



910 CLOPPER ROAD
GAITHERSBURG, MARYLAND 20878
(301) 256-8000

CD-QA-84-081
August 9, 1984

Mr. Dennis Crutchfield
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

50-382

Dear Mr. Crutchfield:

Attached are the resumes for the NUS personnel that have been involved to-date with the Pre-licensing Issues Task Force Support Group. For personnel who are certified as inspectors, we are enclosing their inspector certifications. Likewise, for personnel certified as lead auditors, we are also enclosing their auditor certifications.

The resumes provided are divided into three categories. The first category is personnel assigned to the review of the issues raised in the June 13 letter from Mr. Darrell Eisenhut, to Mr. J. M. Cain. These personnel are reviewing the background of the issues, developing procedures to be used in validating the responses being developed by LP&L, and determining what confirmatory investigations are required. Second category of personnel are those assigned to the review of documentation, conducted in accordance with approved procedures. The final category of personnel are those involved in performing inspections.

We are preparing a letter to you that will provide details of the functions of the Task Force Support Group and the specific assignments of the personnel on-site. We should have that letter to you by early next week.

If I can be of further service to you, or if you have any questions, feel free to call me at (504) 467-8211, ext. 3722.

Sincerely,

P. V. Judd for

P. V. Judd
Project Manager
Pre-licensing Issues Task
Force Support Group

SAB/clb

Attachments

Boo1
1/1

PERSONNEL ASSIGNED TO THE REVIEW OF ISSUES

1. T. M. Boyd
2. S. A. Byers
3. M. R. Deane
4. A. C. D'Hoostelaere
5. I. B. Ferrer
6. C. W. Hawley
7. T. W. Horner
8. P. V. Judd
9. S. Katsenelenbogen
10. V. J. Kysliger
11. S. K. Malur
12. D. J. McGuigan
13. T. F. Mulgrew
14. B. N. Naft
15. B. S. Nanda
16. W. P. Purcell
17. M. J. P. Senasack
18. T. C. Smith
19. F. T. Stetson
20. F. R. Vaughan
21. E. A. Vissing
22. R. D. Wilder
23. H. J. Eckert
24. T. C. Hartman
25. W. D. Lindley
26. J. A. Nemes

THOMAS M. BOYD

EDUCATION

State University of New York, B.A., Business, 1976
U.S. Naval Nuclear Power School at Union Collage and Knolls Atomic Power Laboratory

EXPERIENCE

NUS CORPORATION, 1981-Present
New York State Energy Office, 1980-1981
Burns & Roe, Inc., 1976-1980
Electric Boat Co., 1972-1976
Shore Memorial Hospital, 1970-1972
U.S. Navy, 1948-1970

NUS — Serves as staff engineer on the FSAR update project for Brunswick Units 1 and 2 (BWR) and H. B. Robinson Unit 2 (PWR) nuclear power plants.

NYS Energy Office — As senior nuclear safety specialist, reviewed, analyzed, and prepared recommendations on safety-related components, systems, technical specifications, and operating, maintenance, and testing procedures for the five operating nuclear power plants and two units under construction in the State of New York. Provided evaluations and technical advice for the legal staff to use when participating in NRC hearings for nuclear plant operating licenses.

Burns & Roe — As senior operating/test engineer, developed system descriptions and procedures for preoperational startup tests, operating and maintenance procedures, and the startup and commissioning of plant equipment, controls, and components for nuclear and fossil-fueled utility plants. Projects included the 300-MW Winyah 2 coal-fired generating station with flue gas scrubber, the 1140-MW Forked River PWR nuclear generating station, and the 600-MW Oyster Creek BWR nuclear generating station off-gas waste treatment system.

In support of the Three Mile Island Unit 2 recovery effort, prepared test procedures and supervised testing of the EPICOR II radwaste treatment system, ventilation systems, and emergency diesel electric generation and power distribution systems.

As senior operations engineer on the Clinch River Breeder Reactor Task Force, evaluated the plant operation, maintenance, and test base to ensure that measures to minimize the potential for sodium/water reaction were incorporated in the design.

Electric Boat — As senior test engineer at the Submarine Nuclear Power Plant Prototype (S8G), prepared, reviewed, and implemented documents for test and startup of mechanical systems and components, such as centrifugal and positive displacement pumps, control valves, fluid, steam and electrical power, and control systems. Supervised and instructed craft personnel in equipment, system, and plant startup, and evaluated test/startup data.

Shore Memorial Hospital — Responsible for the operation and maintenance of the hospital's physical plant, including high- and low-pressure boilers, emergency diesel generators, HVAC systems, and buildings and grounds. Directed the safety and fire protection programs to ensure compliance with OSHA standards.

U.S. Navy — Was LDO-ENC instructor, Submarine School and Naval Officer and Chief Petty Officer in the engineering departments of diesel electric and nuclear powered submarines.

THOMAS M. BOYD
Page Two

Assignments included testing and maintenance at the G.E. SIR Seawolf prototype at West Milton, New York, Westinghouse S5W PWR plants, and various other shipboard and shore engineering related duties.

MEMBERSHIP

American Nuclear Society

STEPHEN A. BYERS

EDUCATION

University of Tennessee, B.S. Electrical Engineering, 1970

EXPERIENCE

NUS CORPORATION, 1980-Present
Tennessee Valley Authority, 1973-1980
Southern Company Services, 1970-1973

NUS - As Manager of Quality Assurance (QA) Services, is responsible for managing the efforts of personnel involved in quality assurance consulting and in the development of quality assurance programs for government, industrial, and utility clients. Responsible for interfacing with clients to coordinate contractual matters, for providing personnel and services required, and for monitoring project performance. Serves as project manager on major projects. Provides consulting services related to management controls and quality assurance.

As Manager of Quality Assurance for the NUS Superfund Division, which is involved in hazardous waste investigation and remedial design, responsibilities included development, implementation, and monitoring of the division quality assurance program and related procedures. Provided consultation on problems encountered, and performed audits of the programs implemented. Activities of the division are being performed under contract to the U.S. Environmental Protection Agency (EPA) and are in a broad variety of categories. Typical assignments involved investigation of hazardous waste sites, review of the design of remedial action, coordination with the EPA and other agencies, and providing broad support to EPA activities. Primary purpose of the quality assurance efforts is to maintain the evidentiary value of data and to ensure the integrity of project activities.

As Manager of Quality Assurance Programs, developed QA programs for industrial, utility, and government clients. Also participated in marketing activities, conducted marketing studies, and developed business plans. Served as project manager in a variety of domestic and international projects for utilities, industries, and governments. Was involved in reviewing quality activities of various clients and their vendors. These activities included equipment qualification programs, nuclear weapons, transit systems, and operational nuclear facilities. Also developed quality assurance programs and supporting procedures.

Previously was supervisor of a group of quality assurance engineering personnel involved in the review and evaluation of vendor QA programs and documentation supplied to the client utility. Participated in an ongoing review of operational quality assurance practices of power plants. Served as project manager for various projects related to management consulting, quality assurance program development, program evaluation, QA and management audits, procedure preparation, and personnel training. Developed program procedures for implementation of ANSI/ASME NQA-1, ANSI N45.2, 10 CFR 50, Appendix B, and other standards. Other typical assignments have included quality assurance audits and management evaluations, safety analysis report reviews, review of plant startup programs, preparation of reports, and generation and coordination of procedures, and providing training in quality assurance activities.

STEPHEN A. BYERS

Page Two

Tennessee Valley Authority - As supervisor of an engineering unit at a nuclear plant under construction, was responsible for ensuring that plant quality assurance and quality control activities were conducted in accordance with design and regulatory requirements, and for serving as the plant's interface with Nuclear Regulatory Commission personnel. Was responsible for procurement and quality control of permanent material, served as technical expert on computer programming and operations related to heavy construction (cable pulling, inspection documentation, management information, etc.) and was responsible for supervision of up to 110 engineering and inspection personnel.

Determined documentation requirements to comply with regulations and procedures. Developed and implemented plans and procedures related to indexing, storage, and turn-over of quality assurance records, implementing regulatory requirements, and various management activities. Prepared recommendations for and implemented word processing and computer systems. Directed the preparation of a technical and quality assurance training program for plant and inspection personnel.

Served as group leader of electrical engineering group. Was responsible for cable installation, installation of conduit and cable tray systems, equipment testing, preparation of quality control procedures, project planning, inspection and maintenance of electrical equipment. Was heavily involved in the design and implementation of computer programs required for cable and raceway installation and documentation.

As an electrical design engineer for the design of nuclear power plants, was responsible for the design of electrical features in various plant buildings. Duties included development of design criteria, detailed design, design review, and project planning. Reviewed, prepared, directed, and implemented design criteria and engineering procedures. Directed the efforts of designers and engineers.

Southern Company Services - As electrical design engineer, assigned to the design of Hatch Nuclear Plant for the Georgia Power Company, had primary electrical design responsibility for the control building. Design included electrical equipment, conduit and cable tray systems, and control panels. Directed the efforts of several engineers and draftsmen.

MEMBERSHIPS:

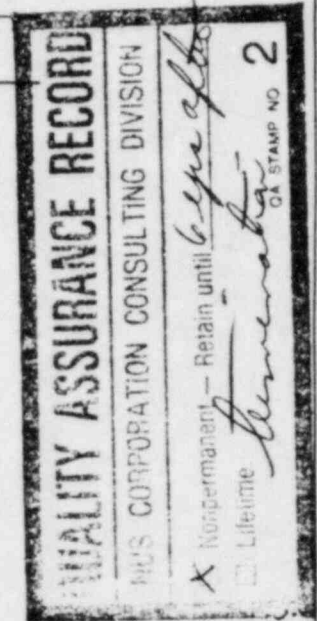
American Management Association
American Society for Quality Control
American Society of Mechanical Engineers
ASME Standard NQA-1 Task Group
Institute of Electrical and Electronics Engineers

Quality Assurance Certificate

This is to certify that Stephen A. Byers has successfully completed the Requirements of Consulting Division Procedures for "Qualification & Certification of Quality Assurance Personnel" for the following level and classification:

Qualifications Lead Auditor per ANSI N 45.2.23

Discipline QA Programs & Program Implementation
Engineering, Electrical



[Signature]
Quality Assurance Administrator
Consulting Division

Certification Date February 28, 1984

Expiration Date February 28, 1985

B. Noft

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Stephen A. Byers

ACTIVITY QUALIFIED TO PERFORM Quality Assurance Inspector. Electrical & Control Inspection & Data Evaluation

LEVEL OF CAPABILITY III

EFFECTIVE PERIOD OF CERTIFICATION 7/2/84 to 10/1/86

NUS DEPARTMENT MANAGER B. L. Buteau *B. L. Buteau*

BASIS FOR CERTIFICATION B. S. Electrical Engineering +
13 years Commercial Nuclear Power

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

QA SERVICES

JUL 13 1984

INITIAL CERTIFICATION 7/2/84

EXPIRATION 10/1/86

RE-CERTIFICATION

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MICHAEL R. DEANE

EDUCATION

Wayne State University
Naval Nuclear Power School
Naval Nuclear Prototype Training Unit

EXPERIENCE

NUS CORPORATION, 1977-Present
U.S. Navy, 1970-1977

NUS — Is presently assigned to Licensing Information Service (LIS) Program. Current responsibilities include monitoring Nuclear Regulatory Commission (NRC) concerns for approximately 70 domestic and overseas nuclear firms, responding to LIS client requests for licensing information such as regulatory interpretations, guidance and previous utility experience via NRC/industry data and personal contacts, developing and coordinating publication of the LIS information volumes, and coordinating publication of the biweekly newsletter, *LISTEN*. Supervises personnel in support of these activities.

Coauthors the LIS "Status Report on Selected Safety and Regulatory Issues" that is prepared semiquarterly for the NUS Japanese affiliate, JANUS. Preparation of this report requires survey of public reports, examination of nuclear plant docket files and personal contact with cognizant industry and NRC officials on various topics.

Assisted in the preparation, schedule, and conduct of the LIS licensing seminar, "Introduction to the Licensing Process." The seminar, intended for entry-level nuclear support personnel, focuses on basic regulations, functions of various guidance and informational documents, the basic licensing process, and operational licensing. Presentations have been conducted in both regional (multicompany representation) and in-house (at one company's office) formats.

Has been responsible for categorizing NRC questions and utility responses, and performing quality assurance checks for the thirteen volumes of licensing information provided to LIS clients. Has participated in the Carolina Power & Light Co. final safety analysis report (FSAR) update project. Tasks included assignment to corporate headquarters for review and retrieval of applicable documentation, review and classification of documents retrieved, and writing several sections of the revised FSAR.

U.S. Navy — Received training as nuclear machinist in both classroom and operational phases. Was assigned as an instructor at a naval prototype for period of 2½ years. Duties included classroom instruction of mechanical principles and systems, systems interactions, and reactor plant operations. In-plant duties included instruction of students in principles of safety plant operation and maintaining personal qualification and proficiency in plant operation and maintenance. Was next assigned to USS *Batfish* (SSN-681), a nuclear-powered fast-attack submarine. While assigned, attained qualification on senior mechanical watchstation. Duties included scheduling and performance of maintenance, operation of plant, maintenance of operating records, and training of subordinates. Ended enlistment aboard USS *Batfish*.

ALFONS C. D'HOOSTELAERE

EDUCATION

University of Detroit, B.E.E., Electrical Engineering, 1951

EXPERIENCE

NUS CORPORATION, 1973-Present
Fairchild Industries, 1972-1973
General Electric Company, 1951-1971

NUS - As an executive engineer, provides senior technical consultation in the areas of quality assurance, equipment qualification, and management and information systems to clients and internal organizations. Performs management evaluations and audits, determines quality assurance requirements and establishes programs to meet those requirements, evaluates test programs, and performs vendor evaluations and audits.

Previously directed the activities of the Laboratory Services, Technical Support, and Qualification Test Departments and the Southern Operations Quality Assurance group. Provided model shop manufacturing, drafting and test services to internal NUS and external clients. Developed test programs, prepared test specifications and plans, and selected and procured appropriate test equipment and associated instrumentation.

As assistant manager, Management Systems, directed activities related to management information systems, office automation, records management, and quality assurance; and provided consultation to clients in these areas. Developed quality-assurance programs and prepared quality-assurance plans and implementing procedures for utility and industrial clients. Prepared procedures for quality assurance, engineering, procurement, and station organizations and performed management evaluations and audits.

As manager of the Quality Assurance Department, directed activities of quality assurance consulting staff, performed surveillance of suppliers of materials and services for utility clients, and audits of suppliers and utility clients. Assisted clients in the initial implementation of quality-assurance programs, including establishing document control and record systems, preparing and reviewing specifications, performing supplier evaluations, designing forms, and instituting forms control. Other implementation activities included the initiation of nonconformance and corrective action activities and the evaluation of the impact of new or revised codes, standards, and regulatory guides. Prepared and conducted training programs in quality-assurance activities. Prepared quality assurance portions of safety analysis reports.

Fairchild Industries - Directed the activities of engineers who were planning and supervising test activities on electronic, electrical, and electromechanical products for major projects for the Department of Defense, (DOD) National Aeronautics and Space Administration (NASA), and the Postal Service. Organized and generated operating policies and procedures for the Product Assurance Department.

General Electric - Directed the efforts of engineers and technicians planning and performing acceptance tests on a broad range of equipment to NASA and DOD requirements. These included environmental tests on electrical power equipment for Kennedy Space Center, tests for the U.S. Army Corps of Engineers to evaluate nuclear blast and seismic effects, and tests for commercial customers (to NRC seismic requirements). Planned tests, prepared test procedures, performed and directed tests of electrical electromechanical components, subsystems, and systems, performed post-test evaluations, evaluated test results, and prepared final test reports. Evaluated test programs for major systems of the Apollo Lunar Module. Evaluated test plans and test results.

As program manager, was responsible for site activation of 412L European Defense System. Implemented turnkey activities for 10-site net.

Managed an engineering organization responsible for designing test equipment for radar and computers. Managed an engineering administration group preparing budgets, planning facilities, and capital expenditures, recruiting technical staff members, planning manpower development, training, and operating a technical data center. Designed electronic equipment for aerospace applications.

Quality Assurance Certificate

This is to certify that A. C. D'Hoostelaere has successfully completed the Requirements of Consulting Division Procedures for "Qualification & Certification of Quality Assurance Personnel" for the following level and classification:

Qualifications Lead Auditor per ANSI N45.2.23

Discipline QA Programs & Program Implementation



[Handwritten Signature]
Quality Assurance Administrator
Consulting Division

Certification Date March 23, 1984

Expiration Date March 23, 1985

QUALITY ASSURANCE RECORD
 NUS CORPORATION CONSULTING DIVISION
 Nonperformance - Retain until 3/23/85
 Listing
 QA STAMP NO. 2

IRINEO B. FERRER

EDUCATION

Pepperdine University, MBA Program
Virginia Polytechnic Institute & State University, B.S., Nuclear
Science, 1977
Virginia Military Institute, Civil Engineering

EXPERIENCE

NUS Corporation, 1979-Present
Virginia Electric & Power Company, 1977-1979
Charleston Naval Shipyard, 1977
Link Division of Singer Company, Co-op Student, 1975-1976

NUS - Provides engineering consulting services to utility clients during the construction, startup, and operation of power plants. These services include the preparation of test procedures, operating procedures, and test assistance for nuclear power stations. Currently assigned as Startup Engineer in the Auxiliary Group of the Technical Department at Midland Nuclear Plant (850 MWe PWR's) responsible for developing testing procedures for the fuel pool cooling, primary water, utility water, and liquid radwaste systems.

Previously assigned to Detroit Edison Company's Enrico Fermi Unit 2 (1139 MWe BWR). Planned and developed schedule of the RHR Complex from system turnover to preoperational testing. Also responsible for coordinating mechanical testing within the RHR Complex. Systems in the RHR Complex include: the RHR Service Water System and Emergency Diesel Generators. Other system responsibilities have been the initial testing of Station and Control Air System.

In prior assignment with Southern California Edison at San Onofre Unit 1, implemented recommendations by the Lessons Learned Task Force requiring new and revised emergency procedures. Reorganized the station procedure index, and reviewed and revised the Station Operating Manual to comply with the requirements of ANSI N18.7.

VEPCO - At North Anna (twin 934 MWe PWR's) was involved in the startup testing of Unit 1. Provided support from 0 to 100% power escalation, in both the gathering and evaluation of test results. Responsible for the preoperational testing of the diesel generator, DC power distribution system and rod control inhibit functions. Also, prepared Unit 2 startup procedures which included: low power physics, power escalation and power transients tests.

IRINEO B. FERRER

Page Two

Charleston Naval Shipyard - As Nuclear Engineer, was responsible for the evaluation of deficiencies found during inspection of reactor plant valves.

