United States of America
Nuclear Regulatory Commission

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	) Docket Nos. 50-250
	) 50-251
FLORIDA POWER AND LIGHT COMPANY	) (Proposed Amendments to Facility
	) Operating License to Permit
(Turkey Point Nuclear Generating Unit Nos. 3 and 4)	) Steam Generator Repair)

THE AFFIDAVIT AND TESTIMONY OF DR. GORDON EDWARDS
CONTENTIONS 1 AND 4b

I, Gordon Edwards, being duly sworn, state as follows:

My name is Dr. Gordon Edwards. I am an applied mathematician with seven years of professional experience in dealing with matters of public policy development in Canada. My special interest is the use of mathematical modeling techniques as applied to such diverse problems as assessing the safety of nuclear power reactors, the health and environmental impacts resulting from radioactive releases, the acceptability of proposed storage and disposal methods for nuclear waste, and the economic advantages of various energy options.

I received a B.SC. (Gold Medal in mathematics and physics) the University of Toronto in 1961 ; M.S. and M.A. (Woodrow Wilson Fellow in mathematics and English literature) from the University of Chicago in 1962 and 1964; and a Ph.D. in Mathematics from Queens University in 1972.

In 1973-74, I co-ordinated and co-authored a nation wide study of the role of the mathematical sciences in Canadian Society (business, industry, government, science, and education) for the Science Council of Canada.

In recent years, I have been retained as a technical consultant by numerous government bodies in Canada, including the Cluff Lake Board of Inquiry Into Uranium Miningin Saskathewan (1977), The Ontario Royal Commission On Electric Power Planning (1976-1978), The Legislative Assembly of the Northwest Territories (1981), The Energy Committee of the New Brunswick Legislature (1979), and The Select Committee on Ontario Hydro Affairs (1979-1980).

Among my publications is "A Monograph on Nuclear Wastes," prepared for The House of Commons Standing Committee on National Resources and Public Works in 1978, "A Monograph on Radiation-Induced Lung Cancers," prepared for The United Steel Workers of America in 1978 (based on testimony which I gave at the Elliot Lake Environmental Assessment Hearings), and a series of short monographs on "Candu Reactor Safety" prepared for the Ontario Legislature from 1978-80.

I am currently a Professor of Mathematics and Science at Vanier College in Montreal, as well as the Chairman for the Canadian Coalition for Nuclear Responsibility and adjunct Professor Science and Human Affairs at Concordia University. My complete curriculum vitae is attatched.

OUTLINE OF TESTIMONY

I have reviewed the Final Environmental Statement related to Steam Generator Repair at Turkey Point UnitsNos. 3 and 4 (NUREG-0743, March 1981), and have found it to be deficient in several important respects. I am prepared to give testimony about the following points, in support of the contentions that have been submitted by Mark Oncavage.

I. HEALTH IMPACTS

1. The calculation of health effects among workers and members of the general public is not conservative. A recent report from the British Columbia Medical Association indicates that the number of deaths and other adverse health effects resulting from the Turkey Point steam generator repair may be seriously underestimated because of inappropriate mathematical methods.

II. OFFSITE CONSEQUENCES

2. Potential offsite consequences have been largely ignored. For example, the possibility of damage to or serious leakage from the drums of radioactively contaminated materials which will be stored outside during the repair is not even addressed. This damage and resultant leakage could result from either natural disasters (hurricane) or man made problems.

III. ULTIMATE DISPOSAL

3. Delayed environmental effects may occur as a result of inadequate storage or disposal of dangerous radioactive materials. The ultimate disposition of the primary coolant, the lower assemblies hulks of the old steam generators, and other radioactive materials produced during the repair is inadequately discussed and vague.

IV. COSTS

4. Assessment of costs is overly simplistic. Among other things, no consideration is given to the possibility that the repair may be less than a complete success and that the denting problem may reoccur. Due to the large sums of money involved, this possibility deserves closer scrutinty.

V. ALTERNATIVES

5. Consideration of alternatives is incomplete and unimaginative. The option to delay repair for two or three years to see if the Suury repair has been successful is not entertained. Nonelectrical alternatives to obviate the need for replacing electrical power while derating the Turkey Point nuclear reactors are not considered.

