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DOCKETED  
April '96

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**PROFESSOR OF NUCLEAR ENGINEERING**  
**AND ASSISTANT DEAN FOR RESEARCH**  
**SCHOOL OF MINES AND METALLURGY**  
**UNIVERSITY OF MISSOURI-ROLLA**

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OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH**EDUCATION**

B.S., Physics, University of Athens, Greece, 1960  
M.S., Nuclear Engineering, University of Illinois, 1965  
Ph.D., Nuclear Engineering, University of Illinois, 1968

**ACADEMIC POSITIONS**

1989-present Assistant Dean for Research, School of Mines and Metallurgy  
1975-present, Radiation Safety Officer for the Campus  
1980-present, Professor Nuclear Engineering

1985-1986, Interim Vice Chancellor Academic Affairs  
1981-1985, Chairman Department of Nuclear Engineering  
1972-1980, Associate Professor Nuclear Engineering  
1968-1972, Assistant Professor Nuclear Engineering

**NON-ACADEMIC EXPERIENCE**

1986-1987, On leave, at the Nuclear Research Center CADARACHE, France.  
1976-1979 (Summer), Arkansas Power & Light Co, Nuclear Fuel Mgt. Group.  
1974-1975, On leave, Senior Engineer at General Atomic Company, Advanced  
Systems Division, Gas Cooled Fast Breeder Reactor.  
1961-1963 Nuclear Research Center DEMOKRITOS, Athens, Greece.

**LANGUAGES :** English, French, Greek**PROFESSIONAL REGISTRATION**

Registered Professional Engineer in Missouri.

**PROFESSIONAL AFFILIATIONS**

Health Physics Society,  
American Nuclear Society,  
National Society of Professional Engineers,  
Missouri Society of Professional Engineers

## NUCLEAR REGULATORY COMMISSION

Docket No. 50-60-LEN EXHIBIT NO. 1  
In the matter of Go. Leach  
☐ Staff ☒ Applicant ☐ Intervenor ☐ Other  
☒ Identified ☒ Received ☐ Rejected Reporter WCLW  
Date 5/29/96 Witness NT

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PDR ADOCK 05000160  
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## HONORS AND AWARDS

- \* Outstanding Teacher Nuclear Engineering Department, 1984-85, 1987-88, 1993-94.
- \* Outstanding Teacher Award, University of Missouri-Rolla, 1968-69, 1970-71, and 1989-90.
- \* Outstanding Faculty Advisor, Alumni Award, 1990-91.
- \* Who's Who in the Midwest, Who's Who in America, American Men and Women of Science, Who's Who in Frontier Technology Today, Men of Achievement, Who's Who in Engineering.
- \* Glenn Murphy Award, given by the NE Division of ASEE for outstanding contributions to the profession and teaching of Nuclear Engineering (1995)
- \* Distinguished Service Award, Radiation Protection & Shielding Division, American Nuclear Society (1995)

## COURSE DEVELOPMENT

- \* "Nuclear Radiation Measurements" ( NE 204) One major outcome of this effort is a text entitled "Measurement and Detection of Radiation", published in 1984 by the Hemisphere (McGraw-Hill) Publishing Co; 2nd Edition, 1995.
- \* Reactor Physics course, for both Undergraduates and Graduates
- \* Radiation Shielding, Graduate Course
- \* Nuclear Fuel Management ( NE 307) (a text on this topic, co-authored by Dr Robert Cochran, of Texas A&M, was published by the American Nuclear Society, 1990)
- \* " Health Physics" (NE 333).
- \* "Radiation Protection Engineering" (NE 335).
- \* " Radioactive Waste Management" (NE 345).

## SHORT COURSES - INSTITUTES

- \* "*Radiation protection Engineering*", organized by WOODSON Associates, offered in October 1993, in S. Francisco, CA.
- \* "*Measurement and Detection of Radiation*", organized by WOODSON Associates, offered in April 1993, in Las Vegas, NV; repeated in February 1994 in Orlando FL, and for Duke Power Eng., May 1995.
- \* Director of a short course on "*Fusion Power*" offered for McDonnell-Douglas engineers, in St. Louis MO, Fall 1981.
- \* "*Radioactive Waste Management*", short course offered in April 1986 in St. MO by Westinghouse; Lecturer.

## PROFESSIONAL SERVICE

### *American Nuclear Society*

- \* 1991-92, Chairman, Central-Eastern Missouri Section of the American Nuclear Society.
- \* 1987- 90, Member American Nuclear Society Special Committee on the review of the Reactor Risk Reference Study (NUREG -1150)
- \* 1987-1988, Chairman Radiation Protection & Shielding Division.
- \* 1984-1986, Secretary Radiation Protection & Shielding Division.
- \* 1983- 1988, Member Program Committee Rad.Prot.& Shielding Division.
- \* 1972-1973, Chairman Program Committee Education Division.
- \* Reviewer of Technical Papers for the Society's National meetings.
- \* Chairman of Technical Sessions at National meetings of the Society.
- \* Member Professional Development and Accreditation Committee, 1995-98.
- \* Chair, ANS Standards Committee 6.6.1 (Skyshine radiation) 1996

### *Missouri Society of Professional Engineers.0 (MSPE)*

- \* 1985-1986, President, Rolla Chapter, MSPE .
- \* 1993-96 , Chairman of the Energy Committee of the MSPE.