Singer Company - Assisted in development of nuclear plant simulator projects. Wrote simulator exercise guides for McGuire 1 and 2, and Cumberland Station fossil plant. Wrote system descriptions, accident description, and plant operating procedures for sample lesson plans. Edited and adapted lesson plans for power plant simulators of different designs.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

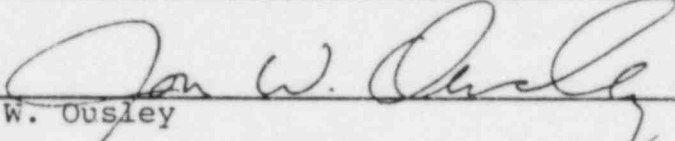
EMPLOYER NUS OPERATING SERVICES CORPORATION

PERSON BEING CERTIFIED Irineo B. Ferrer

ACTIVITY QUALIFIED TO PERFORM System flushing and hydrostatic testing; component level and system integrated preoperational testing; mechanical systems inspection; test data evaluation

LEVEL OF CAPABILITY Level III

EFFECTIVE PERIOD OF CERTIFICATION 8/6/84 to 10/1/86

NUS DEPARTMENT MANAGER 
Jon W. Ousley

BASIS FOR CERTIFICATION E.S. Nuclear Science;
1 year nuclear shipyard inspections;
7 years commercial nuclear testing and inspections.

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 10/27/80 (Initial Level II)

EXPIRATION 10/1/86

RE-CERTIFICATION

9/7/82	8/6/84				
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Capability Statement
For
THEODORE W. HORNER
CONSULTING STATISTICIAN
And
THEODORE W. HORNER AND ASSOCIATES

In late 1969, Dr. Theodore W. Horner initiated a "Professional Practice in Statistical Science," serving industry, government and the legal profession. Throughout, emphasis has been placed on discussions with the client so as to abstract the statistical problem from the subject matter context and to interpret statistical findings.

The Practice provides assistance in:

- Formulating the problem in statistical terms (probability model)
- Defining the universe, the frame, and the type and size of units that constitute the frame
- Defining the sample selection procedures
- Defining data analysis procedures including procedures for estimating proportions, means, standard errors and other statistics
- Evaluating reliability of results

The Practice emphasizes:

- Quality control and assurance
- Statistical estimation, hypothesis testing and construction of statistical models
- Multiple regression and analysis of variance as applied to fixed, mixed, and random models
- Statistical tests such as t, F, Chi-square, and others
- Multivariate analysis and log linear models

An area of particular interest is physical sampling; that is, the sampling of the air, water and soil of waste sites, plant discharges and other pollution sources for both chemical and biological materials.

Dr. Horner is particularly experienced in developing the inference chain that connects context with data, the data assumptions flowing from the context, the properties of statistics computed from data, the population inferences from statistics, and the nature of what can be said from a subject matter point of view.

Although the primary focus of the Practice is the providing of statistical guidance, responsibility is also taken for data analysis if the client so desires. The Practice has full access to computer capability, programming, clerical support, and the use of computation packages such as SPSS, BIOMED, SAS and DATATEXT.

Professional services are provided as per negotiated agreement or on an hourly rate basis with one-half day minimum. The Office is located at:

7904 Glenbrook Road
Bethesda, Maryland 20814
(301) 657-4242

(Over)

Theodore W. Horner, Ph. D.

STATISTICAL CONSULTANT
7904 GLENBROOK ROAD
BETHESDA, MARYLAND 20814

(301) 657-4242

1969-Present

President of Theodore W. Horner and Associates and Consulting Statistician. Experienced in theoretical and applied statistics, biostatistics and biometry, including toxicological, environmental, and epidemiological studies, mathematical modeling, hazard and risk analysis, bioassay data analysis, mathematical genetics, design of experiments, data base design, survey research, operations research, computer programming, project management, consulting, and teaching. Consultant to pharmaceutical firms, biological laboratories and research organizations, for example: developing a mathematical model for estimating the carcinogenic risk of wearing triacetate sleepwear treated with TRIS (2,3-dibromopropyl phosphate); developing a protocol and experimental methodology for evaluating the effects of vitamin C on cancer patients; evaluating the Rubelisa test kit against the HAI titer for serum antibody protection against rubella; analyzing the heritable translocation test for detection of mutagenic agents; estimating the probability that organisms survive sterilization processes on space vehicles; and developing methods for estimating pollutant concentrations and recovery fractions of water samples from industrial plants, including the assessment of the precision of the estimates and the detection of outliers.

Dr. Horner has provided testimony and/or statistical backup for legal cases involving aspirin, a gasoline additive, an acne preparation, detergents, sleepwear garments treated with TRIS, measurement of PCB samples, cellulose insulation regulations, and accident probabilities for LNG tankers.

1959-69

Principal Scientist, Booz-Allen Applied Research. Conducted various statistical studies related to biological problems, including biological defense, biological and physical decay of chamber aerosol clouds, and analysis of biological assay data. Legal testimony was also given with respect to the extent of an award involving large scale power generators.

1957-59

Senior Operations Research Analyst, General Mills Corp. Determined optimum levels of vitamin and mineral enrichment of flour and cereals, developed mathematical models for the effects of advertising and promotion, and a management information system.

1953-57

Assistant Professor of Statistics, Iowa State College. Taught experimental and mathematical statistics at both undergraduate and graduate levels. Consulted with the Iowa Experiment Station and performed research in the area of mathematical genetics.

Dr. Horner holds a Ph.D. ('53) in experimental statistics from North Carolina State University, and has taught Operations Research at Vanderbilt University. He is a member of Sigma Xi, the Institute of Mathematical Statistics, the American Statistical Association, the Biometric Society, and the American Society for Clinical Pharmacology and Therapeutics. He is listed in *Who's Who in the East*.

(Over)

A Professional Practice in Statistical Science Since 1969

Theodore W. Harner, Ph.D.

STATISTICAL CONSULTANT
7904 GLENBROOK ROAD
BETHESDA, MARYLAND 20814
(301) 657-4242

PROFESSIONAL PRACTICE REFERENCES

Dr. Myron S. Weinberg
President
Weiner Consulting Group, Inc.
2028 Pennsylvania Avenue, #301
Washington, D.C. 20007
(202) 342-6513

Dr. George C. Sponsler
President
Law Mathematics & Technology, Inc.
7804 Old Chester Road
Bethesda, Maryland 20817
(301) 986-1120

Jeffrey L. Kestler
Attorney-at-Law
Legal and Patent Division
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C. Frank Riley, Jr.
Division Vice President
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Washington, D.C. 20036
(202) 861-0900

Dr. Allen Pittaway
Vice President
Heiden Pittaway Associates
1100 17th Street, N.W., #1215
Washington, D.C. 20036
(202) 463-8171

Dr. B. K. Radhakrishnan
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BRC Associates, Inc.
4336 Montgomery Avenue
Bethesda, Maryland 20814
(301) 656-2996

Morrill H. Hall, Jr.
Vice President
McLean Group, Inc.
1307 Dolly Madison Boulevard
McLean, Virginia 22101
(703) 356-5507

Dr. Ronald N. Berzofsky
Manager, Clinical Immunology
M.A. Biorproducts
Bldg. 100, Biggs Ford Road
Walkersville, Maryland 21793
(301) 898-7025

Michael Hurley
Abbott Laboratories
Department 461/AP
North Chicago, Illinois 60064
(312) 937-3098

Theodore W. Horner, Ph. D.

STATISTICAL CONSULTANT
7904 GLENBROOK ROAD
BETHESDA, MARYLAND 20814
(301) 657-4242

QUALITY CONTROL APPLICATIONS

I. IMPROVED PROCESS CONTROL OF A TILE PRODUCTION LINE

A Canadian vinyl asbestos tile production line experienced a high rejection rate due to surface blistering. In order to determine and remove the causes of blistering without significantly increasing the company's financial burden, it was necessary to design experiments that could be performed on normal production runs by company personnel in such a way that production losses were held to a minimum. A series of experiments were designed using the principles of evolutionary operation and response surface methodology. These experiments were based on small variations of the controllable variables of the production process (levels of the chemical constituents, temperatures, speed of rollers and so forth) from their normal levels. The experimental results permitted a mapping of the effects of the experimental variables on yield and rejection rates so as to permit a selection of an optimum combination of the controllable variables. The rejection rate by this process was reduced to an acceptable level while at the same time securing maximum yield.

2. QUALITY OF INCOMING RAW MATERIALS

A large processor of cranberries was faced with the problem of rapidly estimating the weight of good cranberries, for the purpose of payment, arriving on trucks at a new production plant. The cranberries arrived in various sizes and shapes of containers and on trucks of various sizes. A quality control study resulted in the selection of the optimum sampling unit, the number of sampling units to be selected from each vehicle and the estimation formula to be used for proper payments to growers. In addition to providing much fairer payments to cranberry growers, the processing of presented loads was substantially quickened.

3. QUALITY CONTROL IN PUBLIC ASSISTANCE

The taxpayer is very much concerned that welfare payments go only to those qualified under legal regulations and in those amounts to which recipients are entitled. An error occurs when a potential recipient is denied the payment that he should have under the law and also when he receives a payment to which he is not entitled. In order that a quality control function could be exercised on the granting of welfare benefits, a program of sampling public assistance cases and evaluating the correctness of decisions

in each of the sampled cases was instituted. The project was concerned with an evaluation of the quality control system and the development of a model for minimizing the combined costs resulting from the various kinds of errors as well as the cost of implementing the quality control system itself. The project resulted in many recommendations for strengthening the public assistance quality control system.

4. QUALITY CONTROL OF KITS FOR THE DETECTION OF RUBELLA

A manufacturer produced a new type of kit for the detection of Rubella. These kits were produced in large batches. A sampling scheme was designed to sample the kits in each batch so as to control the quality of outgoing production.

5. QUALITY CONTROL IN WATER SAMPLING

EPA collects data on the organic pollutants of water samples from diverse manufacturing sources. A quality control project was concerned with the formation of homogeneous groups that are generally similar with respect to production of organic pollutants. Methods were developed for forming such groups as well as setting process means and control limits for members of the group. This program permitted the establishment of a clean data base as well as pointing to particular sources that appeared to be out of line with respect to the remaining sample data for the group under consideration.

6. EVALUATION OF A TEST KIT FOR RAPID DETECTION OF GONORRHEA

A manufacturer developed a test kit for the rapid detection of gonorrhea in the physician's office that required FDA approval. Experimental data were collected and analyzed so as to estimate real and false detection probabilities.

7. EVALUATION OF THE EFFECTIVENESS OF A GASOLINE ADDITIVE

In order to provide marketing data for a manufacturer as to the effectiveness of a gasoline additive in increasing miles per gallon, a statistical analysis was performed on the available experimental data. Point and confidence interval estimates were made of potential product benefit.

8. COMPARISON OF INDEPENDENT LABORATORIES

A potential carcinogenic chemical, PCB, is produced as an incidental byproduct of many industrial processes. In order that EPA could develop appropriate regulations, an assessment of the state of the art with respect to the measurement of PCB in presented samples was required. Similar samples containing PCB were sent to a number of independent testing laboratories. Data were analyzed to determine consistency among the several laboratories and the closeness of analytical determinations to known PCB concentrations.

Theodore W. Horner, Ph. D.

STATISTICAL CONSULTANT
7904 GLENBROOK ROAD
BETHESDA, MARYLAND 20814
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(301) 657-4242

Examples of Survey Design and Analysis

- Design of a large scale household survey in Polk County, Iowa to measure the need for various kinds of social service.
- Design of surveys for studies of the mutual fund industry.
- Design of a survey covering fifteen Army installations in the United States and Europe for providing information on race relations and career motivations.
- Design of a survey of the 14,500 member banks of the American Bankers Association for the purpose of assessing the usefulness and value of ABA communications.
- Design of a national survey for estimating the numbers of volunteers required currently and in future years in the United States by all organizations that employ volunteers.
- Design of a national survey of primary schools that receive Title I funds in order to study the effects of compensatory education.
- Design of a survey of trainees and staff at Job Corps Centers throughout the United States for the purpose of determining the effectiveness of Job Corps training.
- Design of a survey for determining the effects of the changes in the relocation housing payments policy of HUD.
- Design of a survey for the Post Office for determining the characteristics of mail as it enters the postal system.
- Preparation of a Summary of Benchmarking Procedures used by U.S. Government Agencies.

PLEASE SEE REVERSE SIDE
FOR
EXAMPLES IN SUPPORT OF LITIGATION

Theodore W. Horner, Ph. D.

STATISTICAL CONSULTANT
7904 GLENBROOK ROAD
BETHESDA, MARYLAND 20814
—
(301) 657-4242

TYPICAL LEGAL PROJECTS^{1/}

- o Statistical evaluation of a gasoline additive
- o Statistical assessment of the possible impact of proposed cellulose insulation regulations
- o Analysis of round robin data assessing state of the art technology for the measurement of PCB samples
- o Exposure assessment for sprayers, flagman, pilots and others releasing aerial and ground applications of a pesticide
- o Estimates of accident probabilities for LNG ships and tankers
- o Analysis of data to support advertising claims with respect to aspirin
- o Analysis of detergent data and the development of statistical methods for the classification of candidate detergents as poor, average or good.
- o ~~Developed~~ models and estimates of oncogenic risk associated with triacetate sleepware garments treated with Tris, a flame retardant.

1/ Examples of statistical projects in support of litigation

PLEASE SEE REVERSE SIDE
FOR
EXAMPLES OF SURVEY DESIGN AND ANALYSIS

Theodore W. Horner, Ph. D.

STATISTICAL CONSULTANT
7904 GLENBROOK ROAD
BETHESDA, MARYLAND 20814
(301) 657-4242

PARTIAL LIST OF REPORTS AND PAPERS
Prepared by Theodore W. Horner, Ph.D.

1. Horner, Theodore W. An Imputation Recommendation for the Weekly System. Report prepared for Applied Management Sciences, Inc., 1982.
2. Horner, Theodore W. Assessment of Imputation Methods for EIA-64 Data. Report prepared for Applied Management Sciences, Inc., 1982.
3. Horner, Theodore W. Summary of U.S. Government Survey Benchmarking Procedures. Report prepared for Applied Management Sciences, Inc., 1982.
4. Horner, Theodore W. Statistical Evaluation of a Gasoline Additive. Report prepared for Law Mathematics and Technology, Inc., 1981.
5. Horner, Theodore W. Exposure Assessment for Sprayers, Flagmen Pilots and Others Releasing Aerial and Ground Applications of a Pesticide. Report prepared for Booz, Allen and Hamilton, 1981.
6. Horner, Theodore W. An Assessment of a Subcategorization of Textile Industry Plants with Respect to Wastewater Pollutant Concentrations. Report prepared for JRB Associates, March 27, 1981.
7. Horner, Theodore W. Inference from an Initial Water Sample. Report prepared for JRB Associates, August 25, 1980.
8. Horner, Theodore W. Estimation of Average Recoveries of Priority Pollutants. Report prepared for JRB Associates, February 2, 1981.
9. Wilson, Linda J. and Theodore W. Horner. Data Analysis of Tractor-Trailer Drivers to Assess Drivers' Perception of Heavy Duty Truck Ride Quality. U.S. Department of Transportation, 1979 (200 pages).
10. Horner, Theodore W. and et. al. Study of the Disaster Temporary Housing Assistance Program. Federal Emergency Management Agency, 1979 (125 pages).
11. Horner, Theodore W. and Ching-Ju Sheu. Statistical Evaluation of the Heritable Translocation Test: Design and Sample Size Considerations. Food and Drug Administration.

12. Horner, Theodore W. A Statistical Data Plan for Bomex. NOAA Technical Memorandum ERL BOMAP-2, 1970 (100 pages)
13. Lynch, Cornelius J., R. Glenn Stockon and Theodore W. Horner. Using Incomplete Observations in Constructing Regression Equations. Report OAD-CF-86. General Research Corporation, 1974 (95 pages).
14. Horner, Theodore W. and Fred W. Hawker. A Statistical Study of Grip Retention Force. Aerospace Medical Research Laboratory, 1973 (40 pages).
15. Horner, Theodore W. Statistical Analysis of a Double Blind Study for the Comparison of the Effects of Bethistine Hydrochloride and Placebo in Subjects with Vertebral Basilar Insufficiency. Prepared for Unimed, Inc.
16. Horner, Theodore W. Protocol for the Calcium-L-Ascorbate Investigation. Prepared for the National Foundation for Cancer Research.
17. Horner, Theodore W. Statistical Evaluation of Gonodecten TM Test Kit Results. Prepared for Mediserve
18. Horner, Theodore W. Book 47. Statistical Analysis, Results and Conclusions for the Septra-Penicillin Study. Prepared for Health Sciences, Inc.
19. Horner, Theodore W. Book 40. Computer Information Associated with the Septra-Penicillin Study. Prepared for Health Sciences, Inc.
20. Horner, Theodore W. Statistical Assessment of the Effect of A-45975 on Autonomic Challenges in the Dog: Comparison with A-45586. Prepared for Abbott.
21. Horner, Theodore W. Statistical Comparison of A-45975 and A-45586 at Two Intravenous Doses in Anesthetized Dogs. Effect of Premedication with Phenoxybenzamine, Propranolol and Atropine. Prepared for Abbott.
22. Horner, Theodore W. Detection of Abnormal Values in the Weighing of Laboratory Animals. Prepared for Hazelton Laboratories.
23. Horner, Theodore W. Statistical Methodology Associated with the Heritable Translocation Test for the Detection of Mutagenic Agents. Prepared for the Genetic Toxicology Branch of the Bureau of Foods, FDS, FDA.
24. Horner, Theodore W. A Historical Analysis and Evaluation of Cancer Death Rates in an Indianapolis Plant. A report prepared for CPC International, Inc.
25. Horner, Theodore W. Estimation of Probabilities of Organism Survival Following Thermal Sterilization Processes for Unmanned Landers. A report prepared for Exotech, Inc.
26. Horner, Theodore W. A Summarization of Some Concepts Associated with the R.W. McMullen Paper. PRO-TN-28. 1960, Unclassified.

27. Horner, Theodore W. A Study of the Effects of Radio Advertising on Sales. 1961.
28. Horner, Theodore W. Effects of Additives on Physical Recovery Curves. Analysis 5032. September 8, 1961, Unclassified.
29. Horner, Theodore W. Proposed Synder-Lee Experiment on Hazard Rates. PRO-TN-37. 1961, Unclassified.
30. Horner, Theodore W. A Relationship Between Spore Number and Particle Size. Analysis 5052, September 14, 1961, Unclassified.
31. Horner, Theodore W. Comparison of Recovery Rates at Different Temperature Humidity Conditions. Parts I and II, 1961, Unclassified.
32. Horner, Theodore W. Variability of Data from the Pint Mason Jar Chamber. Analysis 4702, March 7, 1961, Unclassified.
33. Theodore W. Horner. Effect of Storage on Viability of "Serratia Marcescens" Cultures. Analysis 4807. April 14, 1961, Unclassified.
34. Horner, Theodore W. A Formula for the Nicotinic Acid Assay Curve. Analysis 4824. April 21, 1961, Unclassified.
35. Horner, Theodore W. Calculation of Biological Recovery Percentages for the Four and Eight Litter Aerosol Chambers" PRO-TN-36. 1961, Unclassified.
36. Horner, Theodore W. Possible Effects of the Particle Radius on Inferences from Chamber to Field. 1962, Unclassified.
37. Horner, Theodore W. Biological and Physical Decay of a Chamber Aerosol Cloud. 1962, Unclassified.
38. Horner, Theodore W. Regression Analyses of Data from a Hawaiian Sugar Plantation. 1962.
39. Horner, Theodore W. Biological Decay Models. PRO-R-6. March 1962, Unclassified.
40. Horner, Theodore W. Assay of Psittacosis Virus. 1963, Unclassified.
41. William S. Mallios and Horner. Cluster Weapon Sampling Pattern and Associated Estimation Procedures. 1963, Unclassified.
42. Horner, Theodore W. Training of Officers for Nuclear Submarine Duty. 1963, Unclassified.
43. Horner, Theodore W. Stability of Virus in Frozen Mosquitoes. 1963, Unclassified.