CONCLUSION

The final environmental statement fails to address some of the most important considerations of the environmental effects of the repair program for the Turkey Point steam generators. By not realistically assessing the potential health impacts, possible offsite consequences, ultimate disposal of radioactively contaminated materials, total costs of repair if not perfectly successful, and realistic, cost effective nonelectrical alternatives, the Final Environmental Impact Statement has failed in its critical objective and should be redrafted. Detailed argumentation to support these points will be given during my testimony.

Gordon Edwards

RELATED CORRESPONDENCE

BIOGRAPHICAL SKETCH

Name: Gordon Edwards
Born: July 18,1940
Birthplace: Ontario
Citizenship: Canadian

Married: Karen Rogers
Children: Three Boys

Education

BS.C. in Mathematics and Physics, University of Toronto	1961
M.S. in Mathematics, University of Chicago	1962
M.A. in English Literature, University of Chicago	1964
Ph.D. in Mathematics, Queens University	1972

Academic Awards

Agnes Kelly Award in Math and Physics	Univ. of Toronto
Arthur W. Einglen Memorial Scholarship	Univ. of Toronto
College Gold Medal in Mathematics and Physics	Univ. of Toronto
Woodrow Wilson Fellowship in Mathematics	Univ. of Chicago
College Scholarship in English Literature	Univ. of Chicago
Teaching Fellowship in Mathematics	Univ. of Chicago
National Research Council Fellowship	Queens University
Canada Council Doctoral Fellowship	Queens University
Queen Elizabeth the Second Fellowship	Queens University
NRC Post Doctoral Fellowship (National Research Council)	Univ. British Columbia

Current Positions

Professor of Mathematics and Science, Vanier College, Montreal.
Adjunct Professor of Science and Human Affairs, Concordia Univ.
Chairman Canadian Coalition for Nuclear Responsibility.

Teaching Experience

Mathematics : University of Toronto, University of Chicago, University of Western Ontario,, Queens Univ., University of British Columbia, Ottawa University and Vanier College

Other : University of Western Ontario, Shakespear. Concordia University, Chemistry in Society, Biology and Society, Environmental Issues. Vanier College, Energy and Society.

Nonteaching Employee

Inspector, Attorney General of Canada (Ontario) 1958-61.
Junior Actuary, Excelsior Life Insurance, 1964.
Assistant Director of Mathematics Study, Science Council Canada1973.
Science Advisor, Science Council of Canada 1974.

Consulting Work

Cluff Lake Board of Inquiry (Uranium Mining), 1977.
Royal Commission on Electric Power Planning, Ontario 1976-78.
United Steel Workers of America 1978.
Canadian Broadcasting Corp. 1977-78.
National Film Board of Canada 1978.
Select Committee on Ontario Hydro Affairs 1978-80.
Energy Committee of the New Brunswick Legislature 1978.
Legislative Assembly of the Northwest Territories 1981.

Publications

An Introduction To Lie Algebras, Queens University, 1970.

Lie Algebra of Infinitesimal Group Schemes, Queens University, 1972.

"Primitive Elements in Symetric Algebras," Canadian Journal of Math. 1975.

"Optimal Dynamics in Commercial Fisheries," Journal of Fisheries Research Board of Canada.

Mathematics in Today's World: Math and Policy Planning
Statistics and the Environment
Mathematics and Technology
Published by the Science Council of Canada, 1974. Copies were deposited in every University Library in Canada. It has been translated into French, Russian and German.

Background Report on Mathematics, Science Council of Canada, 1976.

Nuclear Power: Fact and Fantasy, Manitoba Environmental Council, 1975.

"Nuclear Power, A New Dimension in Politics," Alternatives Magazine, Trent University, 1976.

"Nuclear Wastes: What Me Worry?", House of Commons Standing Committee on National Resources and Public Works, 1978.

"Estimating Lung Cancers," CCNR 1978.

"The Machine and the Ecosystem; a Metaphorical Framework," Summary Argument to the Royal Commission on Electric Power Planning, 1978.

"An Introduction to Candu Safety," CCNR, 1979

Television

"The Great Debate with G. Edwards and Edward Teller," Global Television 1974.

"Quarterly Report; CBC Special on Energy," 1978.

"The Evolution of Mathematical Thought," a series of five half hour T.V. shows prepared for University of the Air, 1979.