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STAFF ROSTER FOR 1979 -
ENERGY TECHNOLOGY PROGRAMS

MASTER

December 1979

DEPARTMENT OF ENERGY AND ENVIRONMENT

BROOKHAVEN NATIONAL LABORATORY
UPTON, NEW YORK 11973

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B. MANOWITZ, Chairman

T. O'HARE, Associate Chairman for Energy Technology Programs

December 1979

**DEPARTMENT OF ENERGY AND ENVIRONMENT
BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.**

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ENERGY TECHNOLOGY

THOMAS E. O'HARE Associate Chairman for Energy Technology Programs

Education College of the City of New York, B.S. Chemical Engineering, 1951; New York University, Master of Business Administration, 1956.

Research Interests Catalysis; Process Development and Engineering Design; Technology Appraisal and Utilization; Economic Analysis.

Professional Affiliations American Economic Associates; American Institute of Chemical Engineers; American Society of Mechanical Engineers; Licensing Executives Society; Society for International Development; Sigma Xi; World Futures Society.
Listed in American Men of Science and Who's Who in the East.

Summary of Experience Mr. O'Hare has a diverse background of over 25 years of consulting, planning, management, design and evaluation experience in the oil, gas, iron and steel, pulp and paper, fertilizer and petrochemical industries. He has been involved in both financing and project management of venture capital projects. He has evaluated a broad range of industrial processes in technical and economic terms as well as in terms of their import and interaction with related industrial, governmental and economic activities. He has worked in the public and private sector in about 30 countries throughout the world.

In his own consulting firms, his experience has included process engineering, project management, technology licensing, plant audits and feasibility studies for oil refineries, ammonia, and ethylene plants, petrochemical complexes, LNG facilities, tank farms, etc., as well as advisory services on natural gas allocation, crude oil pricing, desulfurization, coal gasification, plant start-up and plant siting.

With the Lummus Company until 1954 as a process engineer and then with M. W. Kellogg until 1966 in a series of engineering and managerial posts, Mr. O'Hare received a thorough grounding in the process industries. During the course of his career, he has been involved in a number of firsts: Calvo Sotello - the first oil refinery, lube oil manufacturing, fertilizer and petrochemical complex simultaneously planned and executed in the world; the first large tonnage ammonia plant; the first long distance ammonia pipeline and the first of the new short residence time naphtha fed olefin crackers.

THOMAS E. O'HARE

(cont'd)

He has been a member of the Board of Directors of several corporations; a graduate lecturer in Chemical Engineering at the College of the City of New York; and a U.S. delegate and participant at United Nations Technology Conferences in Geneva, Bombay, Teheran and Kiev.

Mr. O'Hare joined the staff at BNL in late 1979 after having consulted for the Laboratory on energy technology programs for a little under three years. He is also a member of the Board of Directors of the Adelphi Research Center, Inc.

FRANK J. SALZANO	Chemical Engineer
Education	B. Chemical Engineering, City University of New York, 1955; Case Institute, Cleveland, 1955-56; Brooklyn Polytechnic Institute, Long Island, 1971.
Research Interests	Energy Storage, Solid State Chemistry, Electrochemistry, Advance Power Cycles, Fuel Cells, Conservation.
Professional Affiliations	American Association for the Advancement of Science, Electrochemical Society, American Institute of Chemical Engineers
Summary of Experience	Mr. Salzano's interests span the range from chemical engineering process design, solid state chemistry--especially carbon and mixed anionic conductors, high and low temperature electrochemistry, liquid metals, and energy systems studies. He is presently a Senior Scientist who heads the Energy Storage and Conversion Division and has authored over a hundred publications in the areas named above. Mr. Salzano has served on numerous national and international study groups and panels dealing with energy storage, energy systems studies and conservation. Presently he is the head of an International Energy Agency Cooperative Effort on Electrolytic Hydrogen Production involving eight countries in North America, Western Europe, and Japan. He has been a key person in interactions between RNL and industry, most notable in developing commercial interests in metal hydrides and having established the energy conservation programs at BNL.
Selected Publications	<p>F. J. Salzano, A. Mezzina, M. Beller, G. Strickland, and S. Srinivasan, "Hydrogen Technology: An Overview," <u>American Chemical Society/Chemical Society of Japan Symposium, Honolulu, Hawaii, April 5-6, 1979.</u></p> <p>A. L. Berlad, Y. J. Yeh, F. J. Salzano, R. J. Hoppe, and J. Batey, "Annual Fuel Usage Charts for Oil-Fired Boilers," BNL 50903, July 1978.</p> <p>F. J. Salzano and M. F. Bonner, "Program Plan for Fiscal Year 1978 for Electrolysis-Based Hydrogen Storage Systems Program," BNL 23289, November 1977.</p>

ROBERT J. ISLER	Chemical Engineer
Education	University of Michigan, B.S. in Chemical Engineering 1943.
Research Interests	Process/project engineering in waste disposal, liquid metal systems, polymer concrete, molten salt and organic chemical manufacturing.
Professional Affiliations	American Institute of Chemical Engineers; Licensed Professional Engineer, New York State.
Summary of Experience	During the past 28 years at Brookhaven, Mr. Isler was responsible for the process design and engineering of a full scale hydraulic model for high level radioactive waste storage system and a subcritical assembly for generating fission gases for experimental uses. He has been involved in process design and engineering of liquid metal systems from bench scale to plant scale, including design, construction, and start-up. Recently he has been involved in hydrogen system development and fossil fuel utilization. Prior to coming to the Laboratory, he was involved in the development and manufacture of fine organic chemicals.
Selected Publications	<p>Annual Highlights of the Energy Technology Programs, Editor, BNL 50959, December 1978.</p> <p>R. J. Isler, A. H. Beaufrere, F. J. Salzano, and W. S. Yu, "Hydrogen Storage via Iron-Titanium for a 26MW(e) Peaking Electric Plant," Presented at the <u>1st World Hydrogen Energy Conference, Miami, Florida, March 1-3, 1976, BNL 20902.</u></p> <p>R. J. Isler, J. M. Burger, P. A. Lewis, F. J. Salzano, and J. M. King, Jr., "Energy Storage for Utilities via Hydrogen Systems," Presented at the <u>9th International Energy Conversion Engineering Conference, San Francisco, California, August 26-30, 1974, BNL 19266.</u></p>

GERALD DENNEHY

Development Engineer

Education

Massachusetts Institute of Technology (BSME, 1944);
New York University MBA Program, 1953-54.

Research Interests

Planning and management of R&D in conservation technologies. Investment and venture analysis in technology industries. Industrial product planning and marketing.

Summary of
Experience

Mr. Dennehy has over 30 years of diversified experience in engineering, R&D, product planning, marketing, and investment analysis in technology industries. Since joining Brookhaven in 1974, he has performed studies of end use demand for energy and the potential for conservation in the transportation and industrial sectors, and has participated in planning and management of national RD&D programs in buildings conservation. He organized and staffed a Conservation Program Management Group which provides the planning, implementation and monitoring of research programs in a range of conservation areas, through in-house technical projects at Brookhaven and subcontracts with universities and industrial organizations.

Selected
Publications

R. F. Jones, R. F. Krajewski, G. Dennehy, "Case Study of the Brownell Low Energy Requirement House," BNL 50968, May 1979.

D. J. Behling, Jr., G. Dennehy, "Estimation of Final Demands and Current Input-Output Coefficients to 1985," BNL 20369, August 1975.

G. Dennehy, "The Demand for Transport Aircraft--A Ten Year Projection of Equipment Requirements of the Free World Airlines," July 1973.

ENERGY STORAGE AND CONVERSION DIVISION

F. J. SALZANO

MICHAEL F. BONNER Systems Engineer

Education Stevens Institute of Technology, Bachelor of Mechanical Engineering/Electrical Engineering, 1958; Polytechnic Institute of Brooklyn, Master of Science Operations Research, 1971; Polytechnic Institute of New York, Doctoral Program, Operations Research/Nuclear Engineering, 1973-present.

Research Interests Program Management; Systems Analysis, Operations Research; Hydrogen Energy Systems--Structural Analysis, Mechanical Design Engineering.

Summary of Experience Technical and administrative management responsibility in the areas of Energy Storage and Conversion. Recently designated as Associate Program Manager for Chemical/Hydrogen Energy Storage Program. Activities include developing new research areas, program planning, budgets, contracts management, evaluation of systems studies, direction of in-house research, and liaison with DOE sponsoring divisions. Currently Area Manager for end-use applications of hydrogen and director of work in BNL Hydrogen Test Facility (HYTACTS). Additional responsibility as Safety Coordinator for entire department (DEE). Prior to joining BNL in 1976, was associated with Grumman Corporation for 12 years in the areas of business development, corporate operations analysis, and management of test programs on aircraft/spacecraft. Test Project Engineer on \$20 million Air Force Research Satellite. Earlier experience in structural/mechanical design, environmental testing and quality assurance. Previous organizations include Redstone and Picatinny Arsenal (Propulsion and Explosives Research), Fort Belvoir (Design of Ground Support Equipment), and Maxson Electronics (Development of Radar and Guidance Systems).

Selected Publications A. Mezzina, Program Manager, M. Bonner, Contributor, "Electrolysis-Based Hydrogen Storage Systems, Annual Report - January 1, 1978 to December 31, 1978," BNL 51060, April 1979.