44. Horner, Theodore W. Empirical Relationships Between Deposition on Manikins and Ground Contamination Density from Particulate Clouds. 1963.
45. Horner, Theodore W. Reference Toxoid Stability Study 1963, Unclassified.
46. Horner, Theodore W. A Sequential Experimental Procedure for Investigating the Effect of Pharmacologically Active Material on Body Weight. 1963.
47. Robba, Reginal C. and Theodore W. Horner. Experimental Program Conducted on the Vinyl Asbestos Tile Line at the Hamilton Plant of Building Products Limited. 1963.
48. Mallios, William S. and Theodore W. Horner. Perinatal Tetanus Immunity. 1964.
49. Horner, Theodore W. and Harry S. Lum. Analyses of Burst Test Data on Echo II Balloon Material. 1964.
50. Horner, Theodore W. Effects of Temperature on Vector Agent Relationships. 1964, Unclassified.
51. Horner, Theodore W. Optimum Level of Staffing in the Turbine Engine Overhaul Shop San Francisco Maintenance Base. 1964
52. Horner, Theodore W. Accuracy of Steam Turbine Generator Data. 1964.
53. Horner, Theodore W. Effects of Various Rearing Conditions on the Chemical Composition of Adult Mosquitoes. 1964, Unclassified.
54. Horner, Theodore W. Weighted Analysis. 1965.
55. Ross W. Adams and Theodore W. Horner, Comparison of Estimates of Tetanus Antitoxin Titters by the Mouse Neutralization Procedure with Estimates by the Hemagglutination Procedure. 1965.
56. Horner, Theodore W. Experimental Design and Analyses of Experiments for Comparison of Paving Materials. 1965.
57. Moss, T. M. and Theodore Horner. "An Investigation of the Distribution of Direct Hits on Personnel by Self-Dispersing Bomblets". Report ARO-D, 65-3. U. S. Army Research Office, Durham, 1965.
58. Horner, Theodore W., "Mathematical Representation of the Biological and Physical Decay of Chamber Aerosols". Biometrics, Vol. 21, No. 3, September 1965.
59. G. F. Sprague, W. A. Russell, L. H. Penny, T. W. Horner and W. D. Hanson, "Effect of Epistasis on Grain Yield in Maize". Crop Science, Vol. 2, 205-208, 1962.

60. Horner, Theodore W. and Walter D. Foster, "A Review of a Statistical Workshop". ARODR 62-2, U. S. Army Research Office, Durham.
61. Theodore Horner, "An Application of the Exponential Hazard Model to Aerosol Chamber Trial Data". ARODR 61-2, U. S. Army Research Office, Durham.
62. Gates, C. E., C. R. Weber, and T. W. Horner, "A Linkage Study of Quantitative Characters in a Soybean Cross". Agronomy Journal, Vol. 52, 45-49, 1960.
63. Plaisted, Robert L., T. W. Horner, and E. P. Lana, "Design and Analysis of Onion Storage Trials". American Society for Horticultural Science, Vol. 69, 1957.
64. Weber, Charles R. and Theodore W. Horner, "Estimates of Cost and Optimum Plot Size and Shape for Measuring Yield and Chemical Characters in Soybeans". Agronomy Journal, Vol. 49, p. 444-449, 1957.
65. Frey, K. J. and T. W. Horner, "Heritability in Standard Units". Agronomy Journal, Vol. 49, p. 59-62, 1957.
66. Horner, Theodore W. and E. P. Lana, "A Three-Year Study of General and Specific Combining Ability in Tomatoes". The American Society for Horticultural Science, Vol. 69, June 1957.
67. Horner, Theodore W., and K. J. Frey, "Methods for Determining Natural Areas for Oat Varietal Recommendations", Agronomy Journal, Vol. 49, 313-315, 1957.
68. Horner, Theodore W. and Charles R. Weber, "Theoretical and Experimental Study of Self Fertilized Populations". Biometrics, Vol. 12, No.4, December 1956.
69. Horner, Theodore W. "The Components of Variance in Symmetrical Random Mating Populations with the Frequency of the More Favorable Allele the Same at all Loci". Iowa State College Journal of Science, Vol. 31, No. 1, August 1956.
70. Horner, Theodore W. "Full Sib and Parent Offspring Correlations in Symmetrical Random Mating Populations with the Frequency of the More Favorable Allele the Same at all Loci". Iowa State College Journal of Science, Vol. 31, No. 1, August 15, 1956.
71. Horner, Theodore W. "Parent-Offspring and Full Sib Correlations Under a Parent-Offspring Mating System". Genetics, Vol. 41, No. 4, July 1956.
72. Horner, Theodore W. and O. Kempthorne, "The Components of Variance and the Correlations Between Relatives in Symmetrical Random Mating Populations". Genetics, Vol. 40, No. 3, May 1955.
73. Frey, K. J. and T. Horner, "Comparison of Actual and Predicted Gains in Barley Selection Experiments". Agronomy Journal, Vol. 47, No. 4, April 1955.

PETER V. JUDD
SENIOR EXECUTIVE ENGINEER

EDUCATION

Pennsylvania State University, B.S., Electrical Engineering, 1954
University of Virginia, engineering review courses, 1970
U.S. Department of Agriculture, graduate course in Engineering Economics, 1967
University of Maryland, graduate course in Mathematics, 1957
Bettis Reactor Engineering School, 1957
Syracuse University, graduate courses in Electrical Engineering, 1955

EXPERIENCE

NUS CORPORATION, 1966-Present*

Senior Executive Engineer, 1983-Present
Manager, Yugoslav Projects, 1980-1982
Manager, South American Operations, 1972-1979
Manager, Utility Programs, 1971
Manager, Operations, 1970
Manager, Area Office Coordination, 1969
Manager, Midwest Office, 1968
Manager, Projects, 1966-1968
U.S. Atomic Energy Commission, Division of Reactor Development, 1959-1966
Nuclear Propulsion Division, Naval Reactors Branch and Bureau of Ships, Nuclear Power
Engineer, 1965-1966
Pittsburgh Naval Reactors Office, Shippingport Branch Office, 1959-1965
Manager, 1962-1965
Assistant Manager, 1959-1962
U.S. Navy, 1955-1960
IBM Corporation, 1954-1955

NUS — Since November 1982 has resided in Mambucaba, Rio de Janeiro, Brazil, providing management consulting services to Superintendent of a Brazilian nuclear power plant located in the southern part of the State of Rio de Janeiro. Activities include assistance in coordination of startup test program; assistance in performance of special studies to resolve plant deficiencies and investigate plant incidents; assistance to maintenance, operations, and technical support managers in resolving problems and preparing reports in their specific areas; and assistance to utility headquarters engineering and operations groups in contractual matters related to supply of nuclear power plant equipment and services by U.S. prime contractor and U.S. subcontractors.

Resided in Zagreb, Yugoslavia, for 2 years as manager of Yugoslav projects. Provided resident management consulting services to a consortium of Yugoslav utilities in many aspects of planning for nuclear power plant operations and technical support, particularly in the areas of licensing and the evaluation of initial plant preparedness, during the period September 1980 through September 1982.

Resided in Rio de Janeiro, Brazil, for over 7 years as the manager of South American operations. Provided management consulting services on all aspects of nuclear power plant operations planning to the thermal generation superintendency of a Brazilian utility during the period of 1977 through mid-1979.

During the period of 1972 through 1976, provided resident consulting services to the nuclear engineering department of the same electric utility. Activities included design review, training,

*Except for the period of 8/79 - 6/80, during which Mr. Judd was employed as a manufacturing representative by Judd, Inc., Columbia, Maryland

PETER V. JUDD

Page Two

quality assurance planning, licensing, supervision of meteorological program, contract review, and negotiation.

As Manager, Utility Programs, marketed the services of the Applied Technology Group to U.S. utilities.

While managing the operation of all area offices in the Engineering Division, including the headquarters and field offices, supervised activities in U.S. field offices and coordinated them with activities in field offices located outside the United States. Also, handled project management for several foreign clients.

Was responsible for coordinating all NUS activities in Rockville with those of the field offices as Manager of Area Offices Coordination. This included project followup of all work referred to the Rockville office for completion by field offices, and acting as Project Manager for several general-service type contracts NUS had with foreign clients.

As Manager, Projects, directed the consulting activities involved in site evaluations, evaluations of core technical designs, the analyses of nuclear fuel costs, assistance in preparing a preliminary facility description and safety analysis report, the presentation of supporting information at U.S. Atomic Energy Commission (AEC) licensing hearings, the specification of primary and secondary shield requirements, and the evaluation of online computer requirements for central station nuclear power plants.

Lectured in numerous workshops and training courses sponsored by NUS and other companies. Lectures dealt with general characteristics of central nuclear station power plants, siting considerations, and the environmental safety aspects of nuclear power plant operations.

U.S. Atomic Energy Commission — Coordinated naval reactor and contractor personnel technical support for the Shippingport project. Administered AEC's test program at Shippingport, including the development of test program objectives and long-range schedules.

Was responsible for overall administration of Shippingport Branch Office. In this capacity, monitored nuclear plant testing, operations, refueling, and maintenance activities; developed short-range test and operating schedules; and coordinated efforts by the AEC and its contractors to accomplish established test program objectives. As Assistant Manager, was responsible to the Branch Manager for the administration of test program, operations support, and refueling activities. Test program responsibilities included the review of test procedures to determine compatibility with plant operating procedures and capabilities of personnel and equipment, monitoring of tests by contractor personnel, and preliminary evaluation of test results.

U.S. Navy — While on active duty, was assigned to the AEC Division of Reactor Development, Naval Reactors Branch, and Instrumentation and Control Group. Coordinated the design efforts of contractors in the development of reactor control systems for submarine and surface ship applications.

IBM — While design engineer in the Component Analysis Group, Airborne Computer Laboratory, selected computer components for environmental testing and evaluated completed tests.

MEMBERSHIP

American Nuclear Society, Latin American Section

Charter Member

Treasurer, 1976-1979

SERGEY KATSENELENOGEN

EDUCATION

Massachusetts Institute of Technology, M.S. Mechanical Engineering, 1981
Leningrad Institute of Civil Engineers, B.S. Mechanical Engineering, 1978

EXPERIENCE

NUS CORPORATION, 1981-Present
Massachusetts Institute of Technology, 1980-1981
Fitzmeyer & Tocci Consulting Engineers, 1979

NUS - As an engineer in the Safety Analysis Department is responsible for performing multidimensional, transient thermal analysis of nuclear reactor containment and support structures using computer analysis techniques. Performed thermal-hydraulic analysis of toxic chemical vapors and analyzed thermal response of nuclear plant equipment to different accident environment sequences aggravated by hydrogen burn effects. Responsible for hydraulic modeling of nuclear plant feedwater systems, and participated in the development of a state-of-the-art reactor core cooling system using computer code RELAP5. Participated in a thermal analysis of fire hazards and was involved in document review on safety-related issues. Converted major nuclear industry computer codes from CDC CYBER 176 and IBM 370 to CRAY-1 parallel (vector) processor. Developed plotting packages for various computer codes.

M.I.T. - As a research assistant, performed design and experimental studies of water vapor transmission through a porous insulation. Developed benchmark computer programs to solve heat and moisture transfer problems.

Fitzmeyer & Tocci - As a designer, was responsible for heating and air-conditioning layouts, piping design, and heat load calculation. Also chose appropriate HVAC equipment.

HONORS

American Society of Heating, Refrigeration and Air Conditioning Engineers Student Fellowship, 1980.

PUBLICATION

"A Study of Water Vapor Transmission Through Porous Insulation Under Steady State and Transient Conditions." Scheduled for publication under ASHRAE in 1983.

VICTOR J. KYSLINGER

EDUCATION

University of Maryland, M.B.A., 1981
Pennsylvania State University, B.S., Aerospace Engineering, 1972

REGISTRATION

Engineer-in-Training, State of Maryland, 1976

EXPERIENCE

NUS CORPORATION, 1978-Present
Bechtel Power Corporation, 1974-1978
Rockwell International, 1972-1974

NUS - Responsible for performance and direction of piping, pipe support, and mechanical equipment structural analysis in accordance with ASME Boiler and Pressure Vessel Code, Section III, and B31.1 Power Piping Code. Analyzed piping systems for new loads, as-built configurations, to satisfy requirements of NRC I.E. Bulletin 79-14 and 79-02, and support optimization of operating systems.

Lead engineer on a major project to optimize the supporting configuration of piping systems in an operating plant by reducing the number of snubbers on each system. Employed the use of the design computer code HANGIT to identify the optimized supporting configuration. Special attention was given to equipment reactions, support loads, accelerations, deflections, and stresses such that original design limits were not exceeded, thus keeping the amount of construction at a minimum.

Analyzed a reactor coolant pump for a major nuclear steam supplier. Used finite element techniques for analyzing thermal transients and design loads. Performed structural analysis of the seal injection system piping which constitutes a part of the pressure boundary of the reactor coolant pump with imposed design requirements that included the use of no snubbers or springs. Used computer codes such as ANSYS, STARDYNE, EASE, HANGIT, ADLPIPE, PIPESD, NUPIPE, PIPELINE, FETA, and FESA.

Bechtel - Assistant to the group supervisor for industrial and power projects. Performed static and dynamic analysis of pressure vessels and piping systems to the requirements of the ASME Boiler and Pressure Vessel Code, Sections III and VIII, and the B31.1 Power Piping Codes. Also performed analysis of Nuclear Class 1 components for steam hammer and pipe break. Participant in field assignment for pipe support surveillance and coordination of job tasks. Performed detailed analysis of piping components using ANSYS finite element program and reviewed field hung piping, anchor, and hangar designs.

Rockwell International - Involved in the structural analysis of the B-1 forward fuselage. Used the ASKA and NASTRAN finite element computer programs to generate internal loads, stresses, deflections, and influence coefficients for use in the analysis of major sections of the forward fuselage, tail, nose gear trunnion, and crew compartment.

S. K. MALUR

EDUCATION

Institute of Science, Bangalore, India, M.S., Power Engineering (Mechanical), 1959
University of Mysore, B.S., Mechanical Engineering, 1957
Calder Operations School, England, Reactor Operations Course, 1962

REGISTRATION

Professional Engineer, State of Maryland, 1976
Professional Engineer, State of Washington, 1977

EXPERIENCE

NUS CORPORATION, 1973–Present
Department of Atomic Energy, India, 1959–1973

NUS — Currently providing engineering supervision as Project Manager for projects involving installation of post-accident sampling systems, radwaste system modifications, and high density fuel racks. Supervised activities such as design, bid specifications and bid evaluations, vendor followup, field engineering, and cost control.

As Project Engineer, reviewed NSSS and BOP system designs for the 600-MW^e Krsko plant in Yugoslavia; provided consulting assistance in all design-related matters and assisted the client at the SAR review meetings with the International Atomic Energy Agency.

Served as Manager, Nuclear Engineering Department, responsible for the design of fluid systems, mechanical components and structures associated with nuclear power plants such as spent fuel and new fuel racks, liquid and gaseous radwaste systems, component cooling systems, and sampling systems. Prepared and reviewed portions of safety analysis reports for BWRs and PWRs, conceptual designs for ECCS modifications for operating plants, and conceptual designs for auxiliary systems for nuclear power plants. Has also supervised review of system descriptions, flow diagrams, specifications, and evaluation of bids for the NSSS & BOP systems.

Department of Atomic Energy, India — As special assistant, assisted the director for power projects of the Indian AEC for a period of 18 months on all matters related to site selection, plant layout, safety, PERT & CPM, cost estimates, bid selection, and design and construction progress monitoring for three CANDU-type nuclear power projects, each consisting of two 200-MWe units.

As design coordinator, supervised the work of architect-engineers on the design of balance of plant items (secondary, process, service, liquid and solid radwaste systems, etc.) and coordinated interface areas between nuclear designers and the A-E. Reviewed system designs with safety and regulating authorities, supervised scheduling and critical path networks, and coordinated quality assurance groups, for a CANDU-type nuclear power plant consisting of two 200-MWe units in Madras, India.

As erection superintendent, supervised the installation of nuclear equipment, piping, ventilation systems, bid evaluation, and contract management for installation of subsystems for a nuclear power plant consisting of two 200-MWe units in Rajasthan, India.

Operated a 40-MWt research reactor as a shift engineer and designed in-core and out-of-core test facilities. During the construction and commissioning phases of this reactor, was assigned to assist the engineers (Shawinigan Engineering Company of Canada) in testing and commissioning of primary and process systems.

S. K. MALUR

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Assigned to the Central Electricity Generating Board, London, UK, for a period of 6 months to work on bid evaluation for gas-cooled reactors.

Assigned to Atomic Energy of Canada, Ltd., Toronto, for a period of 3 months to work on: fuel engineering, physics and fuel vibration in flow channels for CANDU-type reactors. During this period reviewed fuel fabrication specifications and visited fuel fabrication plant for discussions with fabricator. Conducted tests to determine vibration characteristics of fuel assemblies in test loops.

MEMBERSHIPS

American Nuclear Society

American Society of Mechanical Engineers

DONALD J. McGUIGAN

EDUCATION:

Triangle Institute of Technology, Associate Degree, Architectural Drafting and Construction, 1978

Bechtel Power Corporation, Training Courses
Pipe Support Engineering, 1979
Power Plant Piping, 1978

EXPERIENCE:

NUS CORPORATION, 1980-Present
Bechtel Power Corporation, 1978-1980

NUS - Performed piping system analysis to ASME Boiler and Pressure Vessel Code, Section III, and ANSI B31.1 Power Piping requirements. Project tasks range from the initial updating of the "as-built" geometric piping model to the evaluation of that model through finite element techniques for static and dynamic loading conditions. Performed load evaluation for equipment and support geometries.

Designed and performed analysis of new and modified pipe supports in accordance with the ASME Boiler and Pressure Vessel Code Section III, NF. Finite element computer codes such as HANGIT, PIPESD, PIPSYS, STRUDL, and STARDYNE were used extensively for the performance of the above task.

Developed procedures for fabrication, installation, and evaluation of test apparatus for high density spent fuel storage racks, and monitored the work effort by field personnel on site.

Bechtel - Responsibilities included designing and drafting new and existing piping and HVAC systems. Performed complete system checks to ensure the correspondence of the piping isometrics, layout drawings and P&ID's.

Job site experience included work with the pipe stress and pipe support groups in reviewing as-built piping isometrics and pipe support design configurations. Resolved and answered field change requests on various systems involving a broad range of piping and engineering problems.

Participated on NRC Bulletin 79-14 work efforts in preparing walkdown packages to ensure acquisition of all required data. Assigned to job site to coordinate information and resolved problems between walkdown crews and home office.