### *Other Professional Activities*

- \* Reviewer for Nuclear Technology, Nuclear Science & Engineering, and Health Physics.
- \* Reviewer of DOE-ORAU Fellowship Program for Nuclear Engineering and Radioactive Waste Management (1984-1985).
- \* Missouri Nuclear Emergency Team (MONET)-Member 1981-present
- \* Appointed by the Greek Government a member of the Committee that made a professional evaluation of all the scientists at the Nuclear Research Center DEMOCRITOS, Athens, Greece, 1987-88.

## RESEARCH INTERESTS

Radiation Transport (neutrons, gammas, charged particles). Health Physics- Radiation Protection. Nuclear Fuel Cycle. Radioactive Waste Management.

## RESEARCH GRANTS

- \* Sponsored by the Arkansas Power & Light Co to write a code for Nuclear Fuel Cost (APLCOST), \$10,000 (1978-79).

\* Sponsored by EPRI for the "Calculation of Neutron Energy Spectra in Pressurized Water Reactors", \$357,000 (1980-1984). The objective of this work was to establish a methodology for the best possible calculation of the neutron fluence at the position of the Pressure Vessel in order to obtain a more accurate estimate of the radiation damage to the vessel by fast neutrons. Knowing the damage, allows prediction of the long-term integrity of the Pressure vessel under normal and accident conditions.

The results of this research appear in three EPRI Reports (EPRI NP-3776, EPRI NP-4238, EPRI NP-5622).

## BOOKS

\* "Measurement and Detection of Radiation". McGraw-Hill-Hemisphere Publications, 1983. Has been translated in Japanese (1986) and in Farsi (Persian) (1993). Second edition of this book, published by Taylor-Francis in March 1995.

\* "Nuclear Fuel Cycle: Analysis and Management", with Dr. Robert Cochran of the Texas A&M University. Published by the American Nuclear Society Fall 1990. Second printing 1992.

## PUBLICATIONS

"Pulse Propagation Experiments with a Reactor Source", with G.H. Miley and P.K. Doshi, Proceedings of the Symposium on Neutron Noise, Waves, and Pulse Propagation, University of Florida, AEC Symposium series 9, p.117-134 (1967)

"The Use of an Analytical Response Function for Unfolding Beta Spectra, with B.W. Wehring and M.E. Wyman, Nucl. Instr. Meth., 73, 98 (1969).

"Measurements of Time-Dependent Energy Spectra of Beta Rays from U-235 Fission Fragments", with B.W. Wehring and M.E. Wyman, Nucl. Sci. Eng., 43, 42 (1971).

"Calculation of Gamma-Ray Buildup Factors Including the Contribution of Bremsstrahlung", with J.P. Kuspa, Nucl. Sci. Eng., 52, 117 (1973).

"Two Fusion Reactor Blankets with Vanadium as Structural Material", with J.E. Struve, Nucl. Tech., 21, 201 (1974).

"Gamma-Ray Attenuation Coefficients for Higher Green Plants", Health Phys., 145 (1974) (Tech. Note)

"A Radiation Damage Computer Simulation System", with J.P. Kuspa and D.R. Edwards, Proceedings of the International Conference on Computer

Simulation for Materials Application, NBS Gaithersburg, MD April 1976, p.337-364 (1976).

"Economic Performance of Liquid Metal Fast Breeder Reactor and Gas Cooled Fast Reactor Radial Blankets", with M.M.H. Jankhah, Nucl. Tech., 44, 162 (1979).

"Energy Analysis of Coal, Fission, and Fusion Power Plants", Nucl. Tech. Fusion, 1, 238 (1981).

"The Effects of Plant Reliability Improvement in the Cost of Generating Electricity", with S. Nejat and R.C. Sanders, Nucl. Tech., 56, 372 (1982).

"Neutron Energy Spectra Calculations in Three PWR's", with D.R. Edwards, C. Abou-Gharios, K. Hock, and F. Yin, Proceedings 5th ASTM-EURATOM Symposium on Reactor Dosimetry, GKSS Research Center Geesthacht, FRG, Sept 1984, p. 693-701.

"Pressure Vessel Dosimetry at U.S. PWR Plants", with C.O. Cogburn and J.G. Williams, Invited Paper, Proceedings 5th ASTM-EURATOM Symposium on Reactor Dosimetry, GKSS Research Center, Geesthacht, FRG, Sept. 1984, p. 11-20.

"Neutron Dosimetry of PWR Pressure vessels", with C.O. Cogburn and J.G. Williams, Proceedings of ANS Topical on Theory and Practices in Radiation Protection and Shielding, Knoxville TN, April 1987.

