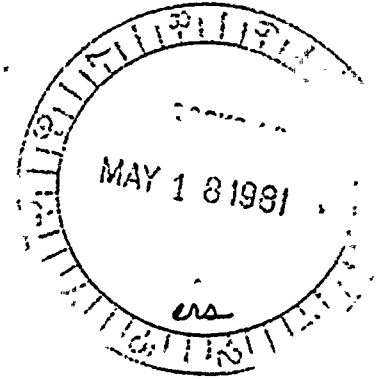


Personally appearing before me John H. Parker who after being duly sworn deposes and says that the attached pre-filed testimony is given under oath.

*John H. Parker*  
*May 12, 1981*

*Emma E. Olson*  
*Fla. International Union*



Notary Public, State of Florida  
My Commission Expires Dec. 11, 1984  
Bonded Thru Troy Fair - Insurance, Inc.



Q. Dr. Parker, please state your full name, address and occupation.

A. My name is John H. Parker and my business address is Physical Science Department, Florida International University, Miami, Florida. I am an associate professor of Chemistry and Environmental Science.

Q. Briefly state your educational and experience background.

A. I received a B.S degree in Chemistry from Emory University in 1963 and a Ph.D. in Physical Chemistry from the University of California at Berkeley in 1969. Since 1969, I have done teaching and research in physical chemistry, air pollution and energy conservation at three universities.

Q. Please describe some cost effective ways in which conservation can be used to replace the energy and power supplied by Turkey Point Nuclear Generating Unit Nos. 3 and 4.

A. Florida, and particularly the Florida Power and Light (FPL) service area, is fairly unique in its energy consumption patterns primarily due to a short heating season and a very long cooling season. Also, about 50% of FPL's electrical consumption is by residential customers. For the average FPL residence, about 50% of the total consumption and close to 60% of the summer peak period consumption is due to air conditioning. Consequently, the primary focus of reductions in the power demand and energy consumption should be on techniques which reduce energy used for air conditioning.

A conservation strategy for reducing the energy consumed



in air conditioning a building is energy conservation landscaping. Florida is an optimal area for using landscaping because of climatic conditions which are conducive to very rapid growth of the vegetation. Recent scientific experiments<sup>1,2</sup> have documented that landscaping can be an extremely effective tool in reducing the energy used in air conditioning during hot summer months. It has been shown that a combination of trees and shrubs on the west side of a house can reduce the temperature on the wall behind the shrubs from about 115°F to 85°F during the late afternoon when peak electrical demands occur. This combination of shading and cooling by evapotranspiration can more than double the effective insulating value of the walls and dramatically decrease the heat gain through the windows.

The effect of landscaping on air conditioning has also been documented by an experiment in which the childcare center at Florida International University was landscaped with trees and shrubs. After a two year growth period, it was found that the electrical energy consumed in air conditioning the double-wide mobile home was reduced by about 60% during very warm summer days. Moreover, the peak power demand during very hot afternoon periods was about five kilowatts less than it was without the presence of landscaping.

For this particular experiment, about \$1500 was spent for the purchase and installation of the vegetation. This cost could have been much less except that fairly large plant materials were utilized to insure quick results. Nevertheless, this yields a cost for demand reduction of about \$300 per kilowatt.



When reserve margins and transmission losses are taken into account, this is equivalent to a power plant cost of \$230 per kilowatt.

These quantitative results suggest that a homeowner (or FPL) could spend about \$700 landscaping the south and west areas of a house resulting in a reduction in peak demand of about 2 kilowatts. This corresponds to \$350 per kilowatt on site or \$270 per kilowatt at the power plant. Due to the energy savings associated with the landscaping, the simple payback time for the homeowner would be about 3 years. It should be noted that this calculation does not include the increased value of the property due to the landscaping. If this landscaping technique were promoted and applied to 100,000 houses in Florida, the reduction in utility system requirements would be about 260 megawatts.

