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CONSTRUCTION OF NUCLEAR ENERGY PLANTS IN THE EUROPEAN SATELLITE COUNTRIES

Comments by the United States Delegation on AC/89-WP/209

Working Paper AC/89-WP/209 is a well stated summary of the status of nuclear powerplants in the European Satellites. Limitations on the possibilities for meeting expanding requirements for power from conventional sources of energy, and the availability of uranium in Eastern Europe, have turned the attention of planners to nuclear energy. Planned construction of nuclear powerplants has been carried out only after considerable delay, probably for the very reasons stated in the paper: technical backwardness, lack of investment capital, and hesitant assistance given by the USSR. Plans for future construction undoubtedly reflect a good deal of wishful thinking and, as the paper states, 'there is hardly a chance that they will be even remotely fulfilled.' The pace of nuclear powerplant development in Eastern Europe will depend, to a large extent, on the degree of Soviet assistance.

Attached is additional comment, in the form of an annotated version of the tables from the paper. The comments may in some instances reflect information that was not available at the time the paper was prepared. For the most part they further substantiate the conclusions of the paper or point out apparent revision in Satellite plans.

Additional comment

Page 2, Item 4

The long time required for construction of the CSSR power reactor also is attributable to the complexity of design. The only other heavy water moderated, gas cooled power reactor built in the world is EL-4 in France which achieved criticality in December 1966 - also some years behind schedule.

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The construction cost of an atomic energy plant may be twice as high as that of a conventional energy plant of the same capacity in the Soviet bloc but this certainly is no longer true in the United States or many other parts of the free world.

Page 4-5, Table

The 1966 agreements which the USSR signed with respect to power reactors mentioned in Item 6 on page 2 and reflected in the table on page 4-5 are based primarily on ordinary water moderated and cooled reactors of the type the USSR has at Novovorenezh - not on heavy water moderated reactors. Our information indicates the following:

Bulgaria

A station (2 reactors) with an installed electric power capacity of 800 MWe is scheduled to be in operation by 1974.

Hungary

The agreement provides for a station consisting of two 400 MWe units of the "Voronezh type" the first of which will be in operation in 1975.

Rumania

Rumania has not yet made a contract to build a nuclear power plant and while we understand they have decided to buy a natural uranium fueled reactor, it is very unlikely that it could be completed in 1970 given the present status.

We have no information on the other projected plants for CSSR, Yugoslavia, or Poland.

Table 1

Nuclear Energy Capacities (MW) of the European Satellite Countries

	End of 1966 In Operation	Under Construction	Planned Capacities In 1970	In 1975	In 1980
Bulgaria	-	-	-	800	1,600+
Czechoslovakia	-	150	150	1,750 a/	2,500 b/
East Germany	70	-	140 c/	300+ c/	2,000
Poland	-	10++	10	320	1,100
Rumania	-	-	-	1,000 d/	2,000+d/
Hungary	-	-	-	400	800
Yuglosavia	-	-	-	300	800
Total	70	160	300 c/	4,870	10,800

\+ Estimated planning
++ Nuclear energy test plant.

a. This figure assumes that the Czechs plan or did plan to design and build a 300 MWe station and a 500 MWe station and to accept a Soviet offer of an 800 MWe station. If the plan for 1,750 MWe in 1975 did exist, it has been changed. The designs of the 500 MWe plant will not be completed until 1980 and construction of the second reactor (300 MWe) at Bohunice will not commence until after the first reactor has been tested and proven. Hence, the plan now calls for a maximum of 1,250 MWe. There was a report that the Czechs plan to import an 800 MWe plant from the Soviet Union, but no dates were given as to the start of construction or operation. (Belgrade, Tanyug in English, 09.07 GMT, 18th October, 1966.)

b. The maximum combined capacity has been reported to be 2,500 MWe. (Prague, Broadcasts in English, 20.00 GMT, 7th October, 1966; 08.45 GMT, 16th December, 1966.) Another report states that eight reactors with a combined output of 1,500-2,500 MWe are to be in operation by 1980. (Prague, Zemedelske Noviny, 16th December, 1966.) Since the first two 500 MWe reactors will not be operating before 1983 (Prague, News Letter, Volume 22, No. 24, 10th December, 1966), it will be necessary to build more 300 MWe reactors and probably import a second plant of 800-1,000 MWe from the USSR. (Prague, Domestic Service in Czech, 16.30 GMT, 24th January, 1967.)

c. The first reactor at Rheinsberg (Atomkraftwerk I) is regarded only as a prototype for larger reactors. Atomkraftwerk II will have two reactors, each of which will be equal in size to the Novo-Voronezh reactor (210 MWe) and several times larger than the Rheinsberg reactor. Under the 1965 agreement the USSR will supply reactors up to 1980. (Bergbautechnik, Leipzig, Volume 16, No. 12, December 1966.) It would seem that another 70 MWe reactor will not be built, but the second nuclear powerplant will have two 210 MWe reactors. Thus, the plan for 1970 may be only 70 MWe but, for 1975, could be either 280 or 490 MWe.

d. The original plan for 1,000 MWe in 1975 was revised in the latter part of 1966. It seems that the Rumanians hope to have the first reactor (500-600 MWe) in operation in 1973 and the second unit of similar size in 1978. (Financial Times, 23rd November, 1966.) If a contract for the first reactor is not signed before 1970, it will probably not be operating before 1975.