M. Bonner, "Overview: BNL End-Use Applications Projects," Proc. of the DOE Chemical Energy Storage and Hydrogen Energy Systems Contracts Review, Reston, Virginia, November 13-14, 1979.

F. Salzano and M. Bonner, "Program Plan for Fiscal Year 1978 for Electrolysis-Based Hydrogen Storage Systems Program," BNL 23289, November 1977.

THOMAS E. BOTTS	Physicist
Education	San Fernando Valley State College, 1965-1966; General Motors Institute, 1966; UCLA (B.S. Engineering 1969, M.S. Materials Science 1970); University of Nottingham, England (Ph.D. 1974); Post Doctoral Fellow, UCLA, 1974-1976.
Research Interests	Laser-Particle Interactions in Gaseous Environments; Environmental Impact of Advanced Energy Systems; Advanced Energy System Conceptualization.
Summary of Experience	Responsible for some of the initial studies into the environmental and safety implications of fusion power. Areas of greatest concentration included waste management and tritium management. Carried out work conceptualizing a method of hot gas particulate control for direct coal-fired turbines and proceeded into a method to utilize lasers to assist rotary flow cyclone performance. Designed a large MHD laser system to interface with a high performance nuclear generating system. Provide technical monitoring for the DOE/STOR Chemical Heat Pump/Chemical Energy Storage Program.
Selected Publications	<p>T. Botts, J. R. Powell, and J. A. Fillo, "Advanced Synfuels Production/Power Systems Utilizing Laser Particulate Control," <u>Proc. 2nd Miami International Conference on Alternative Energy Sources, Miami, Florida, December 10-13, 1979.</u></p> <p>T. Botts and J. R. Powell, "Laser Particulate Control for Open-Cycle, Coal-Fired Gas Turbines," <u>Proc. 24th International Gas Turbine Conference, San Diego, California, March 11-15, 1979.</u></p> <p>J. Powell, T. Botts, and H. Makowitz, "Applications of the Rotating Bed Nuclear Reactor for Directed Beam Energy Weapons," March 1979.</p>

CLIFFORD P. FREDRICKSON Sr. Management Information Systems Analyst

Education State University of New York at Stony Brook, New York
(M.S. Applied Science, 1977); Dowling College, Oakdale,
New York (B.B.A. Emphasis Data Processing, 1974).

Research Interests Computerized information systems design, data base
management, project management, systems development.

Professional Data Processing Management Association
Affiliations

Summary of Administrative management of multi-divisional organiza-
Experience tion including budget preparation, analysis and procure-
ment planning. Design and development of automated data
processing systems; Head, Management Information Systems,
multi-disciplined organization. Participated in Contract
Management and Development of the National Energy Emer-
gency Management Information System (EEMIS).

Selected A. Hermelee, J. D'Acierno, C. Fredrickson, and
Publications K. Van Valkenburg, "Methodology for Coding the Energy
Emergency Management Information System," BNL 50186,
September 1979.

J. Lamontagne, Editor, C. P. Fredrickson, Contributor,
"National Energy Information System (NEIS) Petroleum
Sector Level I Description," (draft).

WILLIAM L. GRAVES Engineer

Education Cornell University (Bachelor of Chemical Engineering, 1950); University of Delaware (M.S. in Polymer Chemistry, 1962).

Research Interests Technology transfer; residential energy conservation and utilization of renewable resources. Environmental impacts of use of renewable resources.

Professional
Affiliations International Solar Energy Society

Summary of
Experience Responsible for engineering aspects of current studies in the environmental impacts of solar and biomass systems on regional and national scales and for the analysis of field tests of residential oil-fired heating systems. Have directed two regional technology transfer programs providing liaison between Department of Energy Programs, state governments, and the private sector. Product engineering experience in the transportation industry in the design, test, and large-scale manufacture of engineered plastics for electrical and mechanical applications.

ROBERT J. HOPPE Development Engineer

Education Spring Garden College, Philadelphia, Pennsylvania, 1949,
AAS-Machine Design.

Research Interests Application of quantitative methods to field demonstra-
tions to determine fuel use changes, project development
and management.

Summary of
Experience Project Manager, BNL Space Conditioning Heating Equipment
Efficiency Test Projects, technical respondent to the BNL
Conservation Programs Management Group, consultant to the
Suffolk County Energy Prospectus Program, BNL representa-
tive to the NYSEO Oil Refit Marketing Program, and
Program Manager for the BNL Oil Refit Qualification Pro-
gram.

Selected
Publications J. Batey, T. Allen, R. McDonald, R. Hoppe, F. Salzano,
and A. Berlad, "Direct Measurement of the Overall Effi-
ciency and Annual Fuel Consumption of Residential Oil-
Fired Boilers," BNL 50853, January 1978.

A. Berlad, Y. Yeh, F. Salzano, R. Hoppe, and J. Batey,
"Annual Fuel Usage Charts for Oil-Fired Boilers,"
BNL 50903, July 1978.

A. Berlad, N. Tutu, Y. Yeh, R. Krajewski, R. Hoppe, and
F. Salzano, "Air Intrusion Effects on the Performance of
Permeable Insulation Systems," Symposium on Thermal
Insulation, Tampa, Florida, October 23-25, 1978.

HUGH S. ISAACS	Metallurgist
Education	University of the Witwatersrand [B.S. (Eng.) in Metallurgy, 1958]; Imperial College of Science of Technology (Diploma of Imperial College in Nuclear Chemical Engineering, 1962); London University (Ph.D. in Corrosion, 1964).
Research Interests	Corrosion and electrochemistry of solids and liquids. Metal oxidation.
Professional Affiliations	Adjunct Professor at State University of New York at Stony Brook.
Summary of Experience	<p>A. <u>Aqueous Corrosion</u> - Corrosion of uranium alloys and oxide forming metals. Valency changes in surface oxides. Localized corrosion including stress corrosion cracking, pitting and crevice corrosion. Scanning and ac techniques to locate and measure corrosion of surface heterogeneities. Corrosion in steam generators.</p> <p>B. <u>Gaseous Oxidation</u> - Steam oxidation of metals and graphite.</p> <p>C. <u>Liquid Metals</u> - Chemistry of oxygen in sodium. Corrosion of metals in liquid sodium. Techniques for determining oxygen concentration in liquid sodium.</p> <p>D. <u>Energy Systems</u> - Behavior of oxygen electrode in phosphoric acid electrode reactions at elevated temperatures in fuel cells and electrolyzers. Design of high temperature electrochemical systems with oxygen ion electrolytes.</p>
Selected Publications	<p>H. S. Isaacs and L. J. Olmer, "The Overpotential Behavior of Electrode Materials at Interfaces with $ZrO_2Y_2O_3$ Electrolytes, <u>Extended Abstracts, Electrochemical Society Meeting, Los Angeles, California, October 1979.</u></p> <p>H. S. Isaacs and B. Vyas, "Scanning Reference Electrode Techniques in Localized Corrosion," <u>ASTM Symposium, San Francisco, California, May 1979.</u></p> <p>H. S. Isaacs and M. Kendig, "Determination of Surface Inhomogeneities Using a Scanning Probe Impedance Technique," <u>Corrosion, 1979.</u></p>

GEORGE KISSEL

Chemistry Associate

Education

Stanford University (B.S. in Chemistry, 1966); Followed short course in Direct Energy Conversion, Arizona State University (1975).

Research Interests

Electrolytic hydrogen production, fuel cells for transportation, high temperature electrochemistry, bioelectrochemistry, electroanalytical chemistry.

Summary of
Experience

Since 1974, responsible for the experimental work leading to the development of advanced alkaline water electrolyzers and fuel cells. This work involves selection and evaluation of materials for cell components (electrodes, separators, gaskets, seals, etc.), optimization of cells, design, fabrication and long term testing of cells. Half kilowatt module alkaline fuel cells are being constructed and tested for potential application as power sources for electric vehicles.

Selected
Publications

J. McBreen, E. J. Taylor, K. V. Kordesch, G. Kissel, F. Kulesa, and S. Srinivasan, "Development of Fuel Cell Technology for Vehicular Applications," BNL 51047, August 1979.

G. Kissel, F. Kulesa, C. R. Davidson, and S. Srinivasan, "Selection and Evaluation of Materials for Advanced Water Electrolyzers," Proc. of Symposium on Industrial Water Electrolysis, Vol. 78-4, p 218, August 1978.