For those homes with unshaded air conditioners on the west and south sides (and there are many in Florida) an even more cost effective application of this concept is to plant a single tree so as to shade the air conditioner as well as the adjacent walls and windows during summer afternoons. After a two to three year growth period, the \$50 installation cost can be offset by an increase in air conditioner efficiency of at least 5% which corresponds to an average reduction in peak demand of about 0.3 kilowatts. This corresponds to a cost of \$150 per kilowatt at the plant. This is a conservative figure since the effect of shading the walls and windows were not included.





Another extremely effective method of reducing the energy consumed in air conditioning a residence is the use of high efficiency air conditioners. Our statistical analysis has revealed that the cost of increasing the efficiency of a one ton room air conditioner from an SEER of 5 to a SEER of 10 is about \$270. The simple payback period for this increased cost is about one cooling season. The reduction in demand during summer peak periods due to the doubling of the efficiency is about 0.84 kilowatts. An effective method of implementing this strategy would be state legislation which phases in increasingly higher minimum SEER standards for air conditioners. Alternatively, FPL could give customers a \$100 rebate for purchasing air conditioners with SEER's greater than 10. If 300,000 residences received such a rebate, the reduction in system demand could approach 220 megawatts at an FPL cost of about \$150 per kilowatt.

Although the costs determined for the above two conservation techniques involve an experimental uncertainty of perhaps 20%, it should be remembered that conservation techniques which reduce demand and energy consumption do not require nuclear or fossil fuels after their implementation and do not result in environmental degradation through air or water pollution or toxic waste disposal.

A very effective means of reducing electrical demand during peak periods is the appropriate use of a timer on a hot water heater. For example, Florida Power and Light currently is offering a Time Of Use (TOU) rate to its residential customers which has significantly higher costs for energy

consumption between 12 noon and 9 p.m. If FPL were to install a timer for each TOU customer which shuts off the hot water heater during that period, an average demand reduction of about 0.7 kilowatts would result from an expenditure of about \$35 (\$25 for the timer, \$10 for wiring). This corresponds to a cost for a reduction in peak demand of \$50 per kilowatt on site or \$38 per kilowatt at the power plant. For every 100,000 TOU customers who received the preset timer, there would be a system demand reduction of 90 megawatts. In addition, the TOU homeowner would save about \$6 per month by diverting hot water heating to off peak hours.

I believe the conservation strategies outlined above can be implemented through an aggressive residential conservation program and offer a cost effective alternative to the repair of Turkey Point Nuclear Generating Units Nos. 3 and 4.

<sup>1</sup>J.H. Parker, "Precision Landscaping for Energy Conservation." Proceedings of the 1979 National Conference on Technology for Energy Conservation, Tucson, Arizona.

<sup>2</sup>D.E. Parker and J.H. Parker, "Energy Conservation Landscaping as a Passive Solar System." Proceedings of the Fourth National Passive Solar Conference, Kansas City, Missouri, Oct. 3-5, 1979.



VITA

JOHN HILLIARD PARKER

Personal

Birthdate: September 30, 1941  
Marital Status: Married  
Children: Two daughters  
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Florida International University  
Tamiami Trail, Miami, Florida 33199  
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Education

Ph.D., Physical Chemistry, University of California, Berkeley, 1969  
(thesis supervisor, Professor George C. Pimentel)  
B.S., Chemistry, Emory University, 1963

Honors and Professional Societies

Phi Beta Kappa, 1962  
Pi Alpha Honorary Chemical Society, 1961-63  
National Science Foundation Summer Research Award, 1961  
Achievement Award (Highest grade in Freshman Chemistry, 1960)  
Martin Marietta Corporation Tuition Scholarship, 1959-1963  
Emory University Scholarship, 1959-63  
Education and World Affairs Faculty Award, 1969-1971  
American Chemical Society, 1970-present  
Outstanding Educators of America, 1975  
American Men and Women of Science, 1976