THOMAS F. MULGREW

EDUCATION

Goldey Beacom College, A.A., Business Management, 1976
U.S. Navy schools in mechanical and electrical engineering, 1949-1956

EXPERIENCE

NUS CORPORATION, 1980-Present
Westinghouse Electric Corporation, Krsko, Yugoslavia, 1979-1980
Sargent & Lundy Engineers, 1977-1979
United Engineers and Constructors, Inc., 1974-1977
Boeing Vertol Company, 1969-1974
Overhaul and Repair, 1968-1969
U.S. Navy, 1949-1968

NUS - Provides consulting services in the fields of engineering and quality assurance (QA). Areas of expertise include power plant systems and components, plant startup, nuclear records, QA, computerized information systems, and project planning. Typical assignments include advising nuclear utility clients in the resolution of QA problems, performing QA program reviews and evaluations, review of plant documentation as well as audits and surveillances.

Was assigned as lead site engineer responsible for interfacing with the client for installation, erection, and for the startup testing of the Off Gas Charcoal System for a BWR. Was assistant project manager of a nuclear utility project involving up to 50 engineering and QA personnel. This project involved evaluating the abilities and performance of material suppliers, reviewing QA programs used by vendors, reviewing plant equipment and material and the related documentation, and determining if the applicable codes and standards have been correctly applied. Was responsible for supervision of project personnel, planning, scheduling, and client interface.

Westinghouse - Senior startup engineer. Developed and implemented inspection and testing procedures for plant startup. Was responsible for quality assurance/quality control activities and documentation related to plant startup. Verified proper installation of plant equipment and components, reviewed and approved testing procedures, and monitored testing activities. Reviewed and verified all plant documentation provided to client. Ascertained that all activities were conducted in accordance with applicable codes and standards, regulatory requirements, and contractual commitments. Interfaced with client personnel on QA concerns. Conducted audits and surveillance of plant activities. Certified as Lead Auditor in accordance with ANSI N45.2.23 and Level III inspection personnel in accordance with ANSI N45.2.6.

Sargent & Lundy Engineers - Was senior construction engineer responsible for supervising activities for the Construction Management Division's mechanical scope of work for nuclear projects. Verified that proper documentation was generated for activities. Was responsible for supervising and programming the Computer Take Off System. Provided detailed reports on piping, hangers, valves, welds, and system mechanical components

THOMAS F. MULGREW

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from vendors through site receiving, erection, and testing. Also was responsible for procedure preparation, special studies, and review of documents to support the project's construction effort.

As supervisor of QA/QC projects, was responsible for the supervision and coordination of all QA activities for the Construction Management Division on nuclear and fossil-fueled projects. Supervised and delegated work to QA/QC engineers assigned to projects. Responsible for the conformance of project activities to applicable quality requirements. Reviewed project plans and schedules for quality-related activities to ensure the timely and effective implementation of QA procedures. Was responsible for writing the Division's QA/QC program for nuclear and fossil-fueled power plants.

United Engineers and Constructors - Involved in all phases of plant startup from construction to cold hydros. Responsible for QA/QC activities related to mechanical and electrical systems. Reviewed documentation generated for technical compliance and accuracy prior to turnover to the client. Reviewed procedures and instructions to verify that testing and startup activities were in accordance with codes, standards, and regulatory requirements. Witnessed system testing activities, as well as system flushing, cleaning, and hydrolasing. Certified as Level II for Mechanical/Electrical Testing in accordance with ANSI N45.2.6.

Boeing Vertol - As field engineer, provided technical assistance and training to customers in electrical, mechanical, and hydraulics maintenance with emphasis on quality control. This included tours in Viet Nam and Spain. Was responsible for setting up a maintenance school in Spain and for teaching and training Spanish Army personnel as instructors.

Was senior technical writer and planned the format of new or revised publications. Assigned tasks to writers and ensured that manuscript and artwork were prepared in accordance with specifications.

Overhaul and Repair - As computer technician, used computer to troubleshoot electronic systems. Was responsible for reviewing and updating the computer program. Responsibilities also included maintenance and modification of the computer as needed.

U.S. Navy - As mechanical-electrical maintenance supervisor, was responsible for supervising maintenance on military aircraft. Responsibilities also included training personnel on various systems of military aircraft and certifying QA/QC inspectors. Three years of this time was spent as senior instructor teaching electrical and electronic systems. Was qualified QA/QC engineer.

MEMBERSHIPS

American Nuclear Society
American Society for Quality Control
The Western Society of Engineers

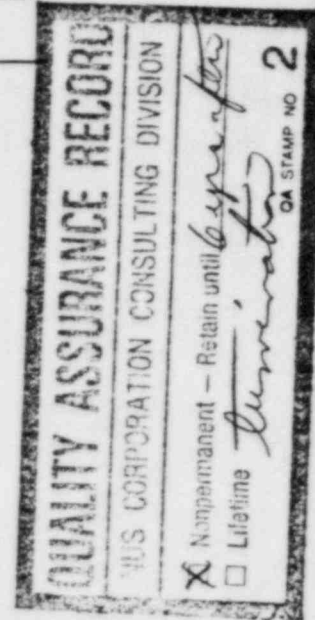
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Quality Assurance Certificate

This is to certify that Thomas F. Mulgrew has successfully completed the Requirements of Consulting Division Procedures for "Qualification & Certification of Quality Assurance Personnel" for the following level and classification:

Qualifications Lead Auditor per ANSI N 45.2.23

Discipline QA Program & Program Implementation



Meredith Senac
Quality Assurance Administrator
Consulting Division

Certification Date February 28, 1984

Expiration Date February 28, 1985

BARRY N. NAFT
MANAGER, LICENSING AND TECHNOLOGY

EDUCATION

Purdue University, Ph.D., Nuclear Engineering, 1968
Clarkson College of Technology, M.S., Chemical Engineering (Nuclear Option), 1966
Clarkson College of Technology, B.S., Chemical Engineering, 1965

REGISTRATION

Professional Engineer (Nuclear), State of California, 1715

EXPERIENCE

NUS CORPORATION, 1974-Present
Science Applications, Inc., 1973-1974
Nuclear Fuel Services, Inc., 1971-1973
Westinghouse Electric Corporation, Nuclear Energy Systems, 1967-1971

NUS -- Responsible for management of NUS consulting services in the area of licensing support, systems safety evaluations, nuclear operations and maintenance technical support, nuclear fuel services, and automated engineering data base applications. This effort includes support in the preparation of safety analysis reports and amendments, preparation of engineering procedures, computerized commitment lists, technical information services, and preparation of special studies on significant licensing and safety-related issues for commercial, utility, and government organizations.

Responsible for project management activities which involve a broad range of technical disciplines such as the preparation and review of the Safety Analysis Report for the San Onofre Nuclear Generating Station and the regulatory review of all six nuclear power plants for the Republic of China and preparation of a safety-related systems design report for the first commercial high level waste storage facility.

Science Applications -- Manager, Fuel Management, responsible for consulting services relating to the environmental impact and safety and licensing of nuclear fuel process facilities. Provided support to the Reactor Safety Study (Rasmussen Report) in the evaluation of relative hazards to the public from the inadvertent release of toxic chemicals. Directed a major support effort in the preparation of the Generic Environment Statement on Mixed Oxide Fuels (GESMO) for the Nuclear Regulatory Commission.

Nuclear Fuel Services -- Supervisor, Nuclear Methods, responsible for the development of analysis models for prediction of nuclear safety, transient analysis, and fuel design. Directed an extensive effort for the Edison Electric Institute relating to plutonium utilization. Provided technical support in the analyses of process safety considerations for the NFS West Valley spent fuel reprocessing plant.

BARRY N. NAFT

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Westinghouse Electric Corporation -- Senior Engineer, involved in a broad range of tasks for the engineering development section, including analyses of data from operating plants, development of nuclear-thermal-hydraulic methods, analyses of transient operation and its interaction with control and safety systems.

MEMBERSHIP

American Nuclear Society (Chairman, Fuel Cycle Division)

PUBLICATIONS

"Creation of Licensing Criteria Accelerates," *Electrical World*, Vol. 187, No. 6, March 1977.

"Safety and Licensing Evaluation of German Pebble Bed Reactor Concepts" (coauthor), C00-4057-2, November 1977.

"Reference Manual for Preparation of Safety Analyses Reports at the Rocky Flats Plant" (Coeditor), preparation for Rockwell International Corp., NUS-1747, June 1976.

"Survey of Technical and Social Issues Relating to Nuclear Safety" (Editor), prepared for Japan Atomic Research Institute, NUS-1646, February 1976.

"Risk Assessment of Large Spills of Toxic Materials" (coauthor), 1974 National Conference on Control of Hazardous Material Spills, August 25, 1974.

"Computational Modeling of Nuclear Power Requirements" (coauthor), 1974 Summer Computer Simulation Conference, July 9, 1974.

"Alternatives and Cost Benefit Analysis for the Generic Environmental Impact Statement on the Mixed Oxide Fuel Cycle (GESMO)" (coauthor), Science Applications, Inc., May 17, 1974.

"The Effect of Regionwise Power Sharing on PWR In-Core Fuel Management," *Trans. Amer. Nuc. Soc.*, Vol. 15, p. 655, November 1972.

"Plutonium Recycle in Light Water Reactors," Purdue Fuel Management Workshop for Utilities (guest lecturer), July 1972.

"The Average Energy Per Fission for Light Water Reactors," Nuclear Fuel Services, Inc., May 1972.

"Pressurized Water Reactor Optimal Fuel Management" (coauthor), *Nuclear Technology*, 14, p. 111, May 1972.

"Pressurized Water Reactor Optimal Fuel Management" (coauthor), *Nuclear Technology*, 14, p. 111, May 1972.

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BARRY N. NAFT
Page Three

"ADDS - An Automatic Design and Depletion Sequence" (coauthor), WCAP-7464, Westinghouse Electric Corporation, April 1971.

"A Direct Search Algorithm for Optimizing Fuel Loading Patterns in PWRs" (coauthor), Trans. Amer. Nuc. Soc. Vol. 13, p. 40, July 1970.

"Determination of Acceptable Site Specific Shipment Frequency (SSF) of Hazardous Chemical Shipments Past Nuclear Power Plants" ENS/ANS International Topical Meeting on Nuclear Power Reactor Safety, Brussels, Belgium October 16-19, 1978.

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BALJIT S. NANDA

EDUCATION

Delhi University, India, B.S., Civil Engineering, 1969
North Dakota State University, M.S., Civil Engineering, 1972
University of Northern Colorado, M.B.A. Studies, 1977

SPECIAL COURSES:

Computer Workshop for Engineers - North Dakota State University, 1972

Multi-Protection Design - Defense Preparedness Agency - 1974
Structural design concept to reduce the probability of damage caused by earthquake, nuclear blast, thermal shock, and tornadoes.

Computer Method for Structural Analysis - University of Colorado, 1975

Dynamic analysis of structural systems subjected to various forcing functions including cyclic loading, shock loading, and earthquake loading.

Pipe Stress and Pipe Support Training - Stone & Webster Continuing Education Division, 1977

To perform pipe flexibility analysis in the piping system with computer and design of pipe supports.

Radiological Safety Course - Stone & Webster Engineering Corporation, 1977

REGISTRATION

Professional Engineer - States of Colorado, Minnesota, North Dakota, California, Nebraska

EXPERIENCE

NUS Corporation, 1982-Present

Stone & Webster Engineering Corporation, 1975-1982

Stearns-Roger, Inc., Denver, 1974-1975

Foss, Englestad and Foss, Minnesota, 1972-1974

Solien L. Vernon Consulting Engineer, North Dakota, 1970-1972

Delhi Development Authority, State of New Delhi, India,
1969-1970

National Building Construction Company, New Delhi, India,
1967- 1968

BALJIT S. NANDA
PAGE TWO

NUS Corporation - Responsible for the performance of technical evaluations of civil and structural adequacy of power plant structures and components; on-site assistance to utilities for the performance of a variety of consulting, engineering and licensing tasks related to plant design and operation.

Stone & Webster Engineering Corporation -

As Project Engineer for 470 MW-PWR Fort Calhoun Station owned by Omaha Public Power District, was responsible for providing engineering services on various TMI modifications, Fire Protection Modification and Retrofit Modification as required by Nuclear Regulatory Commission. Duties included preparing reports and responses to questions regarding licensing documents for submittal to NRC, interpretation of NRC Bulletin requirements, preparation of conceptual design, interfacing with client and NRC, completion of design packages, preparation of public bid documents, bid evaluation, interfacing with vendors and contractors, reporting progress to client and management and following the job to successful completion. Supervised up to 40 persons on the project.

As a Task Engineer on loan to OPPD, was responsible for Conceptual Studies, reviewing project design and project management cost estimates, directing A/E during conceptual and detail design, maintaining criteria change control and cost/schedule control, coordinating support organizations, reviewing and advertising construction bid packages, requesting quotations for materials, bid evaluations, providing technical direction during construction, reviewing manpower estimates during design and construction, negotiating claims and change orders and reporting project status for Fire Protection and retrofit modifications. Performed various complex dynamic analysis, seismic analysis, finite element analysis, load drop analysis, structural design for tornado loads and reviewed work performed by various A/E firms.

As Planning and Scheduling Engineer, responsible for project scheduling and control, establish milestones and schedules, cost estimate, cost control and cost projections. Coordination with clients and support disciplines, logic network and preparation of reports. Familiar with computer programs for project management.

As Lead Structural Engineer, responsible for structural preliminaries; construction and manpower estimates; preparation of specifications, design and drawings; seismic and dynamic analysis; coordination with other engineering disciplines; construction forces for nuclear power plants; and supervised structural design and engineering group.

BALJIT S. NANDA
PAGE THREE

Stearns-Rogers Inc. - Assigned as Design/Support Engineer and performed various complex dynamic analysis, seismic design, finite element analysis on various nuclear, coal fired hydro-electric power and industrial plants, supervised design group. Also performed design of structural components and reviewed shop drawing, construction drawings.

Foss Englestad and Foss - As Design/Support Engineer performed various complex dynamic analysis, seismic design, finite element, analysis on various power and industrial plants, supervised design group. Performed design of structural components and reviewed shop and construction drawings.

Solien Vernon Consulting - Performed design of structural components and reviewed shop and construction drawings. As Design/Support Engineer, performed various complex dynamic analysis, seismic design, finite element, analysis on various power and industrial plants, and supervised design group.

Delhi Development Authority, State of New Delhi, India - Supervised the construction of a 21-story office building (responsible for layout survey, quality control, construction inspection according to the drawings, estimation of work completed and monitoring of payment schedule to the contractor).

National Building Construction Company, New Delhi, India - Performed survey of city streets for layout of new sewer pipelines in the City of New Delhi while studying for B.S. at Delhi University.

MEMBERSHIPS

American Society of Civil Engineers
National Society of Professional Engineers

PUBLICATIONS

"Typical Moisture Density Curves" (Civil Engineering Department, N.D.S.U., 1972) To predict maximum dry density and optimum moisture with one-point proctor test for soil compaction. This method being more accurate, economical, and faster is being used by the North Dakota State Highway Department.

"In-Plane Shear Strength of Cold Formed Steel Members", M.S. Thesis, North Dakota State University, 1972.

WARREN P. PURCELL, JR.

EDUCATION

Anne Arundel Community College, Business & Public Administration
Terre Technical Community College, Mechanical Engineering
Montgomery County Community College, Behavioral Management

CERTIFICATION

ANSI-N45.2.23 - Lead Auditor
ANSI-N45.2.6 - Level III Inspector
AWS Welding Inspector #79112181

EXPERIENCE

NUS CORPORATION, 1980-Present
Waldinger Corporation, 1978-1980
Bechtel Power Corporation, 1974-1978

NUS - Project quality assurance engineer. Performed vendor evaluation (program review and approval, audits, and vendor surveillance); procurement document review and approval; fabrication follow and source inspection/release for the following nuclear component procurements.

Rochester Gas & Electric Company
- H₂ Monitoring Equipment and
Code Valves

Wash. Public Power Supply System
Commonwealth Edison Company
- Spent Fuel Storage Racks

Consumers Power Company
- Auxiliary Fuel Handling Hoist

Carolina Power & Light Company
- Valves

Responsible for the review and approval of design documentation to ensure compliance with client requirements, NUS quality program, and NRC criteria for the following projects:

Carolina Power & Light Company
- AOG System Backfit
- Cold Shutdown System
- Appendix R Modification

Rochester Gas & Electric Company
- Post Accident Sampling System
- Containment Hydrogen System

Commonwealth Edison Company
- Spent Fuel Storage Racks
- Control Room HVAC Modification

Virginia Electric & Power Company
- Equipment Qualification Program

Consumers Power Company
- Auxiliary Fuel Handling Hoist

WARREN P. PURCELL, JR.
PAGE TWO

Additional duties as staff quality engineer include 1) the development, promulgation, and maintenance of the Engineering Division quality assurance program, 2) performance of quality assurance audits for verification of project/procedural compliance to the Quality Assurance Program, and 3) active participation (as a member of the Audit and Compliance Committee) in the CASE Register.

Waldinger - Developed and maintained the corporate supplier quality program (ANSI-N45.2.13), project quality assurance program and procedures for the WPPSS-2 contract, analyzed and prepared bid documents, also responsible for design/procurement document review and approval, and training.

Bechtel - Verified the fabrication, installation, testing, and documentation of nuclear piping systems, mechanical components, and instrumentation and control systems at the Palo Verde Nuclear Generating Station. In addition, provided interface with the HVAC subcontractor to ensure proper implementation of their quality program and contractual requirements, provided training programs for certified inspectors, prepared and approved work plan procedures and checklists, and assumed the responsibilities of Lead QC Mechanical/Piping Engineer in the absence of the supervisor.

On a temporary assignment at the Davis-Besse Nuclear Generating Station for support of operational testing, inspected, examined, and verified preoperational testing activities to assure compliance with the requirements of the Technical Specification. Reviewed and approved preoperational, functional, periodic, and operational test procedures. Developed and approved QA Instruction Procedures.

Monitored and verified the activities of the Construction Startup Test Group at the Calvert Cliffs Nuclear Power Plant. Coordinated the Quality Control Test Inspection for integrated leak rate, structural integrity, and local leak rate tests. Performed inspections of piping and instrument and control systems to ensure that the fabrication and installation activities were in accordance with project documents. Participated in the design and compilation of a computer-controlled records retrieval system, which traced components, subcomponents, and spare parts to the required documentation records.

MEMBERSHIP

American Welding Society

15 September 1982

To: Auditor Qualification File

From: B.W. Burak - Director of Quality Assurance *Burak*

As a supplement to Mr. W. P. Purcell, Jr. Auditor Qualification folder, this letter is to document that the system established to qualify this individual as a Lead Auditor is in accordance with the requirements prescribed in ANSI -N45.2.23 - 1978.