"PWR Pressure Vessel Neutron Spectra at McGuire-1" EPRI NP-5822, Feb. 1988.

"Radioactive Waste Management" with R.G. Cochran; review article; Nucl. Tech., 93, 263-304 (1991).

"Hot Particle Self-absorption Factor", Health Phys., 60, 841, (1991) publication in Health Physics.

"Dose Rates for Several Organs in a Human from Contaminated Soil and Hot Particles Using the QAD Computer Code", with K. Phillips, Health Phys., 61, 853-863 (1991).

"Application of Conformal Mapping to Nodal Methods for Hexagonal Nodes", with Y.A. Chao. Presented at the Joint International Conference on Mathematical Methods and Supercomputing in Nuclear Engineering, April 1993, Karlsruhe, Germany.

"A Model Engineering Curriculum for the 21st Century", Proceedings of the ASEE Centennial Celebration Conference, Rolla, MO, April 1993.

"Cadmium cutoff energy for MCNP modeling of dosimetry reactions", Nucl. Sci. Eng., 118, 103 (1994).

"Gamma Dose Received by Internal Organs and the Fetus from External Sources, Calculated with the MCNP code", with B.J. Shrestha, Rad. Prot. Mgt., p. 21-40, Jan./Feb., 1995.

"Geometry factors used for the calculation of gamma dose received by various organs of a human phantom", with B.J. Shrestha, Rad. Prot. Mgt., p. 56-66, Jul/Aug., 1995.

"Conformal mapping and hexagonal nodal methods- I: Mathematical foundation", with Y. A. Chao, Nucl. Sci. Eng., 121, p. 202-209, 1995.

"Neutron fluence at the Pressure Vessel of a PWR determined with the MCNP code", with Pete Laky, Nucl. Sci. Eng. 121, 433-477 (1995).

"Exposure buildup factors of  $UO_2$  using the Monte Carlo Method," with A. Bozkurt, has been accepted for publication by Nuclear Tech., (1996).

#### PRESENTATIONS IN NATIONAL MEETINGS

"Monte Carlo Buildup Factor Calculations Including the Contribution of Bremsstrahlung", with J.P. Kuspa, ANS Trans., 15, 553 (1972).

"Gamma-Ray Albedo Calculations Including the Contribution of Bremsstrahlung", with E. Aslani, ANS Trans., 17, 572 (1973).

"Infinite Medium Buildup Factors Including the Contribution of Bremsstrahlung", ANS Trans., 18, 394 (1974).

"The Role of Nuclear Engineering Students in Public Understanding of Nuclear Power", ANS Trans., 18, 33 (1974).

"Analysis of the GCFR Critical Experiments", with R.A. Moore, A.L. Hess, and R.J. Carbone, ANS Trans., 22, 694 (1975).

"Thorium Utilization in Gas-Cooled Fast Breeder Reactors", with R.J. Carbone, ANS Trans., 22, 703 (1975).

"Comparison of Nuclear and Coal Power Plants Using Net Energy Analysis" with G. Suwal, 4th Annual UMR-DNR Conference on Energy, Oct. 1977, Rolla MO.

"Comparison of Economic Performance of LMFBR and GCFR Radial Blankets", with M.H. Jankhan, ANS Trans., 28, 384 (1978).

"The Effect of Reliability Improvement in the Cost of Generating Electricity", with S. Nejat, ANS Trans., 34, 588 (1980).

"Public Information Activities of the ANS Student Branch at the University of Missouri-Rolla", ANS Trans., 34, 69 (1980).

"NRC-EPRI Studies of Pressure Vessel Cavity Neutron Field", with J. Grundl et al, NRC 9th Water Reactor Safety Information Meeting, Oct. 1981, NBS, Washington D.C.

"Calculation of Neutron Fluxes at the Pressure Vessel and Cavity of a PWR", with D.R. Edwards et al, 4th ASTM-EURATOM Symposium on Reactor Dosimetry, March 1982, NBS, Washington D.C.

"Gamma-Ray Buildup Factors Near the Air-Ground Interface", with K. Wincel, ANS Trans., 41, 495 (1982).

"Neutron Fluence and Threshold Foil Reaction Rates in PWR's", with D.R. Edwards, L. Kao, and F. Yin, ANS Trans., 45, 592 (1983).

"Dose Rates for Several Human Organs Using QAD", with Kathy Phillips, ANS Trans., 62, p. 461, (Nov. 1990).

"Neutron Flux at the Pressure Vessel of a PWR Determined with the MCNP Code", with Pete Laky, ANS Trans., 71, 391 (1994).

"Gamma Dose from a Cylindrical Source obtained by Point Kernel and MCNP", with B.J. Shrestha, ANS Trans., 71, 411 (1994).

"Comparison of ENDF/B-V and VI Cross Sections for Dosimetry Foil Reaction Rates", ANS Trans., p. 350, 73 (1995).

"A Modern Health Physics Curriculum", invited presentation at a National Conference on B. S. Degree Programs in Health Physics, sponsored by the S. Carolina Environmental Education Consortium, 17-18 November, 1995.