COMMISSION OF THE EUROPEAN COMMUNITIES

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THE NUCLEAR PROBLEMS

(Working document prepared by the Services of the Commission)

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Introduction

1. This paper is intended to provide the basis for a general debate by the Council on current nuclear problems. In the light of the discussion the Commission will come forward in due course with specific proposals for action in areas within Community competence.

I

Present state of nuclear programme

2. In mid-1976, 91 Gigawatts (GW) of nuclear power were already operating, ordered, or firmly planned and 125 GW was regarded as a realistic target for the year 1985 in the light of member Governments' future policies. This was in itself a substantial reduction from the target approved by the Council in December 1974 of 160 - 200 GW.

3. It now seems unlikely that we shall achieve more than 90 GW in 1985. The difference between 90 and 125 GW is the equivalent of 40 M tons fuel oil per year, or 64 M tons of coal. If this amount of electricity is generated from oil it means that oil imports in 1985 may reach a level of 700 million tons, representing 55% of our total energy needs. The table in Annex 1 shows total GW now operating in each country by type (LWR, AGR etc.), the mid-1976 official programme for each country, and the current national indications. The table in Annex 2 shows the contribution made by nuclear energy in total energy demand.

Fast Breeder Reactors

4. In addition, 2 prototype fast breeder reactors are operating at Dounreay (250 MW) in the United Kingdom and at Marcoule (233 MW) in France; a further 282 MW prototype unit is under construction at Kalkar in Germany. France has, in partnership with Italy and Germany, started building a commercial scale prototype (Super Phénix 1200 MW). It is unlikely that fast breeders will be established and proved for full commercial service before 1990. But a major endeavour of this kind requires a continuity of effort, decision and ordering, otherwise the important fast reactor option (which enables over 50% of uranium atoms to provide energy, instead of 2% as with current reactor types) will not be open to us for commercial exploitation.

High Temperature Reactors

5. In the meantime, a high temperature experimental reactor (HTR) of 13 MWe has successfully operated for many years at Julich (Germany) while a prototype unit rated 300 MWe is being constructed, also in Germany, at Uentrop/Schmehausen. The possibility of a further prototype built by industry for Community utilities - using an alternative technology - is at present under study by the Commission with help from member state experts from UNICE+ and UNIPEDE*. Such a reactor might use a new fuel cycle based on thorium, if it can be designed to minimize proliferation risks. The total cost of developing an HTR would be high and might be attractive for development by the Community in collaboration with USA.

Nuclear Fuel Cycle

6. The uranium needs of our current programme are covered until the early 1980s provided, of course, that contracts are honoured. The Council has taken note of a Community supported exploration programme to discover new uranium resources in the Community; but chances of finding major new deposits are not high and we are therefore likely to remain major importers facing risks of shortages and political interruptions.

7. As some technical problems have delayed the availability of reprocessing capacity, irradiated fuel will have to be stored for a time. However, as reprocessing capacity progressively becomes available it will enable our needs to be reduced by about 20% for uranium and by about 15% for enrichment services, besides providing plutonium for recycle and for use in fast breeder reactors.

Research and Development

8. In addition to and complementing nuclear (fission) work by Member States (costing about 700 muc/year) the Community spends about 35 muc/year. Part of this Community effort is applied to safety research, but significant work is also in progress on the treatment and storage of radioactive waste, on the recycling of plutonium and upon radiological protection research. In view of the critical nature of the 'back-end' of the fuel cycle (reprocessing, management and re-use of plutonium, and waste storage) it is for consideration that greater coordination of national programme should be encouraged and increased Community effort should be devoted to such problems.

+) Union des Industries de la Communauté Européenne

*) Union Internationale des Producteurs et Distributeurs d'Energie Electrique.

ANNEX I

GWe*)

	Nuclear Capacity on line 1.5.1977				Mid-1976 Programme	Current National Indications 1.5.1977
	GCR AGR	LWR	Others	Total		
B	-	1.7	-	1.7	5.5	5.4
D	-	5.9	0.1	6.0	37 - 42	25 - 30
DK	-	-	-	-	0.9	-
F	2.3	1.2	0.3	3.8	40 - 45	35 - 40
I	0.2	0.4	-	0.6	17	7.4
IRL	-	-	-	-	-	-
L	-	-	-	-	1.2	1.2
N	-	0.5	-	0.5	0.5 - 3.5	0.5
UK	7.7	-	0.4	8.1	14.5	10
	10.2	9.7	0.8	20.7	116.6 - 129.6 say: 125	84.5 - 94.5 say: 90

*) 1 GWe = 1000 MWe - 1 million kilowatts (electrical)

GCR: Gas cooled reactor

AGR: Advanced gascooled reactor

LWR: Light water reactor

ANNEX 2

Indication of
the contribution of nuclear energy in total energy demand
(in %)

	1976	1980	1985
Belgium	4,7	4,9	10,4
Denmark	-	-	-
Federal Republic of Germany	1,9	6,1	9,2/11,0
France	1,9	8,1	17,4/19,8
Ireland	-	-	-
Italy	0,6	1,2	4,0
Luxembourg	-	-	20,0
Netherlands	1,2	0,9	0,8
United Kingdom	3,2	4,9	5,1
EUR 9	2,0	4,8	8,4/9,4