Existing and Planned Nuclear Energy Plants in European Satellite Countries (Apart from the USSR)

Country Location	Capacity MWe	Beginning of construction		Beginning of operation		Fuel	Moderator	Cooling medium (heat carrier)
		Planned	Actual	Planned	Actual			
Soviet Zone a/								
Rheinsberg	70	1959 b/	1960 b/	1962	1966	enriched uranium	light water	light water
CSSR								
Jaslavske Bohunice I (A-1)	150	c/	1958	1969+		natural uranium	heavy water	carbon dioxide
Jaslavske Bohunice II (A-2)	300	1968 d/		1974 d/		natural uranium	heavy water	carbon dioxide
unknown	500 d/							
unknown	800 e/			1975 e/				
Bulgaria								
Kozloduj	400 f/	1968		1973 f/		enriched uranium	heavy water	
Yugoslavia								
unknown	300			1975		natural uranium	heavy water	
unknown	500			1980		natural uranium		

+ Originally 1962.

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Country Location	Capacity MWe	Beginning of construction Planned	Beginning of construction Actual	Beginning of operation Planned	Beginning of operation Actual	Fuel	Moderator	Cooling medium (heat carrier)
Poland								
Swierk (Test-reactor)	10	1967		1971				
unknown	300	1973						
Rumania								
unknown	600 g/			1970 g/		natural uranium	heavy water	
unknown	1,000 g/			1975 g/		natural uranium		
Hungary								
unknown	800	1966 h/		1975 h/		natural uranium i/		

a. There is some evidence that preliminary work may have started on a nuclear power station at Spandowerhagen and another at Roehrsdorf. It has been reported that the Rheinsberg reactor is a pilot model for considerably larger reactors of the pressurised light water type. (Neues Deutschland, 10th May, 1966; Weimar, Thueringische Landeszeitung, 3rd November, 1966.)

b. Preliminary construction started in October 1957. (Neues Deutschland, 8th October, 1957.)

c. 1958 (Wirtschaft des Ostblock, 13th February, 1966, page 7-8.)

d. The dates for beginning of construction (1968) and of operation (1974) of Bohunice II, (Prague, Prace, 8th February, 1966), have evidently been changed. Jan Neumann, Chairman of the Czechoslovak Commission for Atomic Energy, stated on 24th January, 1967, that other power stations would not be started until the first prototype (A-1) is properly tested and proven. He indicated that construction of the second Bohunice reactor (A-2) would not be started until after 1970 and that the target for design of the 500 MWe reactor (A-3) is 1980. (Prague, Domestic Service Broadcast in Czech, 16.30 GMT, 24th January, 1967.)

e. In February 1966, Czechoslovakia was considering a Soviet offer of a nuclear power station consisting of two 400 MWe pressurized water reactors of the Voronezh type (enriched uranium and light water), which could be put in operation before 1975. (Prague, CTK English, 13.01 GMT, 7th February, 1966.) No information has been received which would indicate that the Czechs plan to operate such a plant in 1975.

f. According to one source, the first reactor at Kozloduy will be operational in 1972 and the second reactor (400 MWe) in 1974. (Radio Free Europe, TELEX, Bulgaria, 8th November, 1966.)

g. According to Rumanian announcements in 1965-66 two nuclear power stations with a total capacity of 1,000 MWe were to be built by 1975. (Bucharest, Agerpres in English, 28th July, 1965; Belgrade, Tanyug in English, 18.53 GMT, 30th November, 1965; Probleme Economice, November 1966.) The original plan called for completion of a 500 MWe plant by 1970. A second unit of similar capacity was planned for completion in 1975. There is evidence that the Rumanians have discussed construction of a 500-600 MWe plant with various western countries and do not expect to have the first plant in operation before 1973. (Financial Times, 23rd November, 1966.)

h. Hungary may not have planned to begin construction in 1966, inasmuch as the formal agreement was not signed until 28th December, 1966 (Népszabadság, No. 306, 29th December, 1966) and a site had not been chosen in January 1967. (Budapest, Figyelo, 18th January, 1967, page 1.) Only the first unit (400 MWe) is scheduled to be operating in 1975. (Moscow home broadcast service, 14.00 GMT, 5th July, 1966 and 20.30 GMT, 6th July, 1966; also Hungarian Telegraph Agency, 16.30 GMT, 6th July, 1966.)

i. The fuel will be enriched uranium. (Radio Budapest, Broadcast on 7th July, 1966.) The reactors will be the Voronezh type. (Négszabadság, No. 306, 29th December, 1966.) This type of reactor uses enriched uranium for fuel and light water for moderant and coolant.