

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of:

SOUTH CAROLINA ELECTRIC &)	
GAS COMPANY, <u>et al.</u>)	
)	Docket No. 50-395-OL
(Virgil C. Summer Nuclear)	
Station, Unit 1))	

SUPPLEMENTARY TESTIMONY
OF LEONARD D. HAMILTON, M.D.,
CONCERNING THE HEALTH EFFECTS OF RADON
FROM URANIUM MINING AND MILLING

The purpose of my supplementary testimony is to give estimates of the health effects to individuals residing near uranium mines and mills in accordance with my prefiled testimony of May 28, 1981, at page 9.

Exhibit LH-6 separately estimates the maximum health effects to individuals residing near uranium mines and mills. These estimates represent the risk to the maximally exposed individuals, i.e., those in the downward direction of the prevailing winds for the model site. Moreover, because radioactivity in the mill surroundings builds up during operation, exposure reaches a maximum in its final year of operation. For this reason, annual doses were calculated for the fifteenth year of operation, assuming it to be the final operating year of the model mill. The method followed in making the health estimates was similar to that used in my testimony in Exhibits LH-2 and LH-3, except that all the risk estimators were derived from BEIR III, 1980.

For perspective, GEIS NUREG-0706 (using its own risk estimators that differ slightly from these in BEIR III, 1980 but which do not significantly affect the results) has estimated the potential health effects to the entire population within 50 miles (80 km) of the model mill as a result of fifteen years of mill operation (p. 6-39).

"For the average individual living in the model region, the probability of a premature cancer death as a result of fifteen years of mill operation is about 2.0×10^{-6} with a range from 8.4×10^{-7} to 4.1×10^{-6} . The risk to the average individual of premature death from cancer due to fifteen years of mill operation represents about 0.001% increase in the natural risk from cancer."

The risk to the average individual living in the region within 50 miles of an open pit mine would be roughly 40% of the above figures, and for an underground mine, much less.

Excess Cancer Mortality Risk for an Individual
Residing Near a Model Uranium Mill
Due to Exposure During Final Year
of Mill Operation

Distance		Exposure (mrem) <u>a/</u>			Excess Cancer Mortality Risk <u>b/</u>			
km	mi	whole body	lung	bone	whole body	lung	bone	sum
1	0.62	31.6	690	160	5.2×10^{-6}	4.0×10^{-5}	4.3×10^{-7}	4.6×10^{-5}
2	1.24	9.4	230	66	1.5×10^{-6}	1.3×10^{-5}	1.8×10^{-7}	1.5×10^{-5}
10	6.21	0.65	19.2	2.6	1.0×10^{-7}	1.1×10^{-6}	7.0×10^{-9}	1.2×10^{-6}
20	12.43	0.2	8.4	0.7	3.2×10^{-8}	4.9×10^{-7}	1.9×10^{-9}	5.2×10^{-7}
100	62.1	-	2	-	-	1.2×10^{-7}	-	1.2×10^{-7}

Excess Cancer Mortality Risk for an Individual
Residing Near a Model Open-Pit Mine
Scaled From Exposure During Final Year
of Mill Operation c/

Distance		Excess Cancer Mortality Risk			
km	mi	whole body	lung	bone	sum
1	0.62	2.3×10^{-6}	1.7×10^{-5}	1.9×10^{-7}	2.0×10^{-5}
2	1.24	6.5×10^{-7}	5.6×10^{-6}	7.8×10^{-8}	6.4×10^{-6}
10	6.21	4.3×10^{-8}	4.8×10^{-7}	3.0×10^{-9}	5.2×10^{-7}
20	12.43	1.4×10^{-8}	2.1×10^{-7}	8.2×10^{-10}	2.3×10^{-7}
100	62.1	-	5.2×10^{-8}	-	5.2×10^{-8}

a/ Doses are taken from log-log plots in NUREG-0706, pp. 6-26 to 6-30. The locations are downwind of the prevailing winds (ibid., p. 6-24).

b/ Risk estimators are derived from BEIR III 1980: whole body 158, lung 58, and bone 2.7 deaths per 10^{-6} rem.

c/ Exposure from an open pit mine was scaled from that from the uranium mill by a factor representing the ratio of the radon emissions from an open pit mine (NUREG-0757 February 1981 p. 4-3 divided by those from a mill (NUREG-0706 September 1980, p. 5-8).

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NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:)	
)	
SOUTH CAROLINA ELECTRIC &)	
GAS COMPANY and)	
)	
SOUTH CAROLINA PUBLIC SERVICE)	Docket No. 50-395 OL
AUTHORITY)	
)	
(Virgil C. Summer Nuclear)	
Station))	

CERTIFICATE OF SERVICE

I hereby certify that copies of "Supplementary Testimony of Leonard D. Hamilton, M.D., Concerning the Health Effects of Radon From Uranium Mining and Milling" in the above captioned matter, were served upon the following persons by deposit in the United States mail, first class postage prepaid, this 18th day of June, 1981.

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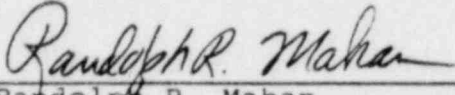
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