uranium combustion. As early as 1966, a USSR offer to supply a nuclear power station with a pressurized water reactor was under consideration.(9) In the head offices of the Czechoslovak power industry, voices in favor of adopting a program based on a Voronezh-type atomic power station grew stronger. During the liberalization process, it was even suggested

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(7) Radio Prague, 13 August 1958.

(8) Planovane Hospodarstvi No.10, October 1969.

(9) Prace, 8 February 1966.



that a well-tested atomic power station be purchased from the West. Naturally, in the changed political climate of today, no one would think of repeating such a suggestion.

A-1-type nuclear power stations, powered by natural uranium, are of enormous economic importance to Czechoslovakia. Their construction and operation would result in huge savings, because Czechoslovakia would be able to produce uranium fuel from its own rich sources. In August 1969, in an article entitled "Our Own Atomic Station?" (10) Karel Havlik warned that in adopting the concept of reactors based on enriched U-235 uranium (the Voronezh type of atomic power station), Czechoslovakia would for all practical purposes remain entirely dependent upon the USSR for imports of this fuel. He said that, roughly speaking, some 10 power stations of the A-1 type could be constructed for what it would cost to build a plant for the production of U-235, and that in any case it was questionable whether Czechoslovakia could afford to purchase sizable quantities of U-235.

Apparently, at the end of 1969 and even at the beginning of the current year, Czechoslovakia had not yet dropped the idea of constructing atomic power stations on its own principle. However, whether this should be done, and to what an extent, would depend upon the operating results of the A-1 and upon favorable technical-economic indicators.

At the same time, Czechoslovakia's "co-operation" with the Soviet Union in the sphere of atomic energy production was intensified, and culminated in the 30 April 1970 treaty regarding delivery of the Soviet atomic power stations of the Voronezh type. This seems to have been the deciding factor as to the type of atomic power plant to be built in Czechoslovakia in the future.

According to present plans, the construction of the first Soviet atomic power plant is to start at Jaslovske Bohunice in 1972; its first block will go into operation in 1977, the second a year later, and in 1978, the first block of the second power station will go into operation. This second atomic power station is to be built in Southern Moravia; its second block is scheduled to start operating in 1980. The Soviets are to supply the blueprints, undertake the primary construction, and provide for the training of Czechoslovak specialists in the USSR.

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(10) Published in Pravda (Plzen), 30 August 1969, Appendix 3.

Czechoslovakia is to prepare the necessary basic data for the project and for the supply of equipment, and is to carry out the secondary construction and assembly. The enriched U-235 uranium required for the Voronezh type of atomic power station will be supplied by the USSR. Czechoslovakia will export to the Soviet Union natural uranium, which will be enriched there, and from which the fuel elements and fuel plates will be fabricated. Thus the plants will be entirely dependent on the USSR for fuel.

According to Jan Neumann, Chairman of the Czechoslovak Atomic Energy Commission, future prospects are roughly as follows: (11) Between now and 1980, construction is to begin on four more atomic power stations. Conventional sources of power will continue to be built until 1985; after that year, only nuclear power stations will be constructed. It is calculated that by 1985 the nuclear power stations will supply 5,000 to 7,000 MW, and by 1990, between 12,000 and 15,000 MW. According to Neumann, these nuclear stations will be constructed in "close co-operation with Soviet industry."

Attainment of these targets will depend primarily on the good will of the Soviet Union. Czechoslovakia certainly deserves this assistance in view of the fact that the USSR has exploited Czechoslovak uranium deposits for the past 25 years.

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(11) Rude Pravo, 6 May 1970, and Radio Prague, 14 May 1970.