Engineering Division

This is to certify that

W. P. Purcell, Jr.

is qualified to perform
Audits of Quality Assurance Programs

as a

Level III Auditor

Bob B. [Signature]

Director of Quality Assurance

10/31/81

Date

NAME: W. P. Purcell, Jr.			<input checked="" type="checkbox"/> LEAD AUDITOR	<input checked="" type="checkbox"/> AUDITOR	
AUDIT NO.	DATE	AUDIT DESCRIPTION	AUDIT NO.	DATE	AUDIT DESCRIPTION
EDB-42	12-80	Project 5307, 08&09 QA Plans	NUS-84-4	3/23/84	INTERNAL AUDIT OF PRAT. 8886 - R.G.I.E
EDB-43	12-80	Procurement Act.	NUS-84-5	4/13/84	EDQA AUDIT OF EDP-20 "TRAINING"
NUS 81-3	3-81	Project 5387 & 5417 QA Plans	NUS-84-7		EDQA AUDIT OF EDP-10 "SOFTWARE PROGS."
NUS 81-4	5-81	EDP-11.0 Internal Audit			
NUS 81-6	6-81	Project 5437 QA Plan			
NUS 81-8	6-81	EDP-11.0 Internal Audit (Process)			
NUS 81-14	10-81	Project 5373 Non S/R			
NUS 81-16	11-81	PROJECT 5417			
NUS-81-17	12/81	EDQA INTERNAL AUDIT - PROJ. 5257			
NUS-82-1	1/82	EDQA INTERNAL AUDIT - PROJ. 5257			
NUS-82-5	2/82	INTERNAL AUDIT OF PROJECT 5257 (DEC)			
NUS-82-7	5/82	INTERNAL AUDIT OF PROJECT 5257			
NUS-82-8	5/82	MANUAL FACILITY AUDIT - P.T.			
NUS-82-9	6/82	INTERNAL AUDIT OF PROJ.			
NUS-82-E	1/82	LOCAL AUDIT OF PROJECT 5257			
NUS-82-11	7/82	INTERNAL AUDIT OF EDP-10.0			
NUS-82-13	7/82	LOCAL AUDIT OF ITT GRINWELL			
NUS 82-17	10/82	INTERNAL AUDIT OF PROJECT 8755			
NUS 82-20	11/82	EDP-5.0 AUDIT			
NUS-83-5	9/29/83	AUDIT OF PROJ. (EQ) 5437			
NUS-83-10	10/83	AUDIT OF PROJECT 5720			
NUS-83-15	11/11/83	AUDIT OF 8827 "R&E DAS"			
NUS-84-1	1/23/84	Surveillance of Proj. 8889 - Smelter Examination			
NUS-84-2	2/7/84	Internal Audit of Proj. 8766 - C.P.S.			
NUS-84-3	2/23/84	Internal audit of Proj. 8829			



INTERNAL CORRESPONDENCE

TO: Auditor's Qualification Folder

EDQA-82-003

DATE: January 7, 1982

FROM: B. W. Burak, Director of QA *BWB*

COPIES:

SUBJECT: Evaluation of Employees Communication Skills

This letter to Mr. P. Purcell's auditor qualification folder attests to the fact that the oral and written communication skills exhibited by this employee, during scheduled audit activities, have been evaluated and are sufficient in the presentation of factual evidence to concerned organizations.

WPP/tjs

NUS CORPORATION
ENGINEERING DIVISION

RECORD OF AUDITOR QUALIFICATIONS

NAME Warren Patrick Purcell, Jr.	DATE October 30, 1981
-------------------------------------	--------------------------

QUALIFICATION POINT REQUIREMENTS		(10 POINTS MINIMUM)
EDUCATION - University/Degree/Date		4 Points Max.
1. Undergraduate Level	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	REMARKS
2. Graduate Level	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
3. Other	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
SUBTOTAL		-
EXPERIENCE - Company/Dates		-9 Points Max.
Technical (0-5 Points) and	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	REMARKS
Nuclear (0-1 Point) or	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	REMARKS
Quality Assurance (0-2 Points) or	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	REMARKS
Auditing (0-1 Point)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	REMARKS
SUBTOTAL		9
PROFESSIONAL ACCOMPLISHMENT - Certificate/Date		-2 Points Max.
1. P.E.	<input type="checkbox"/> YES <input type="checkbox"/> NO	REMARKS
2. Society	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Certified AWS Welding Inspector
3. Other	<input type="checkbox"/> YES <input type="checkbox"/> NO	Nov. 1979
SUBTOTAL		2
MANAGEMENT - Justification/Evaluation/Date		-2 Points Max.
Explain: Leadership, Past Performance		
SUBTOTAL		2
EVALUATED BY: (Name & Title) B. W. Burak, Director of QA		DATE: 10/30/81
TOTAL POINTS		13

AUDIT COMMUNICATION SKILLS Acceptable Not Acceptable

Evaluated by: (Name & Title) B. W. Burak, Director of QA

AUDIT TRAINING COURSES YES NO

Course Title or Topic

-
-

AUDIT PARTICIPATION YES NO

Location

- PAR Systems Corp. Minneapolis, Minn.
- Comsip-Delphia Co. South El Monte, Ca.
- Exosensor Co. Laguna Hills, Ca.
- Internal program audits
-

EXAMINATION YES NO

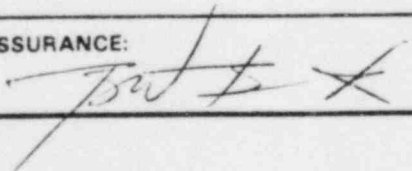
REMARKS

AUDITOR QUALIFICATION CERTIFIED BY: *B. W. Burak*
(Signature & Title) B. W. Burak, Director of QA Date Certified: 10/31/81

ANNUAL EVALUATION (Date)	10/20/82	10/14/83		
(Signature)	<i>B. W. Burak</i>	<i>[Signature]</i>		

**NUS CORPORATION
ENGINEERING DIVISION**

PERSONNEL CERTIFICATION RECORD

NAME: W.P. Purcell, Jr.		EMPLOYEE I.D. NO.: 3783	
DISCIPLINE	LEVEL OF CERTIFICATION	EFFECTIVE DATE OF CERTIFICATION	RECERTIFICATION DUE
Mechanical	III	10/30/83	10/30/85
I & C	III	10/30/83	10/30/85
Welding	III	10/30/83	10/30/85
Piping	III	10/30/83	10/30/85
BASIS FOR CERTIFICATION:			
<input checked="" type="checkbox"/> EDUCATION		<input type="checkbox"/> TRAINING	
<input checked="" type="checkbox"/> GENERAL EXPERIENCE		<input checked="" type="checkbox"/> JOB PERFORMANCE EVALUATION	
<input checked="" type="checkbox"/> SPECIFIC TECHNICAL CAPABILITY			
OTHER FACTORS: N/A			
LIMITATIONS OF CERTIFICATION: None			
DIRECTOR OF QUALITY ASSURANCE: 			DATE: 10/30/83

MEREDITH J. P. SENASACK

EDUCATION

Bucknell University, B.S., Mathematics, 1970

EXPERIENCE

NUS CORPORATION, 1978-Present
Prince George's County Fire Department, 1974-1978
National Bureau of Standards, 1970-1974

NUS - As Quality Assurance Administrator for the Consulting Division is responsible for developing and implementing the Consulting Division Quality Assurance Manual, auditing program implementation, maintaining quality assurance records, reviewing nonconformance to assure closure, training personnel in quality assurance, approving quality assurance plans, and verifying corrective actions.

Also responsible for consulting in the areas of quality assurance, management audits, information management systems, and records management. Areas of expertise include quality program and management audits, systems analysis, planning, design, and implementation; training and staff development; quality assurance; audio/video television applications; indexing; procedure development; and computer output microfilm.

Serves as project manager of on call management and quality assurance consulting services for a major electric utility. Managed and conducted management and quality assurance audits for operational utilities, fuel reprocessing facilities, fuel manufacturing facilities, and utilities under construction. Also verified compliance with regulatory requirements. Participated in a project for development of procedures for DOE facility QA programs.

Has performed a records management effectiveness study for a multi-unit nuclear power station; has prepared policies pertaining to information and records management for a major electrical system; and has performed audits of records and document control programs. Also developed and conducted a records management training course for a municipal government.

Managed an NUS-funded research project on indexing and retrieving nuclear records. Managed a project to design a computerized records indexing system to support records turnover and utilization throughout the lifecycle of the facility, from construction through decommissioning. Performed front end analysis and systems design for computer assisted information retrieval systems to support legal requirements during hearings.

Conducted a study of the effects of information disclosure practices within the nuclear industry in the United States for a foreign government. Has managed an audio/video applications program for a municipal government.

Prince George's County Fire Department - As Supervisor, Statistical Analysis and Records Division, managed programs, projects and resources. Was responsible for developing long-range goals, objectives, and programs; planning, implementing, and monitoring of projects and systems; budgeting; resource management; staff supervision; and training.

Major program areas within the Division included records management, data entry and verification, quality control of source documents and data bases, data base management, system design and development, public information and research and analysis. Work in these program areas involved implementation, monitoring, and refinement of systems after development; design, development, and testing of information systems and components; response to requests for information, reports, data, and statistics from the public and other agencies; and identification and analysis of problems areas, including proposal of solutions and prediction of impact of alternatives.

Provided technical liaison with other agencies; interfaced with State Fire Marshal's office and National Fire Reporting System; provided data and summaries to MNCPPC and COG. Supplied fire department requirements for Police Fire Computer Assisted Dispatching System; ensured that Rescue Report satisfied state requirements; interfaced with County Data Processing Division; justified projects, systems, and equipment through Data Processing Advisory Committee; coordinated projects with Data Processing Analysts and programmers to ensure fire department needs were satisfied; and signed off on completed projects.

Served on technical committees and attended regional, national, and international meetings on Fire Department Data Management; was active on Fire Rescue Information Systems Subcommittee of COG; attended national conference on Fire Protection Master Planning and 5th International Fire Protection Seminar in Germany.

National Bureau of Standards - As Project Leader for Fire Department Data Management Project and staff, was responsible for design, development, and implementation of flexible modular management reporting system for fire departments (MISC Modular Incident Reporting System). Work involved design for associated computer software; development of logical coding structures for data; design, test, and evaluation of reporting forms; study of information flow patterns within fire departments; training of fire service personnel as data reporters and users; and development of management tools to make use of the output, such as monthly reports and measures of output, effectiveness, and efficiency.

Major activities included technical liaison with the Fire Service and provision of support for Management Information Study Committee (MISC), which supplied fire service input to the program. Also served as interface between fire departments and other local, state, and national agencies.

Identified, analyzed, and evaluated existing data management practices. Assisted fire departments in identifying and implementing appropriate systems on the basis of their individual requirements. Applied new techniques from other disciplines to the fire area.

Related activities included budgeting and planning, inhouse contract and proposal evaluation, organization of, and participation in, technical conferences, interfacing with other Federal agencies, and input to design of the National Fire Reporting System (NIFE).

MEREDITH J. P. SENASACK
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MEMBERSHIPS

Association of Records Managers and Administrators
Nuclear Records Management Association
NRMA Committee on Regulations and Standards
American Micrographics Association

PUBLICATIONS & PRESENTATIONS

"The Real World of Indexing," NRMA, 1979.
"Indexing Design Workshop--Putting Principles into Practice," NRMA, 1980.
"Records Turnover Roundtable," NRMA, 1981.
"Specification for Master Computer System to Support Records Management," Houston
Lighting & Power Company, 1983.

THOMAS C. SMITH
MANAGER, MANAGEMENT SYSTEMS DEPARTMENT

EDUCATION

University of California at Los Angeles, B.A., 1968
California State University, graduate studies, 1971
Bechtel Power Corporation, Business Certification Program, 1982

EXPERIENCE

NUS CORPORATION, 1983-Present
Bechtel Power Corporation, 1972-1983
Holmes and Narver, 1971-1972
U.S. Army, 1969-1970

NUS - As manager of the Management Systems Department, is responsible for records management services, systems integration, records transition/turnover projects, office automation, records management training and staff development, configuration management, document/drawing control systems, and project management. Areas of expertise include nuclear and fossil power plants, architect-engineer services, design, construction management practices, and records management services for plant startup and operations.

Bechtel Power - As the Records Manager for the South Texas Project, was responsible for development and implementation of procedures and systems for reviewing, transferring, and accepting the project design records and documentation created by the previous architect-engineer to support Houston Lighting and Power Company's plans for the South Texas Project's Records Management and Information Processing System. Was instrumental in assisting HL&P, Bechtel, and Ebasco in deriving a single-source records management system from creation to turnover.

As project administrator for the Vogtle Project, was responsible for development and implementation of a computer-based nuclear records management system in conjunction with Georgia Power Company. This included managerial and technical responsibility for a 750,000 man-hour budget and a \$2 million computer budget. The project scope covered activities from records initiation to final turnover to the plant power generation department.

Previously, held a comparable position on a nuclear power project for the Taiwan Power Company, Southern California Edison and Salt River Project, as well as a series of increasingly responsible assignments on a variety of Bechtel nuclear and fossil power plant projects.

Holmes and Narver - As logistics analyst, provided a variety of logistical support services for the U.S. Antarctic Research Facilities in Christchurch, New Zealand, relative to U.S. government research activities in Antarctica.

THOMAS C. SMITH
Page Two

U.S. Army - As first lieutenant in the Signal Corps, was responsible for battalion communications, analysis of intelligence reports, and management of a civilian work force of 400 Vietnamese employees.

MEMBERSHIP

Nuclear Records Management Association, Charter Member.

FRED T. STETSON, JR.

EDUCATION

Rensselaer Polytechnic Institute, M.S., Chemical Engineering, 1964
University of Massachusetts, B.S., Chemical Engineering, 1962
University of Maryland, Reliability and Risk Assessment, 1982
University of California at Berkeley, Nuclear Power Plant Safety and Siting, 1972
Massachusetts Institute of Technology, Nuclear Power Reactor Safety, 1971
General Electric Company
 Radiological Physics and Engineering, 1969
 Control Theory Seminars, 1969
 Closed Loop Systems, 1968
 Naval Reactors Shielding Methods, 1967
Rensselaer Polytechnic Institute, Advanced Reactor Analysis; Reactor Design, 1965

EXPERIENCE

NUS CORPORATION, 1981-Present
Atomic Industrial Forum, 1975-1981
New England Electric System, 1974-1975
Yankee Atomic Electric Company, 1972-1974
General Electric Company, 1962-1972

NUS — Is responsible for providing technical assistance to the group executive, Consulting Group, serving as project manager and providing technical support for licensing programs of domestic and foreign utilities, and interacting with government agencies. These responsibilities include monitoring and reporting on rulemaking activities, reviewing safety analysis reports, preparing safety evaluation reports, and preparing special studies on significant licensing and safety issues.

Atomic Industrial Forum — As manager, Reactor Licensing and Safety Projects (1978-1981), was responsible for organizing and managing nuclear industry initiatives and U.S. Nuclear Regulatory Commission (NRC) communications on generic licensing and safety issues of concern to the industry. Served as technical secretary to a committee of approximately 100 industry licensing and safety analysis professionals, including participation in or oversight of 15 technical subcommittees. Was responsible for written and oral communications with the NRC at all levels of staff and management. Organized and directed annual international conferences on nuclear reactor licensing and safety.

As manager, Member Services (1975-1977), was responsible for AIF technical communications in a public affairs context. Has extensive speaking, debating, and media experience in the United States and abroad.

New England Electric System — As manager, Nuclear Information, was responsible for oral and written communications with regional, state, and local officials; the media; and the public concerning technical issues related to a proposed nuclear power plant in Charlestown, Rhode Island. Has extensive speaking, writing, debating, radio, and television experience throughout the New England region.

FRED T. STETSON, JR.

Page Two

Yankee Atomic Electric — As a nuclear engineer in the Nuclear Services Division, was responsible for overall coordination and partial authorship of the preliminary safety analysis report and the environmental report for the proposed Seabrook Station, Seabrook, New Hampshire. Was responsible for thermal-hydraulic engineering support for Vermont Yankee nuclear power station, Vernon, Vermont. Served as a member of the Vermont Yankee Nuclear Safety Audit and Review Committee.

General Electric — As a nuclear engineer at the Knolls Atomic Power Laboratory, performed engineering functions in the areas of mechanical design and analysis of in-pile test equipment; thermal-hydraulic design, analysis, and testing of prototype equipment; reactor physics analysis, including supervising the preparation of a computer code for evaluation of reactor power distribution experiments; reactor protection analysis; reactor transient performance analysis; shielding design of reactor servicing equipment; design physics calculations for nuclear instrument response; and reactor accident analysis and safeguards. Responsibilities included oral presentations to the AEC Division of Naval Reactors and documentation of design analysis and results for shipboard reference.

HONORS

Tau Beta Pi, National Engineering Honor Society, 1961

MEMBERSHIPS

American Nuclear Society
National Public Information Committee

PUBLICATIONS

"How PRA Is Being Used in the U.S.A." (coauthor), *Nuclear Engineering International*, Vol. 27, No. 328, June 1982.

Summary and Analysis of Safety Goal Proposals (coauthor), NUS-3871, 1981.

Comments on NUREG-0739, "An Approach to Quantitative Safety Goals for Nuclear Power Plants" (principal author), Atomic Industrial Forum, Committee on Reactor Licensing and Safety, March 1981.

Comments on 10 CFR 50, Domestic Licensing of Production and Utilization Facilities; Consideration of Degraded or Melted Cores in Safety Regulation, Advance Notice of Proposed Rulemaking (45 FR 65474) (principal author), Atomic Industrial Forum, Committee on Reactor Licensing and Safety, December 31, 1980.

"The Accident at Three Mile Island," presentation to the Annual Meeting of the Health Physics Society, Philadelphia, Pa., July 9, 1979.

"Congressional Hearings on Nuclear Safety and the Report of the Risk Assessment Review Group," presentation to AIF Public Affairs conference, Kansas City, Mo., February 27, 1979.

FRED T. STETSON, JR.
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"Congressional Hearings on Nuclear Safety and the Report of the Risk Assessment Review Group," presentation to AIF Public Affairs conference, Kansas City, Missouri, February 27, 1979.

Statement on Risk Assessment (coauthor), Atomic Industrial Forum, Committee on Reactor Licensing and Safety, February 1979.

"Nader's Nuclear Nonsense," review of The Menace of Atomic Energy, by Ralph Nader and John Abbots, published in Business and Society Review, 1977.

"U.S. Nuclear Non-Proliferation Policy, Domestic and International Effects," presented to University of Maryland Graduate School Seminar, March 7, 1978.

"Nuclear Power Opponents in the United States" presented to IXe Congres de Relations Internationales, Nuclear Development and Proliferation, Quebec City, Canada, October 1, 1977.

"The California Initiative" (coauthor), Investment Dealers' Digest, July 13, 1976.

"Safeguards and the Public, The Utility's Role," in proceedings from Atomic Industrial Forum Public Affairs Workshop, Plutonium Safeguards and the Breeder, Knoxville, Tennessee, October 8-11, 1974.

Seabrook Station Environmental Report, (portions of) Chapter 2, "The Site," 1973.

Seabrook Station Preliminary Safety Analysis Report, (portions of) Chapter 2, "Site Characteristics," and Chapter 15, "Accident Analysis," 1973.

An Analysis of Steady-State Heat Transfer in a Spring-Loaded Dry Shipping Cask, KAPL M-6106, UC-38, General Electric Company, Knolls Atomic Power Laboratory, February 11, 1964.