JAMES MCBREEN	Chemist
Education	University College, Dublin, Ireland (B.Sc., 1961); University of Pennsylvania (Ph.D. 1965).
Research Interests	Batteries, fuel cells, electrodeposition, hydrogen embrittlement of metals.
Professional Affiliations	Life member Electrochemical Society, American Association for the Advancement of Science.
Committees	Vice Chairman, Energy Technology Group, Electrochemical Society. Member Education Committee, Electrochemical Society.
Summary of Experience	Dr. McBreen has been responsible for several major studies on advanced aqueous batteries and fuel cells. This has included basic research, electrode development, cell and battery development, process development and trouble shooting in battery plants. Dr. McBreen received the Battery Division Research Award of the Electrochemical Society for his work on zinc electrodes. Other areas of his work have included studies of silver-zinc, silver-cadmium, manganese dioxide-zinc, nickel-zinc, zinc-air and magnesium seawater batteries. At BNL, Dr. McBreen has carried out work on hydrogen-halogen energy storage systems, phosphoric acid fuel cells, alkaline fuel cells for transportation applications, and zinc electrode morphology. His responsibilities have included both direction of work at BNL and monitoring of contractors.
Selected Publications	<p>D-T. Chin, R. S. Yeo, J. McBreen, and S. Srinivasan, "An Electrochemically Regenerative Hydrogen-Chlorine Energy Storage System: A Study of Mass and Heat Balances," <u>J. of Electrochemical Society</u>, 126, 713 (1979).</p> <p>R. S. Yeo and J. McBreen, "Transport Properties of Nafion Membranes in Electrochemically Regenerative Hydrogen/Halogen Cells," <u>J. of Electrochemical Society</u>, 126, 1682 (1979).</p> <p>J. McBreen and E. J. Cairns, "The Zinc Electrode," <u>Advances in Electrochemistry and Electrochemical Engineering</u>, Vol. 11, H. Gerischer and C. W. Tobias, Editors, John Wiley & Sons, New York (1978), pp 273-352.</p>

ALESSIO MEZZINA	Engineer
Education	Brooklyn College, 1948, B.A. Physics/Mathematics; Selected Engineering Courses, University of Michigan; NYU.
Research Interests	Technical management of interdisciplinary activities in advanced energy technology.
Professional Affiliations	New York Academy of Sciences, American Society of Automotive Engineers; Health Physics Society, American Ordinance Association. (Past)
Summary of Experience	Technical management in nuclear, chemical and electro- chemical energy conversion systems with particular emphasis in fuel cell and metal/air battery systems. As Program Director at NYSERDA, stressed the development and application of new technology for energy conservation and resource conversion. As Program Manager and Director of Research at Leeson Moos Labs, worked in aerospace pene- tration aids embodying radar, IR/optical--a nuclear phenomena. Early experience at Kellogg Corp. in radio- logical safety. Currently Program Manager for Chemical/ Hydrogen Energy Storage Systems at BNL covering activi- ties in electrochemical, storage, chemical heat pumps and end-use systems.
Selected Publications	<p>A. Mezzina, "Electrolysis-Based Hydrogen Storage Systems Overview and Rationale of the Brookhaven National Labora- tory Managed Program," <u>Proc. DOE Chemical Energy Storage and Hydrogen Energy Systems Contracts Review, Reston, Virginia, November 13-14, 1979.</u></p> <p>F. J. Salzano, A. Mezzina, M. Beller, G. Strickland, and S. Srinivasan, "Hydrogen Technology: An Overview," <u>American Chemical Society/Chemical Society of Japan Sym- posium, Honolulu, Hawaii, April 5-6, 1979.</u></p> <p>A. Mezzina, "Electrolysis-Based Hydrogen Storage Systems, Annual Report - January 1, 1978 to December 31, 1978," BNL 51060, April 1979.</p>

HELGA OLENDER	Chemistry Associate
Education	Staatliche Ingenieurschule der Stadt Dortmund (B.S. in Electrotechniques, 1966), Dortmund, West Germany.
Research Interests	Catalysis of fine particles; fuel cell electrode reactions.
Summary of Experience	<p><u>Analysis of Fine Particles</u> Electronmicroscopy (SEM and TEM) on extraterrestrial particles, micrometeoroids and lunar material. Quantitative and qualitative microanalysis of such material by means of microprobe and x-ray diffraction. Preparation of collector surfaces and cosmic dust detectors for sounding rocket flights. Data analysis of zodiacal light experiments on Pioneer 10 and 11 Asteroid-Jupiter probes. Empirical studies of instrumental effects on these data.</p> <p><u>Fuel Cell Electrode Reactions</u> Determination of kinetic parameters of the oxygen electrode reaction in various electrolytes. Investigation of the sintering phenomena of catalyst particles on phosphoric acid fuel cell electrodes at elevated temperatures. <u>In situ</u> measurement of active electrode surface areas. Cyclic voltammetry techniques. Test cell designs. Preparation of carbon supported electrodes.</p>
Selected Publications	<p>W. E. O'Grady, H. Olender, and S. Srinivasan, "<u>In Situ Regeneration of the Pt Surface Area on Carbon Supported Electrodes</u>," <u>Extended Abstracts, Fall Meeting of the Electrochemical Society, Pittsburgh, Pennsylvania, October 14-19, 1979, Vol. 79-2, p. 531.</u></p> <p>W. E. O'Grady, H. Olender, H. S. Isaacs, and S. Srinivasan, "<u>In Situ Surface Area Determination in 85% H₃PO₄</u>," <u>Extended Abstracts, Fall Meeting of the Electrochemical Society, Pittsburgh, Pennsylvania, October 15-20, 1978, Vol. 78-2, p. 842.</u></p> <p>H. Olender, A. C. C. Tseung, H. S. Isaacs, W. E. O'Grady, and S. Srinivasan, "<u>An Electrochemical Method for Regeneration of the Active Area of Fuel Cell Electrodes</u>," <u>Extended Abstracts, Spring Meeting of the Electrochemical Society, Seattle, Washington, May 21-26, 1978, Vol. 78-1, p. 1339.</u></p>

WILLIAM E. O'GRADY	Associate Chemist
Education	Colorado School of Mines (B.S. in Chemical Engineering, 1964); University of Pennsylvania (Ph.D. in Physical Chemistry, 1973); Postdoctoral Fellow, Case Western Reserve University, 1972, 1972-1974.
Research Interests	Bridging the gap between well-defined single crystal surfaces and microparticle surfaces as found in industrial catalysts; application of EXAFS and various electron spectroscopic techniques to electrochemical problems; electrocatalysis; electrode kinetics; quantum mechanical calculations of electronic properties of small clusters.
Professional Affiliations	Electrochemical Society; American Vacuum Society; Adjunct Professor at Brooklyn College.
Summary of Experience	Pioneered in the use of new physical methods in the field of electrochemistry; first <u>in situ</u> application of Mossbauer spectroscopy to establish the chemical constitution of the corrosion inhibiting film on iron; successfully married electrochemical studies with ultra high vacuum surface studies which led to the demonstration of the strong dependence of electrosorption of hydrogen and oxidation of formic acid on the surface orientation of single crystal platinum; developed new catalysts for oxygen evolution used by NASA in the development of a new water electrolysis cell; conducted research on the oxygen reaction in 85% H ₃ PO ₄ and trifluoromethane sulfonic acid and on the aging and regeneration of industrial oxygen reduction electrocatalysts.
Selected Publications	<p>W. E. O'Grady, S. Srinivasan, and R. F. Dudley, Editors, <u>Proceedings of the Workshop on the Electrocatalysis of Fuel Cell Reactions</u>, The Electrochemical Society, Inc., Princeton, New Jersey, Vol. 79-2, 1979.</p> <p>S. Trasatti and W. E. O'Grady, "Properties and Applications of RuO₂-Based Electrodes," <u>Advances in Electrochemistry and Electrochemical Engineering</u>, C. W. Tobias and H. Gerischer, Editors, John Wiley & Sons, New York, Vol. 12, 1980.</p> <p>W. E. O'Grady, "A Mossbauer Study of the Passive Oxide Film on Iron," <u>J. Electrochemical Society</u>, 127, (1980).</p>

LEONARD J. OLMER

Jr. Research Associate

Education

Queens College of the City University of New York (B.A. Physics, 1975); State University of New York at Stony Brook (M.S. Electrical Engineering, 1976); State University of New York at Stony Brook (Ph.D. Electrical Engineering, expected 1980).

Research Interests

Oxide systems and oxygen electrode materials to be used in high temperature fuel cells and electrolyzers. Because of the slowness of the oxygen reaction at the electrode/electrolyte interface, the operation of fuel cells and other devices is impaired. Our studies at BNL were mainly concerned with understanding and determining the rate limiting steps in the oxygen reduction reaction where the overall reaction is $O_2 + 2V_O^{\times} + 4e \rightarrow 2O_O^{\times}$ where $V_O^{\times}$ is a doubly charged positive oxygen ion vacancy and $O_O^{\times}$ is an oxygen atom on a normal site.

Summary of Experience

- Three years at BNL - Ph.D. research - oxygen electrode studies at high temperatures.
- One year research at City University of New York at Queens College. Topic: Optics.
- One year research at SUNY - Stony Brook. Topic: Computer modeling of the cardiovascular control systems.
- Research Assistantship, Ph.D. program in Physics, City University of New York (2/75-6/75); Graduate Fellowship, Ph.D. program in Physics, City University of New York (6/75-9/75); Teaching Assistantship, State University of New York at Stony Brook (9/75-6/76); Energy Engineering Fellowship, College of Engineering and Applied Science SUNY (1976-77).

Selected Publications

L. J. Olmer and H. S. Isaacs, "Determination of Current Transients During Polarization," Extended Abstracts of 156th Electrochemical Society Meeting, Los Angeles, California, October 14-19, 1979.

H. S. Isaacs and L. J. Olmer, "The Overpotential Behavior of Electrode Materials at Interfaces with ZrO_2 - Y_2O_3 Electrolytes," Extended Abstracts of 156th Electrochemical Society Meeting, Los Angeles, California, October 14-19, 1979.

H. S. Isaacs, L. J. Olmer, and S. Srinivasan, "Overpotential Behavior of Oxide Cathodes on Solid Electrolytes," Extended Abstracts of the National Fuel Cell Seminar, Bethesda, Maryland, June 26-28, 1979.