Professional Experience

Current Positions

Associate Professor of Environmental Science and Chemistry, Florida  
International University, 1973-present  
Assistant Director, FAU-FIU Joint Center for Environmental and Urban Problems,  
1976-present 1980

Previous Positions

Associate Dean, College of Arts and Sciences, Florida International  
University, 1975, 1976  
Research Chemist, Environmental Protection Agency, National Environmental  
Research Center, Research Triangle Park, Summer 1974  
Assistant Professor, Florida International University, 1972-1973  
Assistant Professor, Kansas State University, 1971-72  
Assistant Professor, University College of Cape Coast, Ghana, 1969-1971  
Acting Instructor, University of California, Berkeley, 1966-1967  
Research Assistant, University of California, Berkeley, 1965-1969  
Teaching Assistant, University of California, Berkeley, 1964-1966  
Research Engineer, Martin Marietta Corporation, Orlando, 1963-1964

Teaching Experience

Environmental Science and Environmental Chemistry  
Introductory Chemistry and Physical Chemistry  
Atmospheric Chemistry  
Kinetics, Spectroscopy, and Quantum Mechanics

Research Interests

Reaction Kinetics of Photochemical Smog  
Analysis of Indoor Air Pollutants  
Energy Conservation  
Chemical Lasers  
Gas-phase Reaction Kinetics  
Emission Spectroscopy  
Beverage Container Legislation



### Community Activities

Florida Regional Energy Action Committee  
(advisory to the Energy Office of the State of Florida)  
Southeast Florida Air Quality Council  
(technical advisory committee)  
Dade County Bikeways Advisory Committee  
Dade County Committee for Sane Growth  
Sierra Club  
Audubon Society  
University Representative--National Universities Water Resources  
Council  
Participant--series of workshops on "Public Involvement in Growth  
Management"  
Environmental Advisory Committee--FPL Turkey Point Power Plants  
No. 3 and No. 4

### Professional References

Professor George C. Pimentel, Department of Chemistry, University  
of California, Berkeley; Berkeley, California  
Professor William D. Gwinn, Department of Chemistry, University  
of California, Berkeley; Berkeley, California  
Professor R. A. Day, Department of chemistry, Emory University  
Atlanta, Georgia  
Dean Adrian H. Daane, College of Arts and Sciences, University of  
Missouri, Rolla, Missouri