CD 9/83

NUS CORPORATION

FRANK R. VAUGHAN

EDUCATION

University of Pittsburgh, M.S., Mechanical Engineering, 1959
Virginia Polytechnic Institute, B.S., Mechanical Engineering, 1955
Carnegie-Mellon University, Advanced Mathematics Program, 1965
Bettis Reactor Engineering School, 1962

EXPERIENCE

NUS CORPORATION, 1972-1978, 1980-Present
Print Control, Inc., 1978-1980
Honeywell Information Systems, Inc., 1971-1972
E. I. Du Pont Company, Textile Fibers Department, 1965-1971
Westinghouse Electric Corporation, Bettis Atomic Power Laboratory, 1956-1965

NUS - Performs various computer-related tasks over a complete range of activities from conceptual studies to final client training in use of developed systems. The computers utilized range from the IBM PC to the large CRAY mainframes, and include business and scientific applications.

Was a member of the NUS team involved in commercial development of the EMERGE package. This multi-man-year effort provides NUS clients with a system to satisfy the NUREG-0654 requirement relating to real-time dose assessment for planned and emergency releases from nuclear power plants.

Managed the NUS efforts in the conversion of 25 computer programs, of varying complexity, to operate on the CRAY 1S computer owned and operated by the United Information Services (UIS) of the United Telecom Group, Inc. These programs and other converted subsequently are the outgrowth of a cooperative venture with UIS who is currently making them available to domestic nuclear utilities under the commercial label of "Power."

Performed thermal-hydraulic and safety analyses of complex power systems for domestic and foreign clients. These activities involved the analysis of steady-state and transient problems, including independent review of such analyses, the development of related analytical and computer-based mathematical models, and the performance of methods training.

Coordinated the multidiscipline technical effort involved in the preliminary design evaluation of the reactor cooling system for TREAT upgrade. In supporting role, performed thermal evaluation in the conceptual design evaluation of the core support structure for TREAT Upgrade. Assisted with various safety analyses pertaining to subcompartment evaluation for the South Texas Project. Performed thermal evaluations in support of TREAT upgrade fuel design.

Conducted in-core thermal hydraulic analyses and provided training for domestic and foreign clients. Provided technical support for developing, maintaining, and transferring NUS computer systems relating to nuclear fuel economics and in-core thermal-hydraulic analysis on IBM/CDC computers. Performed in-core fuel performance

investigations for foreign clients. Functioned as manager of various projects with budgets ranging from \$10,000 to \$180,000, and involving from one to five engineers full or part time. Contributed to CFE's Laguna Verde and PGE's Boardman bid proposal evaluations. Assisted with plant evacuation analysis following a loss-of-coolant accident with the emergency core cooling system assumed inoperative. Provided statistical assistance to a domestic plutonium fuel manufacturer relating to compliance with AEC accountability requirements. Performed safety-limit analysis for university test reactor requesting AEC clearance for higher power operation. Assisted with conceptual modeling of subcompartments in nuclear plant analyses and modification of computer programs used for NRC subcompartment benchmark studies.

Print Control - As Vice President and Director of System Development was responsible for commercialization of the PCI-1000 systems and their installation at client sites. PCI-1000 is a financial management system (programmed in BASIC for Wang 2200 computers) designed for printing plants having annual gross revenues in the one to four million dollar range. It contains functions for estimating, order entry, job cost accounting, accounts receivables, payroll, accounts payable, inventory, general ledger and sales analysis. Four PCI-1000 systems were made operational.

Honeywell - Supported minicomputer marketing staff as software specialist (FORTRAN and assembly languages) in presales and postsales activities.

Du Pont - Assisted technical and management personnel as data processing specialist and statistical consultant. Taught elementary statistics course. Developed business systems in FORTRAN to perform financial cost forecasts, power plant cost allocations, and laboratory cost/work efficiencies. Adapted FORTRAN programs associated with dyestuff formula matching and CPM with manpower leveling methods. Completed original FORTRAN programs in operations research (network analysis and linear programming) and in quality control (sampling plans for continuous and attribute systems). Assisted engineering with statistically-based developmental tests including setup, implementation data collection, and analysis. Supervised minicomputer installation of dedicated laboratory data reduction system from initial economic studies to project completion.

Westinghouse - As thermal and hydraulic core design engineer, participated in Shippingport development for Core I fuel manufacturing through Core II design formulation, including onsite testing after Core I startup.

Investigated core performance associated with multi-pass/multi-orifice region hydraulic core configurations (ASME 62HT-45). Developed methods to estimate effects of fuel swelling, axial power shape, and local axial and radial power perturbations on core performance. Evaluated special problems such as erosion effects on core components, utilization of as-manufactured channel spacing data and performance of fuel element detection and location system. Performed reactor safeguard studies including cold-water and rod-ejection accidents and loss of flow transients.

Performed feasibility study of multi-reactor power stations including cost and consequence of reactor sequencing. Developed FORTRAN program to perform preliminary advanced core layouts. Formulated hydraulic configuration to accommodate characteristics of advance seed-blanket cores.

MEMBERSHIPS

Tau Beta Pi
Pi Tau Sigma

SELECTED PUBLICATIONS

"COVAN--A Computer Program to Evaluate the Required Reliability/Maintainability Characteristics to Achieve a Specified Availability for a General System" (coauthor), NUS-4424, November 1983.

"The Estimated Availability of Reprocessing Plants that Use Various Maintenance Concepts" (coauthor), NUS-4429, November 1983.

"SAAP--A Computer Program to Evaluate the Reliability Characteristics of a General System" (coauthor), NUS-4298, March 1983.

"TREAT-CS--A Computer Code to Evaluate the Operating Characteristics of the Existing TREAT Cooling System," NUS-3893, September 1981.

"TIRION-4 Code Users Manual for NUS Prime Computer System," NUS-3245, January 1981.

"CORRAL-2 Code User's Manual for NUS Prime Computer System," NUS-3720, December 1980.

"Preliminary Design Evaluation of Reactor Cooling System for TREAT Upgrade" (coauthor), NUS-3652, September 1980.

"Conceptual Design Evaluation of Core Support Structure for TREAT Upgrade" (coauthor), NUS-3583, April 1980.

"A Survey of Capital and Operating Costs for U.S. Nuclear Power Plants 1973-1977," NUS-3167, June 1978

"Fuelcost-V Code Description and User's Manual" (coauthor), NUS-3081, January 1978.

"A Survey of Licensing Issues and Plant Operating Experiences in Westinghouse 1100 MWe Plants," NUS-3063, November 1977.

"A Survey of Operating and Maintenance Costs for U.S. Nuclear Power Plants 1973-1976," NUS-3032, September 1977.

ELIZABETH A. VISSING

EDUCATION

Campbell University, B.S., Mathematics, 1977 (Cum laude)

EXPERIENCE

NUS Corporation, 1980-Present

Fairchild Space and Electronics Company, 1977-1980

NUS - As a senior engineer in the Radiological Analysis Department, performs shielding design analysis, radiation dose assessments, source term development, and consequence analyses of releases of radioactivity, toxic chemicals, and explosive vapors to the environment. Performed probabilistic studies in the areas of aircraft and missile impact on nuclear plants. Evaluated the offsite radiological consequences resulting from postulated loss-of-coolant accidents (LOCAs). Performed a spent-fuel-rack thermal analysis based on storage of higher burnup fuels. Evaluated the dose rates and integrated doses to electrical equipment, postaccident sampling equipment, and test coupons located in a spent-fuel pool using analytical and computer techniques. Provided technical support in the shielding design of a radwaste system building and several high radiation sampling systems. Participated in the installation and conversion of nuclear-related computer codes from CDC, Prime, and IBM computers to the APEX/CRAY-1 computer. Familiar with KAP-VI, ANISN, QAD-SQ, ORIGEN, and HEATING5 computer codes.

Fairchild Space and Electronics - As a quality assurance engineer, was responsible for developing and maintaining a failure analysis reporting system for testing and field use of military electronics systems and for providing trend data and reports to management and staff for resolution action. Participated in the identification, analysis, and resolution of failure trends. Assigned project quality engineer for military data annotation systems. Performed audits related to quality assurance. Trained and certified quality assurance and manufacturing personnel to military electronics specifications.

PUBLICATIONS

"High Radiation Sampling System Airborne Dose Assessment," NUS-3650, March 1981.

"Aircraft Accident Impact Analysis San Onofre Nuclear Generating Station Units 2 and 3" (coauthor), NUS-3805, April 1981.

"Indian Point Unit 2 High Radiation Sample Room Dose Assessment," NUS-4156, June 1982.

"Evaluation of the Dose Rate and Shielding Requirements for the HRSS Equipment," (contributor), NUS-3872, October 1981.

ELIZABETH A. VISSING

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"Detroit Edison Enrico Fermi 2 Radwaste Building Shield Design Report," NUS-4139, Vol II-IX, (contributor), June 1982.

"Offsite Hazardous Chemical Definition Program for the Midland Plant," Appendix D, (contributor), June 1982.

"Radionuclide Mass Balance for the TMI-Accident: Data Through 1979 and Preliminary Assessment of Uncertainties," NUS-4432, September 1983.

RICHARD D. WILDER
Project Manager

EDUCATION

University of South Carolina, B.S., Mechanical Engineering, 1952
Union College, graduate study in Mechanical Engineering, 1956

EXPERIENCE

NUS CORPORATION, 1970-Present
Hittman Associates, Inc., 1969-1970
Martin Company, Nuclear Division, 1959-1969
Knolls Atomic Power Laboratory, 1955-1959
U.S. Navy, 1952-1955

NUS - Managed engineering, design and procurement efforts for the backfit of reactor depressurizing system to the emergency core cooling system in an existing BWR nuclear power plant. The modification consisted of the addition of four high pressure blowdown valves, piping, pipe supports and actuation controls.

Managed engineering and design efforts associated with the addition of reactor coolant pump oil collection and storage system to an existing PWR plant. Performed the same function for an upgrade of the hydrogen addition system at a PWR plant.

Supervised the design work for an upgrade of an existing liquid and solid radwaste treatment system. The work consisted of adding an asphalt based volume reduction and solidification system and upgrading existing systems to accept the new equipment. New equipment included etched disk filter, coalescer-filter unit, centrifuge feed system and drum conveyors. Modified and added to the existing control system to allow it to be computer based and permit all operations to be controlled remotely. Other work included expansion of electrical distribution and HVAC to handle the increased power and thermal loads.

Recent assignments consisted of management of design and procurement activities for retrofit projects associated with fossil-fired generating stations including spreading room fire-suppression systems, modifications to pyrites conveying and storage system, upgrade of fuel-oil accounting systems, replacement of BFP recirculation valves, investigation of steam turbine water-induction protection, addition of crusher house dust collection systems, and addition of vibrators and level detectors to precipitator hoppers.

Another recent assignment included management of design, procurement and technical supervision of construction activities for a large retrofit project for a midwestern utility. Managed the engineering efforts of over 100 engineers and design personnel involved in the design of fly ash system modifications, bottom ash system backfits for recycle and reuse, improved boiler blowdown and drain systems, facilities for the treatment of metal-cleaning waste, and systems for the collection and treatment of coal pile runoff, contaminated yard areas, and roof runoff. Established both engineering and construction schedules; directed the development of system startup, operation and maintenance procedures; and participated in startup testing. The project had an installed cost of \$100 million, required 600,000 manhours, and was completed in 3.5 years.

Hittman - Directed design of electrical, instrumentation, and control systems for a combination isotope producing, desalting, and electric power plant. Prepared procurement specifications for electrical and instrumentation components. Developed primary, secondary, and auxiliary systems for the light water reactor plant.

Martin - Directed conceptual study of inspection and maintenance system for a gas-cooled reactor plant. Prepared designs for the in-service inspection equipment to be delivered with the reactor plant. Supervised the dockside testing and final trials of the MH-1A nuclear power plant. Assisted in planning and conduct of crew training in both classroom and field efforts. Coordinated the MH-1A engineering efforts of the architect-engineer with the base office engineering department. Assisted in resolution of shipyard construction problems while in residence at architect-engineer's office and later at the shipyard. Developed functional requirements for the PM-1 control and instrumentation systems based on analog computer simulation of core and plant systems. Prepared instrumentation specifications and performed vendor liaison during procurement and installation phases. Provided technical supervision during construction and acted as shift supervisor until plant turnover to the owner.

HOWARD J. ECKERT, JR.
MANAGER, ENGINEERING MECHANICS DEPARTMENT

EDUCATION

University of Illinois, Ph. D., Theoretical and Applied Mechanics, 1969
West Virginia University, M.S., Theoretical and Applied Mechanics, 1966
Lehigh University, B.S., Mechanical Engineering, 1962
Bettis Reactor Engineering School, courses in Reactor Materials and the Design of Experiments,
1973-1974
Carnegie-Mellon University, course in Finite Elasticity, 1972
University of Pittsburgh, courses in Viscoelasticity and Plasticity, 1971

REGISTRATION

Professional Engineer, State of Michigan, 1977
Professional Engineer, State of Massachusetts, 1975
Professional Engineer, State of Pennsylvania, 1974

EXPERIENCE

NUS CORPORATION, 1974-Present
Westinghouse, Bettis Atomic Power Laboratory, 1969-1974
University of Illinois, 1966-1969
U.S. Navy, 1962-1964

NUS — Responsible for the management of the Engineering Mechanics Department, which performs design analyses of structures, systems, and components and also develops and implements advanced analytical methods. Provides the direction for the department's technical, administrative, and financial operation as well as the coordination of both technical and marketing efforts.

Project experience includes the development and application of advanced analytical methods in such areas of mechanics as nonlinear dynamics, seismic analysis and testing, impact analysis, fluid-structure interaction, fracture mechanics and fatigue analyses, instability analyses, and elastic-plastic stress analyses. Assignments included performance of a site seismicity analysis and development of floor response spectra for a power plant containment building; establishing test requirements and procedures for the seismic testing of electrical equipment; conducting in-house courses in structural dynamics; initiating and directing a quality assurance program for the department; and performing stress and vibration analyses of many vessels and components. Directed the ASME B&PV Code analyses of fuel assemblies for a high-temperature, gas-cooled test reactor and the analysis of a core-support plate.

Prepared a topical report for review by the U.S. Nuclear Regulatory Commission on the NUS methods of performing seismic analyses of nuclear fuel storage racks. Established the methodology and directed the development of nonlinear dynamic seismic analysis techniques for assuring the structural integrity of nuclear fuel storage racks. Supervised the ASME B&PV Code Section III analyses of several piping systems. Reviewed, in part, the seismic and structural analysis of a nuclear power plant.

HOWARD J. ECKERT, JR.

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Bettis Atomic Power Laboratory — As Senior Engineer, evaluated the validity of design limits on strain for application outside the original qualified range. Assisted in the specification of portions of a structural design basis for core components in the areas of fracture mechanics and material properties. Consulted on the acceptability of reactor components that do not meet specified requirements.

Set up a general procedure for calculating elastic stress intensity factors for use in crack propagation analyses of structural members containing defects. Qualified the use of computer programs for the structural analyses of reactor core components. Performed stress and fatigue analyses. Evaluated the effects of a loss-of-coolant accident on fuel assemblies.

University of Illinois — Instructor in Engineering Mechanics

MEMBERSHIPS

American Society of Mechanical Engineers, Subcommittee on Pressure Vessels and Piping,
1976-Present
Sigma Xi

PUBLICATION

"Piecewise Polynomials and the Methods of Weighted Residuals for the Solution of Nonlinear Boundary Value Problems," Ph. D. dissertation, 1969.

TIMOTHY C. HARTMAN

EDUCATION

U.S. Navy, Nuclear Power School and Prototype
U.S. Navy, Machinist Mate "A" School
Geneva College, Programming Courses

EXPERIENCE

NUS CORPORATION, 1981-Present
Quadrex Corporation, 1979-1981
U.S. Navy, 1973-1979

NUS - As an engineer in the Maintenance Services Department responsible for providing consulting engineering services to electrical utilities in the areas of plant maintenance, preventive maintenance programs, spare parts programs, troubleshooting techniques and maintenance assistance. These services include providing computer software development and administrative assistance to on-site data processing groups.

Assigned to Fermi II Plant. Responsible to the Maintenance Engineer for the development and debugging of vendor supplied spare parts and maintenance scheduling computer programs. Knowledgeable in the area of spare parts procurement, specifications, and quality requirements. Specific areas of expertise include development of computer operating procedures, training program users, coordinating program enhancements, and developing administrative organization and procedures.

Quadrex - At Beaver Valley, Unit 1, was responsible for the operation of the computerized preventive maintenance scheduling, maintenance history, and NPRD reporting programs.

While at Beaver Valley became familiar with FORTRAN and IBM JCL on IBM 370 and the Project 2 Outage Scheduling Program. In addition, trained users in CICS time-sharing graphics programs for use on background radiation monitoring system. Also assisted in the development of a manual tracking system for technical specification cross-reference for post TMI STS.

U.S. Navy - Qualified Mechanical Operator at S-5G prototype reactor and on the USS Lewis & Clark (SSBN 644). Engine Room Supervisor on nuclear submarines, responsible for the operation and maintenance of all mechanical equipment.

11-16-83

WILLIAM D. LINDLEY

EDUCATION

Cornell University, "Principles of Management", 1979
U.S. Armed Forces Institute, Advancement Courses, 1966
U.S. Navy, Storekeeper Class A School, 1965
Cortland Jr-Sr High School, 1965

EXPERIENCE

NUS CORPORATION, 1983-Present
Cornell University, 1969-1983
U. S. Naval Reserve, 1963-1969

NUS -- As a project engineer, Information Systems, Consulting Division, participates extensively in the automated information management programs. Currently, project administrator for the industry sponsored Equipment Qualification Data Bank. Was project engineer during the development of a large scale equipment resale data base for the nuclear industry (PEQEX). Responsibilities in the EPRI EQDB Data Bank includes collecting, processing, upgrading, and loading seismic and environmental qualification data on electrical and mechanical equipment to be included in the data bank. The PEQEX data bank is used to list surplus inventory available for resale to the nuclear industry. Responsibilities in this area include initial setup and software design and implementation, preparation of input data, and custodial duties on new and existing data banks. Assisted in tracking commitments related to the L-reactor restart. This DOE Commitment Tracking Data Bank project consisted of data bank maintenance, support and weekly onsite project meetings, for the DEIS and PEIS for the L-reactor restart at Savannah River operations. In addition, assists with the identification and review of FSAR commitments, and the collection and evaluation of equipment qualification for data for nuclear power plants.

CORNELL UNIVERSITY -- As stock coordinator, managed all stockroom, shipping, receiving, warehousing activities for a national federally funded particle physics laboratory. Duties included, data base management of stock inventories, capital equipment records, and GSA surplus acquisitions. In addition, was radioactive and hazardous waste control officer.

U.S. NAVAL RESERVE -- As a storekeeper, operated the first Navy "PX" and "Clothing Store" in Danang, Vietnam. Maintained the "Master Stock Status Listing", U.S.S. Arcadia, Newport, Rhode Island.

JAMES A. NEMES

EDUCATION

George Washington University, M.S., Civil Engineering (Solid Mechanics), 1981
University of Maryland, B.S., Civil Engineering, (Structures), 1977

EXPERIENCE

NUS CORPORATION, 1978-1981; 1981-Present

Brown & Root, Inc., 1981

Planning Research Corporation/Systems Services Company, 1977-1978

NUS - Field Project Manager assigned to the Cincinnati Gas & Electric Wm. H. Zimmer site. Directed field crew during walkdown of safety related piping systems to verify compliance with NRC I.E. Bulletin 79-14. This effort involved determination and documentation of as-installed piping dimensions, pipe supports and associated equipment.