MATTHEW J. ROSSO

Development Engineer

Education

Polytechnic Institute of Brooklyn 1955-56, no degree; Adelphi-Suffolk University 1964-66, no degree; Suffolk County Community College 1966-70, Associate in Science, 1970; State University of New York at Stony Brook 1970-75, Master of Science in Applied Science, 1975.

Research Interests

Hydrogen storage, internal combustion engine, heat transfer, fluid dynamics, and cryogenics (ultra-low temperature production).

Professional Affiliations

State University of New York at Stony Brook Alumni Society, International Hydrogen Energy Association.

Summary of Experience

Mr. Rosso has worked in such areas as the investigation and metallographic analysis of the phase diagram and corrosion characteristics of cobalt-chrome based alloys; and in the development of a palladium-ruthenium alloy for dental applications, and developed a porcelain formulation with thermal expansion characteristics compatible with that alloy. He has been involved in the fabrication of liquid metal fuels for nuclear reactors, nuclear fuel waste treatment and disposal, and both one "G" and high "G" fluidized bed systems. A number of techniques were conceived for the design of cryostats in which single crystals of solid helium were grown. He participated in an alternative fuel program in which the combustion of methanol and ethanol in a CFR engine was monitored. His major emphasis presently is in fluid dynamics, mass and heat transfer experimentation and modeling of engineering scale metal hydride hydrogen storage systems, and includes the computer programming of engineering problems and data acquisition system implementation.

Selected Publications

M. J. Rosso and G. Strickland, "Hydride Beds: Thermal Transport Enhancement," Proc. 2nd Miami International Conference on Alternative Energy Sources, Miami, Florida, December 10-13, 1979.

G. Strickland and M. J. Rosso, "Bulk Hydrogen Storage Using Metal Hydrides," Proc. 2nd Miami International Conference on Alternative Energy Sources, Miami, Florida, December 10-13, 1979.

M. J. Rosso and G. Strickland, "Hydride Beds: Engineering Tests," Proc. DOE Chemical/Hydrogen Energy Storage Systems Contractor Review Meeting, Reston, Virginia, November 13-14, 1979.

EDMOND J.L. SCHOULER . Visiting Associate Scientist

Education	"Maitrise es Sciences" in Physical Chemistry, University of Toulouse, France, 1969; "Doctorat de Specialite" in Inorganic Chemistry and Electrochemistry, University of Grenoble, France, 1972; "Doctorat es Sciences Physiques," University of Grenoble, France, 1979.
Research Interests	Fundamental and applied research in solid state electrochemistry.
Professional Affiliations	Centre National de Recherche Scientifique (CNRS-France); Electrochemical Society.
Summary of Experience	Basic studies undertaken at Grenoble University (France) since 1969, were devoted to electrode polarization mechanisms on solid oxide electrolytes using dc and ac techniques. Special interest was also given to "grain boundary effects" on zirconia and thoriated electrolytes. Applied research dealing with high temperature H ₂ O and CO ₂ electrolysis and oxygen sensing were conducted. A zirconia multi-tubular CO ₂ electrolyzer producing 1 mole/hour oxygen for O ₂ regeneration from gases in-/exhaled was built and tested. Oxygen sensors with a solid internal reference, operating at 300°C, using a thin film technology (total thickness less than 1 μm) were built and studied. Fuel electrode reactions are studied at BNL.
Selected Publications	<p>E. J. L. Schouler, M. Kleitz, and C. Deportes, "Application selon Bauerle de trace des diagrammes d'admittance complexe en electrochimie des solides," Parts I and II, <u>Journal de Chimie Physique</u>, 6, 923-935 (1973), and 9, 1309-1316 (1973).</p> <p>P. Fabry, E. J. L. Schouler, and M. Kleitz, "Ion Exchange Between Two Solid Oxide Electrolytes," <u>Electrochimica Acta</u> 23, 439-544 (1978).</p> <p>E. J. L. Schouler, A. Hammou, and M. Kleitz, "Complex Impedance of Electrochemical Cells Based on Yttria Doped Thoria," <u>Mat. Res. Bull.</u>, 11, 9, 1137-1146, (1976).</p>

SUPRAMANIAM SRINIVASAN Chemist

Education	University of Ceylon, Colombo, Sri Lanka (B.S. in Chemistry, 1955); University of Pennsylvania (Ph.D. Physical Chemistry).
Research Interests	Theoretical and experimental electrode kinetics; electrocatalysis and surface studies; electrochemical energy conversion, storage and conservation; bioelectrochemistry; electro-organic synthesis.
Professional Affiliations	American Association for the Advancement of Science; American Chemical Society; Electrochemical Society; International Association for Hydrogen Energy; International Society of Electrochemistry; Phi Lambda Upsilon; Royal Institute of Chemistry.
Committees	Co-organizer, past Chairman and member of Executive Committee, Energy Technology Group, Electrochemical Society.
Summary of Experience	Responsible for the Electrochemical Technological Programs (basic and applied research as relevant to development of Fuel Cells, Fuel Cells for Transportation and Water Electrolyzers) at BNL. Perform technical secretarial functions for International Energy Agency Activity on Electrolytic Hydrogen Production. Initiated Graduate Student Thesis Research Program in Electrochemical Technology Group at BNL. Visiting Professor in Dept. of Materials Science, University of Virginia. During 1973-74, served as consultant with IBM, Boulder, Colorado and engaged on project "Methods for Inhibition of Agglomeration of Fine Magnetic Particles." From 1966 to 1973, member of faculty at State University of New York, Downstate Medical Center and carried out bioelectrochemical research on "An Electrochemical Approach to the Solution of Cardiovascular Problems." While at University of Pennsylvania (1959-1966), carried out "Theoretical and Experimental Electrode Kinetic Research" and co-authored book on "Fuel Cells: Their Electrochemistry" with Professor J. O'M. Bockris.
Selected Publications	S. Gottesfeld and S. Srinivasan, "Electrochemical and Optical Studies of Thick Oxide Layers on Iridium and Their Electrocatalytic Activities for the Oxygen Evolution Reaction," <u>Electroanalytical and Interfacial Electrochemistry</u> , No. 125, 265 (1978).

SUPRAMANIAM SRINIVASAN cont.

Selected
Publications

P. W. T. Lu and S. Srinivasan, "Electrochemical-Ellipsometric Studies of Oxide Films on Nickel During Oxygen Evolution," Journal of the Electrochemical Society, No. 125, 1416 (1978).

S. Srinivasan, N. Ramasamy, B. Stanczewski, and P. N. Sawyer, "Blood Surface Interactions as a Basis for Selection of Blood Compatible Cardiovascular Implants," Advances in Cardiovascular Physics - Blood: Rheology, Hemolysis, Gas and Surface Interactions, D. N. Ghista, E. Van Vollenhoven, W. J. Yang, and H. Reul (Eds.), 133-163, S. Karger AG, Basel, Switzerland (1979).

GERALD STRICKLAND	Chemical Engineer
Education	Cleveland State University (B.Ch.E., 1943); Lehigh University (ASTP Diploma in Mechanical Engineering, 1944); several nuclear science and engineering courses given at BNL.
Research Interests	Energy technology, experimental.
Professional Affiliations	American Institute of Chemical Engineers, International Hydrogen Energy Association.
Summary of Experience	<ol style="list-style-type: none"> 1. Process development for fission-product separation 2. Hot cell design and operation 3. Nonaqueous fuel reprocessing 4. Process development for aqueous waste disposal 5. Equipment design and operation for liquid-metal heat transfer studies 6. Equipment design and operation for hydrogen storage technology via metal hydrides 7. Contract management relative to item 6
Selected Publications	<p>G. Strickland and M. J. Rosso, "Bulk Hydrogen Storage Using Metal Hydrides," <u>Proc. 2nd Miami International Conference on Alternative Energy Sources, Miami, Florida, December 10-13, 1979.</u></p> <p>M. J. Rosso and G. Strickland, "Hydride Beds: Thermal Transport Enhancement," <u>Proc. 2nd Miami International Conference on Alternative Energy Sources, Miami, Florida, December 10-13, 1979.</u></p> <p>G. Strickland, "Hydrogen Storage for Automobiles," <u>Proc. DOE Chemical Energy Storage and Hydrogen Energy Systems Contracts Review, Reston, Virginia, November 13-14, 1979.</u></p>

CHIANG YUAN YANG

Assistant Scientist

Education

National Taiwan University (B.S. in Physics, 1970); Northwestern University (M.S. in Physics, 1972); MIT (Ph.D. in Materials Science, 1977).

Research Interests

General interest in interfacial science on energy technology related areas. Surface chemistry and catalysis, in particular, the electronic structure of small metal clusters on substrates. Electrochemistry and electrocatalysis, especially electrode kinetics and modified electrodes. Solid state electrolyte systems, in particular, oxygen ionic conductors.

Professional
Affiliations

American Electrochemical Society

Summary of
Experience

Co-principal Investigator of the High Temperature Solid Electrolyte Steam Electrolyzer Program. Studies include materials compatibility problems, oxygen diffusion in interconnectors, and electrode kinetics. Co-principal investigator of the Photoelectrochemical Systems Program. This is a new program and the initial emphasis will be on studying mixed oxides as electrodes for photodecomposition of water. Applying ultra-high vacuum and quantum chemistry techniques to study the electronic structure of gas/metal cluster interactions. Systems being studied are O/Ni, O/Pt, N/Fe, H/Fe, S/Fe, etc. Electrode kinetics studies of the $\text{Cr}^{+3}/\text{Cr}^{+1}$ redox couples for the redox flow cell energy storage device. Catalytic electrodes have been developed.