## Papers

1. J. V. Kasper, J. H. Parker, and G. C. Pimentel, "Iodine-Atom Laser Emission in Alkyl Iodide Photolysis," *J. Chem. Phys.*, **43**, 1827 (1965).
2. J. H. Parker and G. C. Pimentel, "Analysis of Quenching in the  $\text{CF}_3\text{I}$  Atomic Iodine Laser." Paper presented before the Division of Physical Chemistry, 152 Meeting of the American Chemical Society, New York, New York, September, 1966.
3. J. H. Parker and G. C. Pimentel, "Hydrogen Fluoride Chemical Laser Emission through Hydrogen-Atom Abstraction from Hydrocarbons," *J. Chem. Phys.* **48**, 5273 (1968).
4. K. L. Kompa, J. H. Parker, and G. C. Pimentel, " $\text{UF}_6\text{-H}_2$  Hydrogen Fluoride Chemical Laser: Operation and Chemistry," *J. Chem. Phys.* **49**, 4257 (1968).
5. J. H. Parker and G. C. Pimentel, "Vibrational Energy Distribution through Chemical Laser Studies." Paper presented before the 2nd Conference on Chemical and Molecular Lasers, St. Louis, Missouri, May, 1969.
6. J. H. Parker and G. C. Pimentel, "Vibrational Energy Distribution through Chemical Laser Studies. I. Fluorine Atoms plus Hydrogen or Methane," *J. Chem. Phys.* **51**, 91 (1969).
7. J. H. Parker, "Vibrational Energy Distribution in Reaction Products and Chemical Reactivity of Excited Species through Chemical Laser Studies," Ph.D. Thesis, University of California, Berkeley, 1969.
8. J. H. Parker and G. C. Pimentel, "Some New  $\text{UF}_6\text{-RH}$  Hydrogen Fluoride Chemical Lasers and a Preliminary Analysis of the Chloroform System," *IEEE J. Quantum Electron.* **6**, 1975 (1970).
9. J. H. Parker and G. C. Pimentel, "Vibrational Energy Distribution through Chemical Laser Studies. II. Fluorine Atoms plus Chloroform," *J. Chem. Phys.* **55**, 857 (1971).
10. E. Cuellar, J. H. Parker and G. C. Pimentel, "Rotational Chemical Lasers from Hydrogen Fluoride Elimination Reactions," *J. Chem. Phys.* **61**, 422 (1974).
11. J. H. Parker, T. Casey, R. Slayton, and C. Herod, "Mandatory Deposits on Beverage Containers in Florida" (Report submitted to Florida State Senator J. Gordon), 1974.
12. J. H. Parker, "Hydrogen Fluoride Vibrational Energy Distributions for the Reactions of Fluorine Atoms with Cyclanes" *Int. J. Chem. Kinetics* **7**, 433 (1975).
13. J. H. Parker, "Rotational Chemical Lasers from Hydrogen Fluoride Elimination Reactions." Paper presented before the Division of Physical Chemistry, 26th Southeastern Regional Meeting of the American Chemical Society, Norfolk, Virginia, October, 1974.
14. J. H. Parker, "Reaction Kinetics of the  $\text{CF}_3\text{I}$  Atomic Iodine Laser." (Manuscript in preparation).
15. J. H. Parker, B. W. Gay, R. Noonan and J. J. Bufalini, "A Kinetic Analysis of the Photodecomposition of Methyl Nitrite in the Presence of Air." (Manuscript in preparation).
16. J. H. Parker, "Environmental, Social and Economic Impacts of Energy Conservation." Paper presented at the Energy Conservation Training Institute, U.S. Federal Energy Administration, Atlanta, Georgia, March, 1976 (invited paper).
17. J. H. Parker and M. Sullivan, "Sulfur Oxides in Dade County." Paper presented before the Dade County Commission Hearing, June 1, 1976.





## Recent Papers

18. M. A. Ogden and J. H. Parker, "Ecological Landscaping." Paper presented at a workshop on ecological landscaping, Miami, Florida, April 1977.
19. J. H. Parker, "Frontiers of Environmental Thought." Paper presented at the National Association of Environmental Education Conference, Estes Park, Colorado, April 1977.
20. J. H. Parker, "Precision Landscaping for Energy Conservation," Proceedings of the 1979 National Conference on Technology for Energy Conservation, 1979.
21. Barney L. Capehart and J. H. Parker, "Florida's REAC'D: A Vehicle for Technical Input by Citizens to the State Energy Policy Process," Proceedings of the 1979 IEEE Region III Conference, Roanoke, Virginia, 1979.
22. Danny S. Parker, Mona Sullivan, and J. H. Parker, "Energy Conservation through Landscaping--A Case Study," Meeting of the Florida Academy of Sciences, Miami, Florida, March 1979.
23. Danny S. Parker and J. H. Parker, "Energy Conservation Landscaping as a Passive Solar System." Paper for the 4th National Passive Solar Conference, Kansas City, Missouri, October 1979.
24. J. H. Parker, "An Energy and Ecological Analysis of a Residential Landscape." Paper presented at the Florida Academy of Science Meeting, March 1980.
25. J. H. Parker, "Uses of Landscaping for Energy Conservation." Report submitted to the Governor's Energy Office of Florida, January 1981.
26. J. H. Parker, "Energy Conservation Landscape Designs for Mobile Homes in South Florida." Report submitted to the Governor's Energy Office of Florida, March, 1981.
27. P. J. Shlachtman and J. H. Parker, "Peak Load Energy Conservation." Paper presented at the Florida Academy of Sciences Meeting, May, 1981.