Provided technical and managerial assistance in the areas of mechanical design and engineering mechanics during review of subcontractor-analyzed piping systems and support design. In addition, provided the interface between the site and office for support modifications resulting from NUS-performed computer analysis.

Designed and analyzed structural and mechanical components and piping systems. Modeled piping systems and interrelated components for use in finite element computer programs such as PIPESD, STARDYNE, EASE, and NASTRAN. Evaluated base plate reactions to verify compliance with NRC Bulletin 79-02 using computer code STRUDL. Specific tasks include the analysis of pumps, heat exchangers and compressors in accordance with ASME Section III requirements, including Class 1 analyses for fatigue and thermal transients.

Brown & Root - Engineering Coordinator for Subcontractor performing piping analysis related activities for the South Texas Project. Interfaced with the subcontractor disciplines within Brown & Root and the utility. Specific functions included evaluating proposals, coordinating review of subcontractors work and resolving technical problems.

Planning Research Systems Services - Designed and analyzed ground support facilities for the space shuttle program. Specific activities include participation in the design of a radiation shield to be used in shuttle engine test firing, and design and analysis of pipe supports for liquid hydrogen and oxygen lines in accordance with AISC and space center codes. Also involved in the frequency analysis of the space shuttle crawler using computer program NASTRAN.

PERSONNEL ASSIGNED TO THE REVIEW OF DOCUMENTATION

1. P. C. Barkley
2. S. R. Demner
3. H. C. Jordan
4. A. C. Moses
5. P. G. Pope
6. R. V. Raman
7. B. A. Welch

PATRICIA C. BARKLEY

EDUCATION

University of New Orleans, B.G.S., 1980

University of West Florida, B.S., Systems Science, 1983

EXPERIENCE

NUS CORPORATION, 1984-present

Gold Card Travel Management, 1983-1984

NUS—Responsibilities include customer systems analysis, computer programming, data base management systems and computer assisted records management.

Analysis and upgrading of comprehensive accounting package for NUS' Licensing Information Service (LIS), used for automated processing of monthly statements, usage billing and personnel involvement tracking.

GOLD CARD—Directed installation/interface between Apollo Business Systems (ABS) and the existing United Airlines Apollo Reservation System.

Responsibilities included consolidation of ticketing function into an autonomous Ticketing Department. Trained ABS agent/operators and bookkeeper/operators. Defined policies and procedures to support these two departments.

Programmed custom client reports to be generated by ABS. Designed format for Apollo customer profiles.

HONORS

Magna Cum Laude, University of West Florida

MEMBERSHIP

Data Processing Management Association

SUSAN R. DEMNER

EDUCATION

University of Georgia, B.S., Computer Science, 1983

EXPERIENCE

NUS CORPORATION, 1983-Present

NUS — Is responsible for the maintenance and modification of several NUS software products including:

- o GDB - Generalized Data Base which is used in many utility and NUS data management applications.
- o MAILNET - The electronic mail program and similar electronic communications programs such as LISNET.
- o CFI - Command Fetch Interface which is a fourth level language used in the design of applications.

Developed a software module tied to GDB to create Gantt scheduling charts.

Responsible for the support of the several system directories, which contain the software used by NUS users. Also performs system programming on the Prime family of computers.

Also responsible for upgrading and developing procedural software and software modules for various applications such as:

- o EPRI - Equipment Qualification Data Bank
- o STSTS - Surveillance Test Scheduling and Tracking System
- o ASTS - Action Statement Tracking System
- o LIS/ADB - Licensing Information Service Automated Data Base.

Developed procedures for the documenting system covering software change, maintenance and notification to users. Is also responsible for maintaining that system.

HAZEL C. JORDAN

EDUCATION

Montgomery College, A.A., 1984

Currently working on B.A. in Business Administration, University of Maryland
Courses in the Publications Specialist Program, George Washington University, 1981

EXPERIENCE

NUS CORPORATION, 1977-Present

CSG Incorporated, 1976-1977

NUS - Currently working as engineering assistant providing support to nuclear power plant licensing activities for client utilities. Is the lead coordinator for the Detroit Edison project for updates to the Fermi 2 Final Safety Analysis Report (FSAR) and various other tasks. Serves as liaison between NUS Corporation and the onsite project manager at the Fermi plant. Is responsible for the entire amendment process from collecting and controlling final change notices, editing, word processing, review, final print stages, and docketing at the Nuclear Regulatory Commission. Also initiates training of new employees in the FSAR amendment process.

Assisted in the preparation of the procedure for the Fermi 2 FSAR amendment production and figure update and participated in the subsequent FSAR figure update project. Responsibilities included creating a data base on the Prime computer, determining figures for update, ordering engineering drawing mylars from the client's document control center, coordinating the photo reduction and paste-up process, and integrating updated figures into the FSAR amendments.

As senior production coordinator in the NUS Publications Division, served as liaison with clients through all phases of document production. Directed and coordinated amendments, reports, proposals, procedures, and brochures. Also was responsible for standardizing and revising all NUS corporate forms.

Previously was word processing technician. Duties included creating and editing documents on the Daconics, Xerox 850, and Kodak photo typesetter and communicating documents from NUS to other regions.

CSG - As word processing technician, created and edited documents for various societies such as the Epilepsy Foundation and the National Cancer Society.

ABINOAM CHELLADURAI MOSES

EDUCATION

Spicer Memorial College, Poona, India, 1961
St. Josephs College, Bangalore, India

EXPERIENCE

NUS CORPORATION, 1976-Present
Kidde Consultants, 1969-1976
Commonwealth Transportation Consultants, 1969

NUS - Provides administrative licensing assistance to nuclear utilities. Participated in a project to identify all Cincinnati Gas & Electric Company's commitments to the Nuclear Regulatory Commission; this involved review of I & E Bulletins, Circulars, Notices, and licensing documents. Provided similar onsite commitment identification assistance for the Carolina Power & Light Company. Was a member of the project team that introduced a surveillance test scheduling and tracking system at the Brunswick Plant for CP&L. Work consisted of collecting and recording data, and interviewing plant personnel to integrate the various types of surveillance tests required by technical specifications into the Scheduling and Tracking Program. Assisted in a technical specification verification program for Iowa Electric Light & Power Company, which included reviewing the technical specifications for internal consistency between sections, and for consistency between the technical specifications and their various surveillance procedures. Also participated in the quality assurance phase of a project that involved conversion of various nuclear energy analysis programs to the Cray-1 computer for United Information Services, Inc. Updated portions of the Surry FSAR based on plant modifications, reanalyses, and operational changes.

Previously, was an associate designer responsible for drafting and computing volumes and slopes for evaporation/percolation ponds for nuclear and coal-fired power plants; and for planimetry and auditing the tonnage and wheelage of coal and royalties paid by Cannelton Industries, West Virginia, to Mariners Museums each quarter. Drafted structural and concrete designs for high radiation sampling systems structures, electrical wiring diagrams, block diagrams and logic diagrams for Detroit Edison Company and Argonne National Laboratory.

Kidde Consultants - As a draftsman/designer, drafted new subdivision street grades in Montgomery, Anne Arundel, and Frederick counties, Maryland and Prince William County, Virginia, and profiles of storm drains and water and sewer systems. Computed earth quantities for grading and earth moving. Was also a rodman and chainman in survey crews.

Commonwealth Transportation Consultants - As a draftsman, drafted plans and profiles of highways, bridges, culverts, and grading for the Government of the Honduras.

PAMELA GREER POPE

EDUCATION

St. Petersburg Jr. College, courses toward B.S. in computer science

EXPERIENCE

NUS CORPORATION, 1975-Present
Honeywell, Inc., 1973-1975

NUS — As a senior engineer aide in the Consulting Division Licensing and Information Systems Department, is involved extensively with the Automated Information Management Program, which entails various data bank applications such as Customized Environmental Qualification Data Banks, Commitment Tracking Data Banks, Surveillance Test Scheduling Systems, and the EPRI Equipment Qualification Data Bank. Duties include initial setup and implementation of data banks, assistance in data collection and loading, preparation of users' manuals, custodian duties for established data banks, and training NUS clients in data base activities.

As manager of the Project Services Section, duties included overview and delegation of department administrative and word processing workload and all data loading activities. Was responsible for department project files from initial setup to project end in meeting company and industry QA requirements.

As a secretary in the NUS Licensing Information Services (LIS) Department, coordinated all secretarial duties for the LIS program. Was responsible for maintaining client contract and correspondence files; typing client correspondence for staff engineers; coordinating and allocating all international client requests; invoicing domestic and foreign clients; and maintaining current address, mailing, and client-contact lists. Also planned semiannual client-sponsored conventions, which included arranging hotel facilities and room reservations and planning banquet activities.

Honeywell — Served as secretary in the Product Assurance Department for two quality assurance supervisors and department engineers.

RAJI V. RAMAN

EDUCATION

Currently working on Ph.D. in Business Administration, Georgetown University, Washington, D.C.
University of Phoenix, M.B.A., 1983
University of Madras, India, B.S., Statistics, 1973
West Valley College and San Jose State University, Fortran IV, Cobol 68, and IBM Assembler, 1980-1983
Institute of Business Studies, Madras, India, Cobol 74, 1973-1974
Alliance Franchise de Madras, Diploma in French, 1970
American Management Association courses in Project Management and Line Management, 1980-1983
Control Data Corporation, CAD/CAM course, 1983
Oholone College, Pascal Programming, 1983

EXPERIENCE

NUS CORPORATION, 1983-Present
Quadrex Corporation, 1978-1983
Colonial Penn Insurance Company, 1976-1978

NUS - Participates in consulting activities related to fuel cycle services, including market projections, financial and economic analyses, and various technical surveys for utility, government, and other institutional clients. Is currently lead engineer on a survey for the Tokyo Electric Power Company on advanced power reactors and is project manager on load-following operation for Westinghouse-designed PWRs. Also involved in marketing and applications of the Fuel Data Base Program, which was designed primarily to account for both the quantity and the cost of all types of fuel consumed within an electric utility's power generating system. Is also involved in applications of GDB software to commitment lists and computerized technical specifications and in marketing and development of a computerized data base to word search and update FSARs and a computerized licensing commitment tracking system.

Was a staff engineer on the Unresolved Safety Issues Review Program and the Nuclear Rulemaking Review Program. Provided technical consulting support to improve safety compliance and to support plant operations, including spare-parts maintenance and component classification lists (Q-List). Supported NUS effort in review and analysis of the Inservice Inspection/Testing Program (IST) for Consolidated Edison of New York. Also assisted in NUS project to develop trend analysis and lessons to be learned for the Department of Energy's unusual occurrence reporting system using system SKS2000.

Quadrex - Was project engineer on Q-List projects and lead project engineer for a licensing commitment tracking system. Was responsible for software development and coordinating all computer applications and data base management systems.

Was responsible for the review and reevaluation of nuclear systems and components to establish their functions in safety-related and important-to-safety actions. Also assessed their quality level and seismic requirements. Plants involved were Grand Gulf, San Onofre, Limerick, and Beaver Valley.

RAJI V. RAMAN

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Developed rules and procedures for Q-List programs. Responsible for training Q-List personnel in-house and onsite. Was also involved with indoctrination and quality assurance audits for in-house projects. Generated procedures and a usage manual for the training of new personnel on Time Share. Performed analysis and programming using Fortran on the Prime computer systems. Generated tables and charts, and checked mathematical calculations using CDC, General Electric's Time Share and the Prime computer. Prepared various tasks using data available from blueprints. Worked on special assignments at GE for three months. This included testing Mark II containment 4TCO Tests, using various programs including GE's New Loads, to generate data.

Colonial Penn Insurance - As a data/systems analyst, served on an onsite team designing data flow diagrams which decided the input flow of the insurance business. Performed validation of input and produced two complete subsystem specification documents. Worked with the supervisor of claims coverage and analyzed the methods needed to computerize their business. Estimated cost for hardware and software, installed the system after it was programmed, and trained the users. Also trained the staff on balancing the computer reports.

MEMBERSHIPS

American Nuclear Society
Atomic Industrial Forum
Society of Woman Engineers

PUBLICATION

"Nuclear Plant Availability, Reliability and Myths," Master's Thesis, University of Phoenix, Phoenix, Arizona, 1983.

BENJAMIN A. WELCH

EDUCATION

University of South Florida, courses towards B.S. in mechanical engineering, 1975-1980
U.S. Navy submarine training courses in propulsion plant operation, pumping systems, hydraulics, pneumatics, atmosphere control, and air conditioning/refrigeration systems, 1970-1973

EXPERIENCE

NUS CORPORATION, 1981-Present

Westinghouse Electric Corporation, 1979-1981

Senior Engineering Technical Assistant, June 1981-September 1981

Engineering Technical Assistant, Breeder Reactor Component Project, August 1979-May 1981

U.S. Navy, 1971-1973

NUS — As junior engineer is responsible for assembling and operating an environmental qualification test facility that qualifies various system components for use under harsh environmental conditions associated with loss-of-coolant accidents in nuclear generating facilities.

Westinghouse Electric — Generated computer models of piping systems using interactive graphics terminals and software for stress analysis.

Set up and conducted equipment tests to determine process parameters. Designed and implemented special application tooling; wrote process specifications, project procedures, equipment reports, and specifications; wrote and issued purchase orders, prepared samples, and performed mechanical tests on process qualification materials.

Implemented a computer scheduling program based on the critical path methods, which included terminal updating of product status, interface with existing scheduling systems, and product structure revisions.

U.S. Navy — As nuclear submarine auxiliaryman (MM2), acted as planned maintenance and damage control petty officer. This included scheduling and assigning preventive maintenance tasks to members of division and inspection, and controlling shipboard damage control equipment. In addition, as leading second class petty officer, was responsible for operating and repairing shipboard hydraulic, high-pressure air, oxygen generating, HVAC, and seawater pumping systems.

MEMBERSHIP

Student Member, American Society of Mechanical Engineers

PERSONNEL PERFORMING INSPECTIONS

1. B. R. Bagwell
2. J. E. Craft
3. M. R. Crook
4. T. W. Fillingim
5. D. C. Flynn
6. K. E. Gunter
7. J. G. Kennedy
8. S. R. Kennedy
9. G. L. Krampholz
10. J. A. Larson
11. J. R. Orgeron
12. J. W. Ousley
13. G. L. Rush
14. D. G. Seelye
15. S. W. Smith
16. D. C. Tatousek
17. M. Vislay

BOBBY R. BAGWELL

Mr. Bagwell has over five years of instrumentation and control experience of which one year has been in the nuclear power generation industry. His experience includes performing loop calibrations, initial instrument calibrations, surveillance procedures and instrument repairs. Other experience includes performing instrumentation calibration, specification checks, and computer troubleshooting for the chemical and refinery industry. Mr. Bagwell has also worked as an electrical technician in the installation of low voltage electrical systems.

EDUCATION

Delta Ouachita Vocational Technical School, 1975
U.S. Navy Electronics "A" School, 1974

EXPERIENCE

NUS Corporation, 07/84 - Present
Cataract, Inc., 08/83 - 07/84
Harrison International Corp., 02/83 - 06/83
TCP Engineering & Construction, 06/81 - 01/83
Industrial Control Systems, 05/79 - 05/81
Trisler Electric, 08/78 - 04/79

NUS - Currently assigned as an instrument technician to the Waterford 3 nuclear plant. Performs cable and raceway walkdown as part of a field inspection team. Reports deficiencies to Louisiana Power and Light for resolution by engineering and quality assurance groups.

Cataract - As a Level II I&C technician at the LaSalle Nuclear Station, performed final calibration and startup of instrument and control systems. Provided preoperational test support and performed scheduled instrument surveillance procedures. Repaired and tested Westinghouse 7300 control systems and components.

Harrison - As an electrical technician, performed termination, troubleshooting, checkout, and calibration of fire protection systems. Also, checked out annunciator systems.

TCP - As an electrical instrument technician, performed instrument loop calibrations and provided preoperational and startup test support. Additionally, worked as an electrician on low voltage systems, including LDC-40 Line-of-Logic Computer Systems.

B. R. Bagwell
Page Two

ICS - As an instrument technician, performed instrument calibration, instrument loop calibration, and startup troubleshooting on instrument and control systems.

Trisler Electric - As an electrical technician, installed conduit and cable for instruments. Terminated and calibrated instruments. Performed loop calibration testing.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

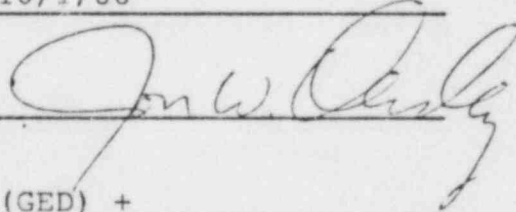
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Bobby R. Bagwell

ACTIVITY QUALIFIED TO PERFORM Instrumentation/Electrical Calibration,
Testing, and Walkdown

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 6/29/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate (GED) +
5 years Commercial Nuclear Power

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 6/29/84

EXPIRATION 10/1/86

RE-CERTIFICATION

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JOHNNY E. CRAFT

Mr. Craft has fifteen years of instrumentation and control and electrical experience of which four years have been in the nuclear power generation industry. His experience includes installation, calibration, testing, and repair of instrumentation and electrical components and systems. Other experience includes instrumentation and control procedures preparation, planning and scheduling, and supervision of technicians.

EDUCATION

Richland Technical School, Columbia, SC
IBEW Apprentice Program

EXPERIENCE

NUS Corporation, 07/84 - Present
WISCO, 12/83 - 03/84
MATSCO, 03/81 - 05/83
Harrison International, 09/80 - 12/80 and 12/78 - 03/80
Johnson Controls, 03/80 - 09/80
F&D Electrical Contractors, 07/77 - 12/78
Carolina Eastman, 08/75 - 06/77
M.E.C. Company, 10/73 - 06/75
South Carolina Electric & Gas Co., 02/72 - 10/73
IBEW Local 382, 12/65 - 12/71

NUS - Currently assigned as an instrument technician to the Waterford 3 nuclear plant. Performs cable and raceway walkdowns as part of a field inspection team. Reports deficiencies to Louisiana Power and Light for resolution by engineering and quality assurance groups.

WISCO - As a Level II technician at the Waterford 3 nuclear plant, performed electrical and instrumentation and control calibration and testing to support the Phase II (Preoperational) Test Program.

MATSCO - As an electrical technician supervisor at Fermi II, supervised and performed electrical system and component testing during the construction and startup test phase.

Johnson Controls - As an engineering technician at the Brunswick Steam Electric Station, prepared station instrument and control procedures.

Harrison International - As a startup technician at the V.C. Summer Nuclear Station, performed calibration and testing of station instrument and control systems.

J. E. Craft

Page Two

F&D - As an electrical superintendent for the Columbia, SC Airport Project, planned and directed the installation and testing of electrical equipment for the project.

Carolina Eastman - As a startup technician, performed checkout, testing, and startup of electrical equipment and control systems for multi-unit chemical complex.

M.E.C. - As an electrical startup technician, performed electrical and control system testing during startup of a soybean processing plant.