Selected
Publications

K. H. Johnson, C. Y. Yang, D. Vdensky, and R. P. Messmer, "SCF- $X\alpha$ -Scattered Wave Molecular Orbital Models of Metals and Alloys," Proceedings of ASM Symposium of Alloys Phase Stability, New Orleans, Louisiana, 1979, edited by L. H. Bennet, et al.

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ENGINEERING DIVISION

R. J. ISLER

JOHN W. ANDREWS	Associate Scientist
Education	Massachusetts Institute of Technology (S.B. in Physics, 1963); University of Notre Dame (Ph.D. in High Energy Physics, 1967); Postdoctoral Research, Yale University, 1967-1969.
Research Interests	Solar and ground-coupled heat pump systems; low-cost thin-film collectors.
Professional Affiliations	International Solar Energy Society; American Physical Society.
Summary of Experience	Dr. Andrews serves as group leader for the BNL Solar Technology Group. He is responsible for several systems analysis studies of solar and ground-coupled heat pump systems. These studies have elucidated the collector performance requirements of solar assisted heat pumps and have evaluated the various options for combining solar and ground-source energy in building systems. Dr. Andrews has also contributed to the economic and performance analysis of the low-cost thin-film plastic solar collectors under development at BNL. The BNL group which Dr. Andrews heads is responsible to the U. S. Department of Energy for technical support and program planning of solar and ground-coupled heat pump systems.
Selected Publications	<p>J. W. Andrews, "Optimization of Solar Assisted Heat Pump Systems Via a Simple Analytic Approach," <u>Second Annual Systems Simulation and Economic Analysis Conference Proceedings, San Diego, California, Jan. 23-25, 1980.</u></p> <p>J. W. Andrews, "A TRNSYS - Compatible Model of Ground-Coupled Storage," BNL 51061, September 1979.</p> <p>J. W. Andrews, "Heat Pump Impact Upon Solar Collector Design and Cost," <u>International Solar Energy Society Silver Jubilee Congress Proceedings, Atlanta, Georgia, May 1979.</u></p>

ALBERT H. BEAUFREIRE Mechanical Engineer

Education	Stevens Institute of Technology (M.E. in 1943) also completed advanced math, aerodynamic and gas dynamic courses at Stevens Institute of Technology and Massachusetts Institute of Technology.
Research Interests	Analysis, aerothermodynamic and mechanical design and the advancement of the technology necessary for improving the efficiency and applicability of turbomachinery, engines, and combustion power and heat recovery systems. Formulating related R&D plans and technical monitoring.
Professional Affiliations	American Society of Mechanical Engineers - Gas Turbine and Coal Utilization Committee
Summary of Experience	Engineering and management responsibility for several large companies (Ford, MW Kellogg and UTC) major tasks and total R&D programs concerning advancing the design and technology of combustion power systems and related components, including: gas turbine and internal combustion engines, combustors, heat exchangers, compressors, pumps, bearings and turbines and the integration in total energy systems aircraft/drones, automotive and rail systems. At Brookhaven completed engineering design and technical monitoring assignments concerning the development of novel hydrogen storage/heat exchanger and electrochemical energy conversion systems and related test facilities. Now investigating advanced combustion and heat recovery systems and assisting in formulating comprehensive research and development program plans for the development of advanced technology necessary for increased fuel efficiency and increased utilization of coal, biomass and other non-premium fuels.
Selected Publications	<p>A. H. Beaufriere, "A Hydrogen-Halogen Energy Storage System for Electric Utility Applications" <u>12th IECEC Conference</u>, Aug. 1977.</p> <p>A. H. Beaufriere, "Hydrogen Storage via Iron-Titanium for a 26 MW_{ce} Peaking Electric Plant", <u>International Journal of Hydrogen Energy</u>, (Jan. 1976).</p> <p>A. H. Beaufriere, "An Exploration of the Automotive Gas Turbine Engine" <u>SAE Journal</u>, (Feb. 1965).</p>

THOMAS A. BUTCHER	Development Engineer
Education	United States Merchant Marine Academy (Bachelor of Science in Marine Engineering, 1975); Stevens Institute of Technology (M.Sc. in Mechanical Engineering, 1978)
Research Interests	Alternate Fossil Fuels in Power Systems; Combustion in Commercial, Industrial, and Utility Scale Applications.
Professional Affiliations	American Society of Mechanical Engineers; The Combustion Institute
Summary of Experience	Served as an engine cadet aboard steam turbine powered merchant ships and obtained U.S. Coast Guard license as Third Assistant Engineer, unlimited horsepower. Performed field test work for performance and emissions of utility size steam generators, oil and coal fired, while employed by Combustion Engineering. Currently involved in the Coal-Oil Mixture Program and recently participated in a study of the atomization characteristics of coal slurries.
Selected Publications	T. A. Butcher, C. R. Krishna, and A. Pucci, "Atomization of Coal Slurry Jets", <u>2nd International Symposium on Coal-Oil Mixtures Combustion, Danvers, Massachusetts, November 27-29, 1979.</u>

MARK A. CATAN	Development Engineer
Education	Grinnell College (B.A. Physics, 1978).
Research Interests	Solar technology, pollution control, cetacean behavior, computer modelling.
Professional Affiliations	Application for membership to International Solar Energy Society has been made.
Summary of Experience	Twenty percent of college credits were earned through independent work emphasizing applied physics topics (measurement of index of refraction of gases, computer modelling of solar systems, holography, philosophy of physics). Developed electrostatic precipitator design as R&D engineer and tested, specified and supervised installation of industrial air curtains as engineer for Dynaforce Corporation, Old Bethpage, New York. Ministered prototype air pollution control experiments for United McGill Corporation. Experience with coal fired boilers, flue gas desulfurization, Kraft paper process - chemical recovery boilers.

ROBERT I. GOLDBERG Chemistry Associate

Education State University of New York at Buffalo (B.A. in Chemistry, 1979).

Research Interests Novel inorganic reagents in organic synthesis, computers' use in structure determination and synthesis, chemistry's effects on society.

Summary of
Experiences Involved with various aspects of organic synthesis at Buffalo, doing research for Dr. P. T. Lansbury in the area of natural products chemistry and novel methods in organic synthesis; at the Weizmann Institute of Science in Israel, selected for an international summer research program, working for Dr. Yehuda Mazur doing synthesis of vitamin D derivatives, studies of reagents on solid media and some computer graphics for structure determination; and at Brookhaven National Laboratory, preparing synthetic inhibitors to human enzymes, hoping to elucidate the mechanisms of some diseases, in a biochemistry group headed by Dr. Elliot Shaw. Recently began in catalysis group at Brookhaven, now studying the mechanism of the water-gas shift reaction.

DONALD W. HUSZAGH Mechanical Engineer

Education B.S.E.E. U.S. Naval Academy 1945

Research Electric, hydraulic, and pneumatic control systems.
Interests Automatic machinery. Man/machine interfacing.
Oceanographic buoys and moorings.

Summary of Worked on new automatic valve development at the Dole
Experience Valve Co. At BNL was project engineer on a radioactive
waste reduction facility, two "hot" cell facilities,,
the H.F.B.R. air lock system, and three oceanographic
buoy systems. Was responsible for the design and imple-
mentation of the system controls on liquid metal processes,
"hot" cells, food irradiators, live blood irradiators,
conveyor systems, air locks, coal mine machinery, auto-
mated medical equipment, and shipboard hydraulic machinery.
Has designed and built a variety of special purpose
machines at BNL, and two patented food processing machines
for the Inmont Corp. Has served as engineering consultant
to the Inmont Corp and to Long Island Oyster Farms Inc.
Most recently has been engaged in the development of
oceanographic research buoys at BNL.

Selected D. Huszagh, W. Ripperger, and S.Fink, "Design, Construction,
Publications and Initial Operation of the BNL-Coastal Transport and
Diffusion, Air/Sea Interaction Research Buoy," BNL 51111,
October 1979.

D.G. Dimmler, D. Huszagh, "A Controllable Real-Time
Data Collection System for Coastal Oceanography,"
OCEAN '76, Washington, DC, Sept. 13-15, 1976.

D. Huszagh and S. Fink, "Operations, Engineering, and
Modification Rework of the M.I.T. (SMILE) Buoy,"
BNL 50547, June 1976.

