UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In The Matter Of	)
	)
DUKE POWER COMPANY	) Dkt. No. 70-2623
	)
(Amendment to Operating License SNM-1773 for Oconee Spent Fuel Transportation and Storage at McGuire Nuclear Station)	)

AFFIDAVIT OF ARTHUR R. TAMPLIN, Ph.D.

City of Washington	)	
	)	ss:
District of Columbia	)	

I, Arthur R. Tamplin, Ph.D., being first duly sworn, do hereby depose and say:

Duke Power appears to be taking a substantial risk in order to avoid the immediate construction of an ISFSF. They are assuming that a series of reactors will be constructed and licensed on a timely basis. This carries with it the assumption that estimates of the future electrical demand in their service area is correct. Such estimates involve significant uncertainties for the Cherokee and Perkins units.

In their affidavit, Spitalny and Glenn of NRC (p. 9) state that the existing scheduled storage capacity of Duke Power is capable of storing spent fuel generated by Duke's system until 1995. They present the following schedule to support their contention:

Station	Date of Commercial Operation	Present (Planned) Storage Capacity
Oconee		
Unit 1 and 2	73/74	336 (750)
Unit 3	1974	474
McGuire		
Unit 1	04/80	(500)
Unit 2	04/82	(500)
Catawba		
Unit 1	07/81	(1418)
Unit 2	01/83	(1418)
Cherokee		
Unit 1	01/85	(693)
Unit 2	01/87	(693)
Unit 3	01/89	(693)
Perkins		
Unit 1	01/90	(693)
Unit 2	07/91	(693)
Unit 3	01/93	(693)

484142

Even if we allowed that Duke Power's estimates of the dates of commercial operation were valid, this cascade plan will only carry then to 1995. It is, as we indicated very optimistic to assume that the waste storage problem will be resolved by 1995. Moreover, this ambitious plan of Duke Power involves the assumptions that their electrical power demands are correct and that the facilities will be constructed and licensed on the projected time schedules. Moreover, this requires that all subsequent transshipment (a series of licensing actions) are allowed on a timely basis.

According to a Duke Power memorandum, the following is the proposed transshipment schedule through 1991, assuming the Oconee rerack is completed on schedule:[1/]

Summary of Projected Cascade Plan Transfers
Minimum to McGuire, Rerack 1,2

Year	Oconee-McGuire 1	Oconee-Catawba	McGuire-Catawba
1979	0	0	0
1980	56	0	0
1981	56	20	0
1982	0	156	0
1983	0	46	0
1984	0	67	0
1985	0	192	15
1986	0	176	92
1987	0	100	118
1988	0	72	140
1989	0	132	140
1990	0	144	0
1991	0	36	0
	112	1141	505

POOR ORIGINAL

484 143

1 / Glover, Michael R., op cit.

According to Applicant's answers to NRDC Interrogatory 26, this transshipment schedule will maintain FCR at the 3 stations only through 1991. Thus in 1991 all 3 stations (7 reactors) will require transshipment in 1992. There is little reason to assume that Duke Power's spent fuel storage problem will be resolved by this time. At the same time, this proposed transshipment schedule is predicated upon the construction and licensing of the Catawba reactor by 7/81 and 1/83.

Allowing this optimism on the part of Duke POwer relative to the Catawba station, it is then necessary to allow that their projections relative to the need for and the completion and licensing of the Cherokee station unit will be completed prior to 1992. But even this tricky assumption does not buy them much.

It is unclear what fuel cycle will be used by Duke Power at Oconee, McGuire or Catawba. However, the use of an 18 month refueling cycle will involve a smaller yearly spent fuel discharge. For the purpose of the following analysis we shall use these estimated yearly discharge rates from the reactor stations:

	Yearly discharge
Oconee	
3 reactors at 50 assemblies/yr	150
McGuire	
2 reactors at 70 assemblies/yr	140
Catawba	
2 reactors at 60 assemblies/yr	120
Cherokee	
3 reactors at 60 assemblies/yr	180
Perkins	
3 reactors at 60 assemblies/yr	180

These values are based upon the observation that on an 18 month cycle the yearly discharge rate is about 3/4 of the discharge on a 12 month cycle. The rates for Catawba, Cherokee and Perkins were chosen as the mean between the Oconee and McGuire rates. For the purposes here these estimates should be adequate.