C. R. KRISHNA	Associate Mechanical Engineer
Education	Indian Institute of Science (M.E. in Internal Combustion Engines, 1961); State University of New York, Stony Brook (Ph.D. from the Dept. of Mechanical Engineering, 1974).
Research Interests	Combustion, Fossil Fuel Utilization.
Professional Affiliations	Combustion Institute
Summary of Experience	Design of aircraft jet engine components, performance analysis of gas turbine systems. Type-testing of accessories. Contribution to an assessment of the role of energy storage power systems in transportation. Assessed safety of metal hydride systems. Contributed to the study of fluid beds. Contributed to the study of coal slurry atomization.
Selected Publications	<p>C. R. Krishna, T. Butcher, and A. Pucci, "Atomization of Coal Slurry Jets", <u>2nd International Symposium on Coal-Oil Mixture Combustion</u>, Danvers, Massachusetts, Nov. 27-29, 1979</p> <p>C. R. Krishna and A. L. Berlad, "A Model for Dust Cloud Auto-Ignition", BNL 25302, Nov. 1978.</p> <p>C. R. Krishna, R. T. Yang, and M. Steinberg, "Fluidized-Bed Coal Combustion with Lime Additives. The phenomenon of peaking of sulfur retention at a certain temperature." <u>I & E.C. (Fund)</u> 16, 465, 1977.</p>

EDWARD A. KUSH, JR. Associate Scientist

Education Polytechnic Institute of Brooklyn (B.S., M.S. in Mechanical Engineering, 1961, 1964); Virginia Polytechnic Institute (Ph.D. in Aerospace Engineering, 1972).

Research Interests Application of thermodynamics, fluid mechanics and heat transfer to energy problems through experiment and analysis especially solar heating and cooling, wind energy, and aerothermochemistry of combustion.

Professional Affiliations American Institute of Aeronautics and Astronautics (AIAA); International Solar Energy Society (ISES).

Summary of Experience Brookhaven National Laboratory - Research on solar heating and cooling systems and their components, particularly solar assisted heat pumps. Responsible for management of DOE solar heat pump program and related solar technologies, including photovoltaic/thermal hybrid systems.

Kaman Corporation - Wind generator studies, solar collector development and system studies, helicopter aerodynamics.

UTRC - Turbulence/laser interactions in chemical and gas dynamic lasers.

General Applied Science Laboratories - Research applied to high speed air breathing propulsion systems, particularly supersonic combustion ramjets - including aerodynamics of inlets and nozzles, aerothermochemistry of combustors. Design and operation of wind tunnel tests, instrumentation and facilities.

Doctoral Dissertation - Decomposition of a Liquid Jet Injected Normal to a Supersonic Airstream

Selected Publications E. A. Kush, "Experimental Performance Study of a Series Solar Heat Pump," International Solar Energy Society Silver Jubilee Congress Proceedings, Atlanta, Georgia, May 1979.

E. A. Kush, "Performance of Heat Pumps at Elevated Evaporating Temperatures - With Application to Solar Input," American Society of Mechanical Engineers Winter Meeting, New York, New York, Paper No. 79-WA/Sol 19, Dec. 1979.

E. A. Kush, "The Series Solar Heat Pump and Energy Conservations," 2nd Miami International Conference on Alternative Energy Sources Proceedings, Miami Beach, Florida, Dec. 1979.

PAUL Le DOUX Design Engineer

Education School of Industrial Arts, New York, N.Y. (H.S. Graduate);
New York Naval Shipyard, Brooklyn, N.Y. (Full-time Engineering
Trainee) completed 800 hours educational program.

Research Design support for energy related programs.
Interests

Summary of Mr. Le Doux has an extensive background in the planning
Experience and design of utility power plants, process plants, research
facilities and heavy mechanized components. He has a good
working knowledge of vessel design, piping systems, manufac-
turing techniques, A.S.M.E. Codes and A.S.T.M. Standards.
He has contributed to the design of such B.N.L. projects as
the HFBR Critical Facility, Chemonuclear Loop, Low Mass
Critical Facility, Pulse Neutron Reactor and The 7-Foot
Bubble Chamber. His other activities included design of
theatrical equipment such as orchestra lifts, hoists,
turntables, rigging systems, etc. for theatres of Lincoln
Center and J.F.K. Center of the Performing Arts.

ARNOLD J. LOSI Design Engineer

Education Brooklyn Tech H.S. (H.S. Graduate)
 (Various inhouse design training programs)

Research Large scale research facilities design
Interests

Summary of Mr. A.J. Losi has an extensive background and field experience
Experience of over 35 years of consulting, planning, and design in
 utility power, chemical process plants, oil refineries, paper
 mills, and reactor facilities, such as our on-site H.F.B.R.,
 The Con Edison Indian Point Reactor and others. He has a
 good working knowledge of power and hydraulic piping systems
 and has performed this work within the requirements of A.S.T.M.
 Standards and A.S.M.E. Codes. Recent experience includes a coal
 hydrocracking research facility, metal hydride electrical
 energy storage systems and the updating of our on-site H.F.B.R. .
 from 40 megawatt to 60 megawatt capacity.

STANLEY J. MAJESKI Sr. Design Engineer

Education Brooklyn Technical High School, Brooklyn, N.Y. 1938-42
U.S. Army - Technical Training 1943 (Student)
U.S. Army - Technical Training 1944 (Instructor)
Pratt Institute Brooklyn, N.Y. 1946 - 50 (C.E., Certif.)

Research R & D in energy related programs particularly
Interests alternate sources.

Professional American Men of Science
Affiliation

Summary of Mr. Majeski has an extensive background of over 30 years
Experience of consulting, planning and design including estimating,
specification writing and liaison experience with customers,
vendors and fabricators.
He has experience with the following codes: AISC, ACI,
ASME B & PV Code, API, TEMA, ASNT, numerous RDT and OSHA
standards and regulations as well as other industry and
manufacturers standards.
His past experience included responsibility for coordinating
the layout and installation of all reactor compartment
equipment and piping systems on the first nuclear submarine.
His knowledge and experience often result in requests
for assistance on matters of safety, materials and
equipment selection by DEE, DNE, and other departments.
In addition to supervising the efforts of the Engineering
Design Group, he is also involved in the preparation of
conceptual designs and graphics used in numerous Lab-
oratory proposals and reports.

Selected L.G. Epel, S.J. Majeski, D.G. Schweitzer and T.V. Sheehan
Publications "Preliminary Design Study of a Large Scale Graphite
Oxidation Loop," BNL NUREG 51054, Aug. 1979.

J.A. Fillo, et al. "Hydrogen Production From Fusion
Reactors Coupled With High Temperature Electrolysis, "
DOE BNL 24625, 1978.

J.R. Powell et al. "Preliminary Reference Design of a
Fusion Reactor Blanket Exhibiting Very Low Residual
Radioactivity," BNL 19565 Dec. 1974.

PAUL MARNELL	Associate Chemical Engineer
Education	City College of New York (B.Ch.E., 1956) Union College (M.S., 1961), Columbia University (Eng.Sc.D., 1973).
Research Interests	Coal utilization in industrial combustion; coal gasification; biomass fuels and chemical processes.
Professional Affiliations	Project Management Institute
Summary of Experience	Responsible for the oil shale development and coal gasification programs (interim basis) of the U.S. operation of the Lurgi Company. Project manager of several process plant projects. Consultant to various industrial and financial institutions on energy and environmental matters, such as geothermal energy development, heavy water separation technology, and coal gasification state-of-the-art. Manager of mechanical engineering for Technik Inc., and was responsible for the technical and financial management and client liaison of numerous research and development projects, such as random vibration and hypervelocity impact damage. Senior engineer with the Stone and Webster Corporation having responsibility for various system analyses related to PWR's.
Selected Publications	<p>P. Marnell, "The Lurgi/Ruhrgas Process", Chapter in <u>Synthetic Fuel Processing</u>, Marcel Dekker, 1977.</p> <p>P. Marnell, "Solvent Recovery in a Modern Rotogravure Printing Plant", <u>EPA Conference on the Environmental Aspect of Chemical Use in Printing Operations</u>, King of Prussia, PA, 1975.</p>

PHILIP D. METZ	Development Engineer II
Education	State University of New York at Buffalo (B.S. in Physics, 1972); Rutgers University (Ph.D. in Physics, 1978).
Research Interests	Solar Energy; Storage for Solar Heating Systems; Ground Coupled Solar Heat Pump Systems; Photovoltaics
Professional Affiliations	American Physical Society, International Solar Energy Society
Summary of Experience	Presently the principal investigator and co-proposer of the Solar Ground Coupling Research Program at BNL, and technical monitor of ground coupling research for the U. S. Department of Energy. Dr. Metz has written an increasingly widely used digital computer program called GROCS which models ground coupling devices and has created several energy-related inventions, on one of which BNL has applied for a U. S. patent. Recently, he was a Storage for Electric Heat Pump Combinations Panelist and State of the Art Speaker at the Solar Energy Storage Options Workshop in San Antonio, Texas (March 1979) and has written a draft section on Ground Coupled Storage for a Thermal Storage Chapter of the 1981 ASHRAE Handbook of Fundamentals.
Selected Publications	<p>P. D. Metz, "Experimental Results From the First Year of Operation of the Solar Ground Coupling Research Facility at Brookhaven National Laboratory," BNL 27137, Dec. 1979.</p> <p>P. D. Metz, E. A. Kush, J. W. Andrews, "The Use of Earth Coupling in Solar Assisted Heat Pumps," <u>Nordic Symposium on Earth Heat Pump Systems Proceedings, Göteborg, Sweden, Oct. 15-16, 1979.</u></p> <p>P. D. Metz, "Experimental Results from the Solar Ground Coupling Research Facility at Brookhaven National Laboratory," <u>International Solar Energy Society Silver Jubilee Congress Proceedings, Atlanta, Georgia, May 1979.</u></p>

WESLEY G. RIPPERGER	Design Engineer
Education	State University of New York at Plattsburg 1947-1951
Research Interests	Research equipment and techniques for atmospheric and oceanographic pollution control.
Summary of Experience	Involved in the design of the High Intensity Radiation Lab (HIRDL) which included preliminary layout of building, cells and design of all mechanical equipment required for operation of the facility. Designed and coordinated construction of food irradiators, shipping casks and conveyors. Designed fluid and neutron irradiators, research equipment for BNL Medical Department. Designed buoys and equipment for off-shore oceanography and meteorology research, including aircraft components for pollution studies.
Selected Publications	D. Huszagh, W. Ripperger, and S. Fink, "Design, Construction, and Initial Operation of the BNL-Coastal Transport and Diffusion, Air/Sea Interaction Research Buoy," BNL 51111, October 1979.

PEGGY ROSADO

Co-op Engineer

Education

City College of N. Y. (Degree objective: B.Ch.E.); N.Y.C.
Community College (Degree: Associate in Science).

Research Interests

Safe and efficient use of coal and alternate sources for
energy production.

Professional
Affiliations

Member of AIChE - Student Chapter

Summary of
Experience

Worked with Dept. of Nuclear Energy at Brookhaven National
Laboratory on the Fission Products Project. My duties
were to run experiments simulating a core heat-up accident
using activated triso coated $^{235}\text{UO}_2$ pellets in a quartz
reactor, to analyze the chemical state of the fission prod-
ucts so released, and to graph deposition profiles of those
species. Contributions were made to several quarterly re-
ports to the Department of Energy.

HENRY P. SERRY

Development Chemical Engineer

Education

George Washington University (worked 2 years towards a B.S. in Chemistry, 1973-75); Howard University (B.S. in Chemical Engineering, 1978); currently working on M.Sc. in Material Science and Engineering at State University of New York, Stony Brook (expected time of graduation 1981).

Research Interests

Energy Systems Analysis, Combustion, Polymers

Professional
Affiliations

American Institute of Chemical Engineers, AIChE; National Engineering Honor Society, Tau Beta Pi

Committees

Laboratory Safety Committee

Summary of
Experience

Worked three years (on a part-time basis) for the Frito-Lay Co. and during this period contributed to the development of analytical techniques for the determination of several components in potato chips and corn chips e.g., moisture content, oil content, etc. Experience with energy systems analysis was gained at BNL as a result of summer employment in my junior year.

Selected
Publications

H. P. Serry, R. Lesse, J. Karkheck, and R. Tessmer, "Engineering Data Base for District Heating Pipe System Design", BNL 51097, September 1979.

H. P. Serry and H. Davitian, "Use of Carry-Over Grain Stocks as a Supplement During Emergencies", BNL 51050, August 1979.

H. P. Serry, "Underground Piping Systems for District Heating with Particular Application to Geothermal District Heating in Utah", BNL 25494, September 1978.

WILLIAM A. SLEGEIR Assistant Scientist

Education Drexel University (B.Sc. in Chemistry, 1971); Drexel University (M.Sc. in Organic Chemistry, 1972); University of Texas (Ph.D. in Organometallic Chemistry, 1979).

Research Interests Homogeneous and heterogeneous catalysis; catalytic reaction mechanisms; organometallic chemistry; coal gasification and/or liquefaction.

Professional Affiliations American Chemical Society

Summary of Experience Experience in various aspects of organic, inorganic and organometallic chemistry, including synthesis, characterization, kinetics and mechanistic studies, and in particular, the study of orbital symmetry rules for organometallic and catalytic reactions. Recently involved in the study and development of catalytic reactions, including highly active homogeneous water gas shift catalysts, highly selective hydroformylation catalysts and the use of carbon monoxide and water in place of hydrogen in the reduction of organic molecules.

Selected Publications W. A. Slegeir, "Homogeneous Catalysis with Ruthenium Carbonyl Complexes", Ph.D. Dissertation, The University of Texas, 1979.

W. A. Slegeir, R. Pettit, K. Cann, T. Cole, and C. H. Mauldin, "Catalytic Reductions Using Carbon Monoxide and Water in Place of Hydrogen", Advances in Chemistry Series, 173, 121 (1979).

W. A. Slegeir, K. Cann, T. Cole, and R. Pettit, "Catalytic Reductions Using Carbon Monoxide and Water in Place of Hydrogen: Reduction of Aromatic Nitro Compounds to Amines", Journal of the American Chemical Society, 100, 3969 (1978).

CHARLES H. WAIDE	Chemical Engineer
Education	Polytechnic Institute of Brooklyn (Bachelor of Chemical Engineering, 1952); Graduate studies in various disciplines.
Research Interests	Alternate fuels combustion, combustor development, fluid-bed combustion. Transportation application of alternate fuels and hydrogen storage devices, program development and implementation, environment.
Professional Affiliations	American Association for the Advancement of Science American Institute of Chemical Engineers American Nuclear Society Combustion Institute
Summary of Experience	Mr. Waide has functioned as a chemical engineer on the staff of Brookhaven National Laboratory for more than twenty years serving in a variety of roles as project engineer, project manager and supervisor. Current responsibilities include the coordination of fossil technology project for the department and supervision of the work of the Fossil Technology Group. Technical areas of particular interest are fossil fuel combustion and techniques for the desulfurization of high temperature combustion gases. Earlier work in this general area dealt with the development of remote, pumpable roof bolting system for coal-mine roof support and the development of a process for the treatment of acid mine-drainage. He has contributed to the development and evaluation of hydrogen storage systems for use in transportation applications. He has been responsible for a number of projects in the field of nuclear reactor development and chemical-radiation processing for the production of chemicals.
Selected Publications	<p>C. H. Waide, "Energy Storage Systems for Automobile Propulsion: 1978 Study", UCRL-52553 VI&2, (Hydrogen Storage Application Sections) (Dec. 15, 1978).</p> <p>C. H. Waide, "Pumpable Rockbolt Method", Patent #3,930,639, assigned to U. S. Department of Energy, Jan. 6, 1976.</p> <p>C. H. Waide, K. C. Hoffman, J. J. Reilly, F. J. Salzano, R. H. Wiswall, and W. E. Winsche, "Metal Hydride Storage for Mobile and Stationary Applications" <u>Japan-U.S. Seminar on Hydrogen Energy, Tokyo, Japan, July 21-23, 1975.</u></p>

WILLIAM G. WILHELM Development Engineer

Education Adelphi University (B.S. in Physics, 1969).

Research Interests Energy Conversion Applications

Summary of Development Engineer - Bubble Chamber Group, Electronic
Experience Instrumentation and System Design

Manager, Deputy in Charge of Operations - 80 Inch Bubble
Chamber and 7 Foot Bubble Chamber

Development Engineer - Microprocessor System Development,
Accelerator Department

Development Engineer - Instrumentation and Controls, and
Computer Interface, Solar Group

Principal Investigator - Low Cost Solar Collector Devel-
opment, Solar Group

CONSERVATION PROGRAM MANAGEMENT GROUP

G. DENNEHY

HOMAYOUN T. GHAFARI Development Engineer

Education University of Kansas (B.S. in Mechanical Engineering, 1972); University of Missouri (M.S. in Mechanical Engineering, 1974); University of Illinois (M.S. in Thermal Sciences, Mechanical Engineering, 1977).

Research Interests Thermal Energy System Analysis; Energy Conservation and Optimization Methods; Multiphase Flow Systems; Alternative Fuels: Solar Utilization, Coal Gasification and Liquefaction, Biomass; Combustion Systems Analysis; Thermal Environmental Conditioning.

Professional Affiliations International Solar Energy Society; The Combustion Institute; American Society of Mechanical Engineers; American Society of Heating, Refrigeration and Air-Conditioning Engineers; Solar Energy Industries Association.

Summary of Experience Developed and designed fossil-fuel power plants in relation to circulation water system; pipe design, total plant design, and utility rate analysis at Lutz, Daily and Brain Consulting Engineers. Investigated and modified methods of coal gasification and liquefaction in affiliation with ERDA and the office of energy research at the University of Illinois. Researched to analyze and survey the transfer of pulverized coal with the "particle deposition in turbulent shear flows" analytical approach at the Environmental Research Center of the University of Illinois. Obtained the exact solutions to simultaneous, transient heat and mass transfer of various boundary conditions with numerical analytical computer programming at the Georgia Institute of Technology. Performed research to analyze and survey methods of energy conservation in industrial processes. Experimented and simulated for optimization of heat generating components at Engineering Experiment Station of Georgia Institute of Technology.

Selected Publications H. T. Ghaffari, "Utilization of Solar Energy for Heating and Cooling of Buildings," M. S. Thesis, University of Missouri, May 1974.

H. T. Ghaffari and J. J. Stukle, "Coal Gasification and Liquefaction Processes," Project Report to ERDA, University of Illinois, 1976.

H. T. Ghaffari and W. S. Bulpitt, "Circulation Fireplace Combustion Efficiency Studies," Final Report to DOE, Engineering Experimental Station, Georgia Institute of Technology, 1979.