In 1992 shipment from Oconee, McGuire and Catawba to Cherokee will be required. The following tabulation accounts the storage capability at Cherokee:

	Cherokee Discharge			Transshipment		
	1	2	3	Oconee	McGuire	Catawba
1986	60					
1987	60					
1988	60	60				
1989	60	60				
1990	60	60	60			
1991	60	60	60			
1992	60	60	60	150	140	180
1993	60	60	60	150	140	
Total	480	360	240	300	280	180

Total Storage Capacity	2079
Total Storage Used	1840
Remaining	239

This tabulation shows that transshipment to Cherokee will only allow 1 additional year of operation to Oconee, McGuire and Cherokee before transshipment to Perkins would be required in 1993 for one station and all 4 stations (10 reactors) in 1994. The following

484 145

tabulation accounts the storage capability at Perkins:

	Perkins Discharge			Transshipment			
	1	2	3	Oconee	McGuire	Catawba	Cherokee
11	-						
1992	60						
1993	60	60					180
1994	60	60	60	150	140	180	180
1995	60	60	60	150	140	180	180
	300	180	120	300	280	360	540

Total Storage Capacity	2079
Total Space Used	2080
Remaining	-1

These tabulations show that the Duke POwer cascade plan will allow for maintainence of one FCR at each station only through 1994 (providing all their assumptions are correct). This date, 1994, is an extremely optimistic date for the resolution of the spent fuel disposal problem.

Considering all the uncertainties involved in getting to this 1994 date when an ISFSF would be required anyhow, Duke Power would appear to be taking an unnecessarily high risk.

In their answer to NRDC Interrogatory 11, the Applicant estimated that the cost of shutting down the Oconee station for 1 year would be $300 million. The above analysis indicates that Duke POwer is going to have to build additional spent fuel storage facilities at some time in any case or be forced to shut down as many as 7 to 13 reactors. Building additional at-reactor-storage space at this time would appear to be the most prudent course when compared with the cost of reactor shut-down. Moreover,

484 146

the cost of such a plan represents only a small fraction of the overall capital investment for the nuclear stations.

In response to NRDC Interrogatory 13, the Applicant indicates that the cost of ISFSF would be $34,500 per rack location. It is not clear here whether this cost means per assembly or not. In the EIA for this procedure, the NRC presents an estimate of $9,000 per assembly for an ISFSF.[2/] The Department of Energy (DoE) presents an estimate of some $20,000 per assembly.[3/] In the subsequent analysis we shall use the DoE figure of $20,000/ assembly.

The lifetime fuel assembly discharge from Oconee will be some 4,500 assemblies (150 x 30). After reracking of Oconee 1 & 2, there will be some 1200 spaces. Thus an additional 3,300 spaces will be required. At $20,000/space, this would represent $66 million dollars. This represents only about 2% of the $3 billion cost of the Oconee facility and is only 1/4 of the cost of shutting the facility down for 1 year.

The Oconee, McGuire, and Catawba plants will discharge some 12,600 assemblies over their lifetime. Their present (planned) storage capacity is some 5000 assemblies. Construction of 7,600 additional spaces would cost some $152 million. This again is only 2% of the capital cost of the 7 reactors and is less than the cost

---

2/ U.S. NRC, EIA, op cit., p. 51.

3/ U.S. DoE, Draft EIS, Charge For Spent Fuel Storage, DOE/EIS 0041-D, December 1978, p. II-27.

484 147

of shutting down the Oconee station for one year.

There is only a small chance that Duke Power's complicated gamble will pay off. The greatest chance is that they will have to build additional spent fuel storage facilities in the near future. The most prudent course would be to construct them now since the cost of additional storage would be only a fraction of the cost of shutting down a reactor station and since the costs of the additional storage represent only 2% of the cost of the reactor stations. This approach would avoid problems and risks of spent fuel transshipment and would avoid the uncertainties associated with the forecast of electrical energy demand, the timely construction and licensing of planned reactors and the timely licensing of the necessary transshipments. Besides, there is little basis for assuming that use of these planned reactor storage basins will resolve Duke Power's spent fuel storage problems.

All the above statements are true and correct to the best of by personal knowledge.

Arthur R. Tamplin, Ph.D.

Signed and sworn to before me
this 25th day of May 1979.

Notary Public