ANTHONY S. HENDRICK	Development Engineer
Education	Rensselaer Polytechnic Institute (Bachelor of Mechanical Engineering, 1956); Harvard University (Master of Business Administration, 1961).
Research Interests	Energy conservation in buildings using control systems; solar energy; energy transmission and transportation. Industrial market research; market forecasts and commercialization; research and development program planning.
Professional Affiliations	Tau Beta Pi, Pi Tau Sigma, ASHRAE; Listed in Who's Who in Finance and Industry.
Committees	Member ASHRAE--Building Control Systems.
Summary of Experience	Currently responsible for planning and direction of research, development, and demonstration programs involving control systems for buildings. At BNL since October 1977. Earlier positions at FCC, Western Union, General Electric, IBM and as an independent consultant. Author of numerous technical and business books. Experience includes responsible technical and managerial positions in the functional areas of industrial marketing, product development and manufacturing as applied to the product/market areas of data/telecommunications, computer peripherals, medical electronics and large electric equipment. Inventor of composite silver-stainless steel cardiac pacemaker electrode.
Selected Publications	<p>A. S. Hendrick, "Monitoring and Control/HVAC Progress--Energy Management Systems Cut Energy Costs," <u>Building Energy Progress</u>, Vol. 1, No. 2, 16-17, (May/June 1979).</p> <p>A. S. Hendrick, "Control and Monitoring Systems for Energy Conservation in Buildings: New Business Opportunities," <u>Proceedings of Energy Magazine's Second Annual International Conference on Energy</u>, Washington, D. C., November 30-December 1, 1978.</p> <p>A. S. Hendrick, "Magnetic Recording Equipment and Tapes--1977 to 1985. Consumer Markets: Audio, Video, Computer," published jointly by Find/SVP and BCC Inc., October 1977.</p>

ANDREW W. JACKSON

Program Liaison Office

Education

American University (B.S., 1957).

Summary of
Experience

Technical Coordinator, (Head, Program Liaison Office, Washington, D. C.). Serve as BNL liaison with DOE on hydrogen program and various conservation programs. Experience prior to joining BNL included service as the Special Assistant to the Chairman of the Atomic Energy Commission (Schlesinger); Acting Controller of the Nuclear Regulatory Commission during its formative stages; Executive Officer of the AEC/NASA space nuclear program during the period when the SNAP-27 nuclear generators were developed and successfully operated on the moon as part of five of the Apollo missions; and Executive Officer of the AEC/DOD Army Reactors Program which developed small nuclear electrical power plants for Army, Navy, and Air Force use at remote locations.

RALPH F. JONES

Architect

Education

Pratt Institute, School of Architecture; Brooklyn Polytech, Structural Analysis; Hofstra University, Cert. Prof. in OSHA; Colorado State University, Solar Engineering.

Research Interests

Natural Thermal Storage in Passive Solar Design; Innovative Residential Construction Techniques; Thermal Performance Evaluation of Energy Conserving Architecture.

Professional Affiliations

Registered Architect: New York, 1958; New Jersey, 1968; Maryland, 1962; NCARB Cert. (National Licensure), 1965; Prof. Eng., Virgin Islands, 1963. Member of the American Institute of Architects, New York State Association of Architects, L. I. Society Chapter, AIA, International Solar Energy Society, American Wing, New England Solar Energy Association. Listed in Profile Architectural Firms, AIA.

Committees

Committee on Program Area Plan for Performance Evaluation of Passive/Hybrid Solar Heating & Cooling System, DOE--SERI.

Summary of Experience

Responsible for design and construction of large nuclear facilities at Indian Point, Oak Ridge, and Cornell University, also several mass housing projects in underdeveloped countries designing and utilizing appropriate innovative technology such as the "Cinva Ram" stabilized earth block machine. Designed and built first "Heat of Light" concept office building using fixture heat to temper heat pump. At BNL, in Solar Technology Transfer Program, provided technical assistance to architects and engineers in various solar projects. As Program Manager, in the Conservation Program Management Group, is responsible for the Brownell Residence Case Study, the Brookhaven House project (utilizing natural thermal storage), and several other on-going case studies of innovative residential design.

Selected Publications

R. F. Jones, R. F. Krajewski, G. Dennehy, "Case Study of the Brownell Low Energy Requirement House," BNL 50968, May 1979.

R. F. Jones, R. F. Krajewski, G. Dennehy, "Thermal Storage Analysis of the Brownell Low Energy Requirement House," Proceedings of the Solar Energy Storage Options, San Antonio, Texas, March 1979.

RICHARD F. KRAJEWSKI Development Engineer

Education Polytechnic Institute of Brooklyn (Bachelor of Mechanical Engineering, 1960); Polytechnic Institute of New York (Master of Science, Mechanical Engineering, 1974).

Research Interests Residential Energy Conservation; Residential Solar Applications, Space Conditioning, Human Comfort Criteria, Alternate Energy Sources.

Professional Affiliations Licensed Professional Engineer in New York State, New York State Society of Professional Engineers, American Society of Testing and Materials.

Summary of Experience Diverse experience in a number of industries including consulting, planning, management, design, and evaluation at both the administrative and technical levels. Shared in the successful design, development and evaluation of a broad range of equipments and systems in the military, aerospace, power, and food processing industries and has performed technical and administrative liaison functions in the interaction between related industrial and governmental activities.

Recent experience includes consulting services and management of programs in energy conservation for commercial and residential buildings, the food processing industry and heavy manufacturing industry, including program sales and initiation, preliminary and detailed energy surveys for individual recommendations, report preparation and findings presentations.

Mr. Krajewski has been involved with a number of power and energy conservation consulting organizations, both independent and corporate subdivision and is presently managing a program for performance testing of oil- and gas-fired residential heating equipment at Brookhaven National Laboratory.

Selected Publications R. F. Jones, R. F. Krajewski, G. Dennehy, "Case Study of the Brownell Low Energy Requirement House," BNL 50968, May 1979.

R. F. Jones, R. F. Krajewski, G. Dennehy, "Thermal Storage Analysis of Brownell Low Energy Requirement House," Proceedings of the Solar Energy Storage Options, San Antonio, Texas, March 1979.

ROGER J. MCDONALD

Development Engineer

Education

State University of New York at Stony Brook (Bachelor of Engineering, Mechanical Engineering, 1977); State University of New York at Stony Brook, presently pursuing a Masters of Science Degree in Mechanical Engineering.

Research Interests

Energy conservation in industrial and residential boiler equipment; environmental impact studies of combustion systems; coal utilization projects.

Professional Affiliations

Associate member of the American Society of Mechanical Engineers.

Summary of Experience

Present research involves energy conservation analysis of oil-fired residential heating equipment. Development work is in progress to expand program scope to include natural gas testing and fundamental combustion research. This to include detailed emissions analysis studies.

Selected Publications

J. E. Batey, T. W. Allen, R. J. McDonald, R. J. Hoppe, F. J. Salzano, and A. L. Berlad, "Direct Measurement of the Overall Efficiency and Annual Fuel Consumption of Residential Oil-Fired Boilers," BNL 50853, January 1978.

J. E. Batey, R. J. Hoppe, A. L. Berlad, T. W. Allen, and R. J. McDonald, "Annual Fuel Use and Efficiency Reference Manual, Hydronic Equipment," BNL 50816, December 1977.

J. E. Batey, R. J. McDonald, and R. J. Hoppe, "Reduction of Residential Fuel Oil Consumption by Vent Dampers," BNL 26467, May 1979.

JULIUS S. MILAU	Development Engineer
Education	Polytechnic Institute of Brooklyn (Bachelor of Chemical Engineering, 1950).
Research Interests	Coal-fired solid fuel IC engines. Particulate separation from coal gasification. Coal-fired turbines.
Summary of Experience	Pilot plant and development lab scale production of anti-histamines, acetylenic alcohols and operation of acetylene scrubbers. Project engineer for an in-pile liquid metal loop which required unique instrumentation such as valves, flow meters, remote sampler and an iron deposition gauge. Operations supervision of the High Intensity Radiation Development Laboratory. Responsible for design of shielded casks for shipping as well as remote handling and machining. Designed and fabricated a metal hydride experiment to measure long-term effects of cycling on particle attrition, pressure drop, poisons and kinetics.
Selected Publications	<p>J. Powell, F. J. Salzano, W. S. Yu, and J. S. Milau, "A High Efficiency Power Cycle Using Hydrogen Compressed by Absorption in Metal Hydrides," BNL 20107, 1975.</p> <p>P. Bezler and J. S. Milau, "Safety Analysis Report on Packaging Evaluation of HFBR Fuel Shipping Cask versus Requirements of ERDA 0529," BNL 20538, July 1974.</p>

LAWRENCE M. WOODWORTH Development Engineer

Education Union College (Bachelor of Science in Civil Engineering, 1966); C. W. Post (Graduate courses in Economics and Law); Professional Engineer, State of New York.

Research Interests Energy conservation in buildings; combustion research; burner-boiler/furnace development for gas and oil.

Professional Affiliations American Society of Professional Engineers.

Committees Gas Research Institute Advisory Committee.

Summary of Experience Responsible for controlling the research, development, and demonstration of advanced oil and gas burners, boilers, and furnaces. Mr. Woodworth was Executive Vice President of Tymponic Corporation where he developed the ultrasonic reactor which emulsified fuel oil and water for reduction of fuel consumption. He also supervised the development of a pilot plant for manufacturing of coal-water-oil slurries. He was Project Manager/Engineer for Rentor Plaza, and responsible for the development and execution of a \$50-million commercial and industrial complex, the largest in the world. Prior to that, he was a management assistant/engineer for Howard Needles, Tammen, and Bergendoff and responsible for financial control and analysis of projects under a senior partner's direction.