SCE&G - As an electrical startup technician, performed calibration and testing of control systems and electrical systems at the Wateree and Lexington Stations during plant startup.

IBEW - As a construction electrician, worked for various electrical contractors on various commercial and industrial projects in the Columbia, SC area.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

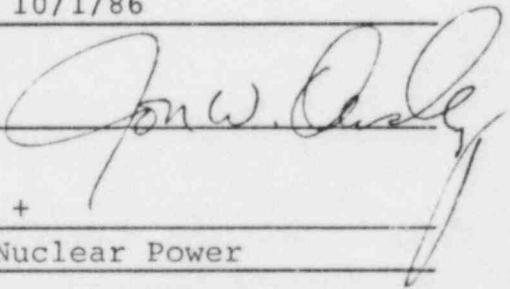
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Johnnie E. Craft

ACTIVITY QUALIFIED TO PERFORM Instrumentation/Electrical Calibration,
Testing, and Walkdown

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 7/9/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate +
4½ years Commercial Nuclear Power

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 7/9/84

EXPIRATION 10/1/86

RE-CERTIFICATION

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MICHAEL R. CROOK

EDUCATION

Navy Nuclear Power School
Idaho State University
Suffolk County Community College

EXPERIENCE

NUS CORPORATION, 1977-Present
Johnson Controls, Incorporated, 1977
EG&G, Incorporated, 1973-1977
U. S. Navy, 1965-1973

NUS - Section Supervisor, Startup Services Department responsible for providing consulting engineering services to utility customers during construction, startup, and operation of nuclear power plants and project management of same. Responsible for the supervision of the field startup test and operations engineers assigned to the foreign and domestic plant sites who are performing similiar consulting work.

While assigned to the Shoreham Nuclear Station (820-MWe BWR) was responsible for system description development, writing the fire protection pre-fire plans and station fire procedures, and writing maintenance and surveillance procedures. Took lead in procurement and cataloging of safety and non-safety related mechanical spare parts. Reviewed maintenance section purchase specifications and plant systems for adequate spare part availability.

While assigned to TMI II Recovery Operations Group, served as Supervisor, Radwaste Shipping and Disposal a utility staff position responsible for seeing that all radioactive material shipments from TMI - Units I & II are within state, DOT, and NRC regulations. This included receipt of radioactive materials. Supervise 11 full-time radwaste personnel and 4 - 6 additional support personnel. Responsible for both low level and high level waste staging and storage facilities. Annual budget of \$2.5 million. Involved in development and implementation of programs / procedures for equipment specification, volume reduction, solidification and operation

Previously functioned as Radwaste Shift Engineer. Responsible for ensuring that site processing and discharging of liquid / gas radwaste and non - radwaste satisfied all safety, ALARA, and regulatory requirements. Developed and completed study programs for moisture absorbant material in spent resin liners, testing of scale model dewatering system to evaluate adequacy of system, and testing program for resin sluicing equipment to be incorporated into solidification process.

MICHAEL R. CROOK

Page Two

Johnson Controls - while Controls and Instrumentation Technician, was assigned to Davis-Besse Nuclear Generating Station (900-MWe PWR), assisting Toledo Edison Company in initial startup phase of instrumentation and Controls Systems. Duties included procedure development, equipment trouble-shooting, initial calibration of various pneumatic, electropneumatic and electronic controls, and instrumentation.

EG&G - Control Room Operator (Reactor); controlled operations of 175-MWe test reactor utilized for research in liquid metal fast breeder reactor safety program.

Previously System Engineer for liquid metal purification facility responsible for initial startup, maintenance, and upgrade of this system; and for high vacuum system, responsible for initial startup, maintenance, and upgrade of same. Also served as Technical Writer developing numerous operating and test procedures currently being used in the sodium loop safety program.

U. S. Navy - While Watch Section Supervisor (nuclear submarines), coordinated and controlled operation and maintenance of nuclear power plant, life support, and electrical power generating systems. Formulated highly effective, preventive maintenance programs.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

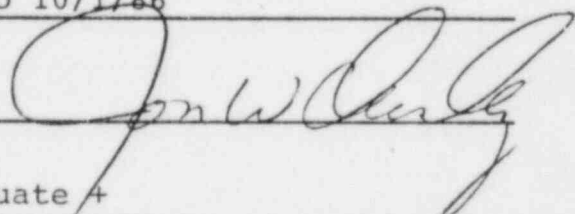
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Michael R. Crook

ACTIVITY QUALIFIED TO PERFORM System flushing and hydrostatic testing;
component level and system integrated preoperational testing;
evaluation of test results

LEVEL OF CAPABILITY III

EFFECTIVE PERIOD OF CERTIFICATION 6/29/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate +
8 years Navy Nuclear Program
4 years Research Reactor Startup and
Operation
7 years composite Commercial Nuclear Power

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 10/27/80

EXPIRATION 10/1/86

RE-CERTIFICATION

6/29/84					
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THOMAS W. FILLINGIM

Mr. Fillingim has over six years of instrumentation and control systems experience of which seven months has been in the nuclear industry. He has performed instrument and instrument loop calibrations and he has provided preoperational and startup test support. His experience includes testing and inspections of electrical and electronic systems in the shipbuilding, paper, petroleum, and nuclear power generation industries.

EDUCATION

Mississippi Gulf Coast Junior College, 1980
Pensacola Junior College, 1976

EXPERIENCE

NUS Corporation, 8/84-Present
Cataract Inc., 5/83-12/83
Brown & Root Corp., 2/83-5/83
Harmony Construction Co., 1/83-2/83
TCP Construction Co., 6/81-1/83
BE&K Construction Co., 11/80-6/81
Ingalls Shipbuilding Co., 5/77-9/83

NUS - Currently assigned as an instrument technician at the Waterford 3 nuclear plant. Performs cable and raceway walkdown as part of a field inspection team. Reports deficiencies to Louisiana Power and Light Company for resolution by engineering and quality assurance groups.

Cataract - As a Level II technician at the LaSalle Nuclear Station, performed instrument and instrument loop calibrations on instrumentation and control systems. Provided preoperational and startup test support. Also performed trouble-shooting and repair on assigned systems.

Brown & Root - As an instrument technician at the Chevron oil refinery, performed pneumatic and electronic instrument calibrations. Performed loop checks and inspected instruments and process control hooks to ensure installation according to specifications.

Harmony - As an instrument technician at the Marathon oil refinery, performed calibration and maintenance on instrumentation and control systems. Also performed loop checks prior to system startup.

T. W. Fillingim
Page Two

TCP - As an instrument technician at the Good Hope refinery, performed calibration and loop checks of instrumentation. Involved in startup on new systems and startup after system shut down.

BE&K - As an electrician at the St. Regis paper plant, installed cable and raceways.

Ingalls - As an electrician at the shipbuilding facilities, performed wiring and checkout of fire water control valve system, tank level indicating systems, alarm panel systems, smoke detection systems, 120 and 440 VAC power systems, and the radar wave guide system.

DARRELL C. FLYNN

EDUCATION

University of Missouri, BSNE, 1979
General Electric, Field Engineering Program School

EXPERIENCE

NUS Corporation, 1984-Present
Independent Consultant, 1983-1984
General Electric Co., 1980-1983

NUS - As a Senior Engineer in the Maintenance Services Department, provides consulting engineering services to utility clients in the areas of plant maintenance, preventive and corrective maintenance procedure development and review, outage management, and general maintenance assistance.

Currently assigned to LP&L's Waterford 3 Nuclear Station as a member of a task force to resolve NRC concerns prior to issuance of an operating license. Specific duties consist of performing field walk-downs to verify hangar installations and electrical separation criteria. Additionally responsible for auditing inspection activities of LP&L and Ebasco.

Independent Consultant - Developed a microcomputer based software package to track welder qualifications and the application of welding codes to specific weld processes.

GE - As a field engineer assigned to Lasalle was responsible for data acquisition and records assembly for the preservice and in-service inspection program.

Was assigned to Cleveland Electric Illuminating Company's Perry plant to supervise NSSS mechanical equipment installation. Responsible for the documentation associated with the installation and initial alignment of major NSSS components.

At the Cooper station was responsible for supervising welding activities associated with the reactor water cleanup line replacement project.

While assigned to the home office, developed computer programs to track ultrasonic test data and a penetration seal estimation program for use at Millstone.

KENNETH EARL GUNTER

Mr. Gunter has ten years of instrumentation and control systems experience of which ten months has been in the nuclear industry. He has performed loop and instrument calibrations and he has provided preoperational test support on Westinghouse 7300 systems. His experience includes work in the chemical, petrochemical, petroleum, and the fossil and nuclear utility industries.

EDUCATION

Foxboro School, Process Control and Calibration Courses, 1979
Jackson County Junior College, Electronics Courses, 1977

EXPERIENCE

NUS Corporation, 7/84-Present
Cataract Inc., 8/83-5/84
Brown & Root Inc., 3/83-8/83
Gulf Coast Technical Services, 5/82-12/82
Thiokol Chemical Corp. (Subcontract), 1/82-2/82
Valvonic Inc., 7/81-12/81
Pennwalt Corp., 1/81-6/81
Mississippi Chemical Corp., 3/74-1/81

NUS - Currently assigned as an instrument technician to the Waterford 3 nuclear plant. Performs cable and raceway walkdown as part of a field inspection team. Report deficiencies to Louisiana Power & Light Company for resolution by engineering and quality assurance groups.

Cataract - As a Level II technician at the LaSalle Nuclear Station performed instrument and instrument loop calibrations and provided preoperational test support on Westinghouse 7300 systems. Also tested and repaired these systems.

Brown & Root - As an Analyzer Technician at the Chevron Residuum Project, assisted a third-party engineering group. Performed pre-commissioning tests on analytical equipment associated with the refinery control systems and performed duplicate factory test runs to verify that equipment met specifications. Also loop-checked Taylor Mod III computer system.

Gulf Coast Technical - As a plant technician at LP&L's Nine Mile Station and Little Gypsy Station performed maintenance and outage services on these fossil generating stations.

Thiokol - As a contract technician designed instrument systems and performed calibration and modifications.

Valvonic - As an instrument technician at a Shell isoprene plant, installed and calibrated analyzer systems. Assisted in the overhaul of the plant.

Pennwalt - As an instrument technician performed startup, checkout, and operation of plant analyzers. Attended in-plant school for Taylor Recorders and Controllers.

Mississippi Chemical - As an instrument supervisor, supervised installation, modification, and startup of three fertilizer plants, two ammonia plants, two sulfuric acid plants, and a water treatment/waste disposal plant.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

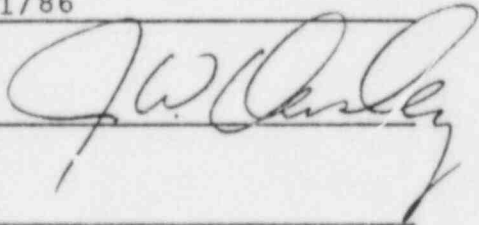
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Kenneth E. Gunter

ACTIVITY QUALIFIED TO PERFORM Instrumentation Calibration, Testing,
and Walkdown

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 8/9/84 - 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate +
Junior College Electronic Courses +
Foxboro Process Control Course
10 months Commercial Nuclear Power
10 years Equivalent Instrumentation Experience

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 8/9/84

EXPIRATION 10/1/86

RE-CERTIFICATION

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JAMES G. KENNEDY

Mr. Kennedy has six years of instrumentation and control experience of which one year has been in the nuclear power generation industry. His experience includes performing loop calibrations, initial instrument calibrations, surveillance procedures and instrument repairs. Other experience includes performing instrumentation calibration, specification checks, and computer troubleshooting for the chemical and refinery industry. Mr. Kennedy has also worked as an electrical technician in the installation of air conditioning, lighting, and communication systems.

EDUCATION

International Technical Institute, Baton Rouge, La - Continuous Process Control
RETS Electronic School, Metairie, La - Solid State Electronics

EXPERIENCE

NUS Corporation, 07/84 - Present
Cataract, Inc., 05/83 - 07/84
Chevron, 9/82 - 5/83
TCP Engineering & Construction, 5/79 - 9/82
Roshier Electrical Contracting, 3/79 - 5/79
Stauffer Chemical Corp., 7/77 3/79

NUS - Currently assigned as an instrument technician to the Waterford 3 nuclear plant. Performs cable and raceway walkdown as part of a field inspection team. Reports deficiencies to Louisiana Power and Light for resolution by engineering and quality assurance groups.

Cataract - As a Level II I&C technician at the LaSalle Nuclear Station, performed final calibration and startup of instrument and control systems. Provided preoperational test support and performed scheduled instrument surveillance procedures. Was assigned responsibility for neutron monitoring system surveillance and calibration.

Chevron - As an instrument technician at the Pascagoula Residuum Conversion Plant, performed specification checks, calibrations, and loop verifications on electronic and pneumatic instrumentation. Major equipment included three 900-ton sulfur units, a residuum desulfurization plant, an alkylation unit, and a crude reformer. Also responsible for checkout of Sybron/Taylor Distributed Control System and Taylor 1010 Supervisory computer.

TCP - As instrument technician at the Good Hope Refinery, was responsible for instrument calibration, loop checks, and preventive

maintenance on vacuum unit, alkylation unit, dimersol unit, 650 psi gas fired boiler, air compressors, and gas compressors. Also worked with Foxboro Spec 200 with Video Spec and Fox 3 computer.

Rosher - As an electrical technician, installed computer controlled air conditioning systems, lighting control systems, and communication systems in commercial buildings.

Stauffer - As an instrument and electrical apprentice, installed and performed checkout of relay logic systems, on-off control systems and alarm systems.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

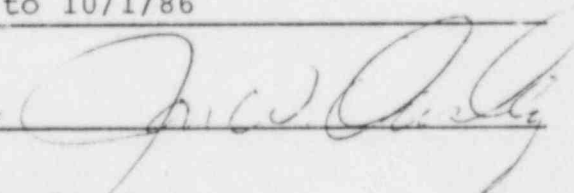
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED James G. Kennedy

ACTIVITY QUALIFIED TO PERFORM Instrumentation Calibration, Testing,
and Walkdown

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 6/29/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate +
Instrument Technical School +
1 year Commercial Nuclear Power
4 years Equivalent Instrumentation Experience

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 6/29/84

EXPIRATION 10/1/86

RE-CERTIFICATION

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STEVEN ROY KENNEDY

Mr. Kennedy has over five years of experience with instrumentation and control and electrical systems of which six months has been in the nuclear industry. He has performed loop and instrument calibrations and he has provided preoperational and startup test support. His experience includes work in the nuclear, petroleum, construction, and chemical industries.

EDUCATION

U.S. Navy Basic Electricity & Electronics School, 1974
M.G. Montgomery High School, 1973

EXPERIENCE

NUS Corporation, 7/84-Present
Brown & Root Corp., 1/83-5/83
TCP Construction Co., 3/81-1/83
Harmony Construction Co., 1/81-3/81
Roshier Electrical Co., 9/78-1/81
McIntyre Electrical Co., 1/78-6/78

NUS - Currently assigned as an Instrument Technician to the Waterford 3 nuclear plant. Performs cable and raceway walkdown as part of a field inspection team. Reports deficiencies to Louisiana Power and Light Company for resolution by engineering and quality assurance groups.

Cataract - As a Level II I&C technician at the LaSalle Nuclear Station, performed calibration and startup of instrumentation and control systems. Provided preoperational test support and performed instrumentation trouble-shooting and repair.

Brown & Root - As an Instrument Technician at the Chevron Residium Project, performed instrument and loop calibrations and provided test support for assigned systems. Performed trouble-shooting, repair, and testing activities on systems prior to turnover to Chevron.

TCP - As an Electrical Instrument Leaderman at the Good Hope Refinery, performed pre-checks, loop checks, and startup testing for all wet-gas and H₂S compressors and burner management panels.

Harmony - As a Maintenance Electrician at the Good Hope Refinery, performed maintenance on instrumentation and electrical shut down systems associated with wet-gas compressors, burner management panels, line-o-logic systems, furnaces, and 480 V motors.

S. R. Kennedy
Page Two

Rosher - As an apprentice electrician for this electrical contracting firm, installed and repaired commercial and industrial electrical systems.

McIntyre - As an apprentice electrician at the Stauffer Chemical plant, performed instrument calibrations and loop checks and installed wiring for 480 V switch gear in motor control centers.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

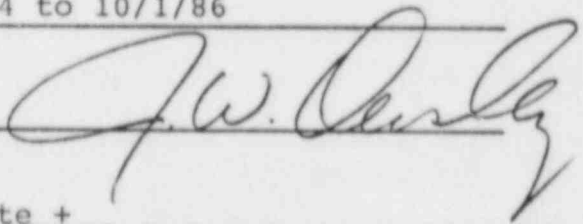
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Steven R. Kennedy

ACTIVITY QUALIFIED TO PERFORM Instrumentation Calibration,
Testing, and Walkdown

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 8/9/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate +
US Navy Basic Electricity and Electronics School
6 months Commercial Nuclear Power
5 years Equivalent Instrumentation Experience

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 8/9/84

EXPIRATION 10/1/86

RE-CERTIFICATION

GARY L. KRAMPHOLZ

EDUCATION

The Pennsylvania State University, Bachelor of Technology Degree in
Water Resource Engineering Technology, 1981
The Pennsylvania State University, Associate Engineering Degree in
Surveying Technology, 1979

EXPERIENCE

NUS, 1981 - Present
U.S. Nuclear Regulatory Commission, 1980 - 1981
Allegheny-Kiski Engineers, 1979

NUS - Provide utilities with consulting engineering services during construction, startup, and operation of power plants. These services include providing test assistance and the preparation of test procedures for new and operating power stations. Currently assigned to Midland Nuclear Plant (852 MWe PWR's) as startup and test engineer in the auxiliaries systems group of the primary systems test section. System responsibilities included the radwaste systems. Previously assigned as assistant to the technical supervisor. Duties included reviewing and revising test and TPM procedures, coordinating Test Working Group activities, and developing and coordinating the test procedure approval and review cycle. Also responsible for QA nonconformance responses.

NRC - Provided technical support for the regulatory process during the TMI-Unit II cleanup. Assigned to the Technical Support Section as Intern Radwaste Engineer. Initial assignment included providing support data pertaining to EPICOP II, a radioactive wastewater treatment system. This required interfacing with the licensee, vendors, consultants, and other regulatory agencies. Reported the major evolutions in the NRC TMI Program Office Weekly Status Report. Additional duties included reviewing operational procedures, compiling and evaluating Krypton-85 purge data.

Allegheny-Kiski - As a surveying technician, operated a kern automatic level, a Lietz theodolite, and a transit. Was a head and rear chainman, a rodman, and a note keeper. In the office, delivered the surveys to customers.

MEMBERSHIPS

Pennsylvania Society of Professional Engineers
Pennsylvania Chapter of Water Pollution Control Federation

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

EMPLOYER NUS OPERATING SERVICES CORPOPATION

PERSON BEING CERTIFIED Gary L. Kramonolz

ACTIVITY QUALIFIED TO PERFORM System flushing and hydrostatic testing; component level and system integrated preoperational testing; and mechanical component inspections and testing.

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 8/8/84 to 10/1/86

NUS DEPARTMENT MANAGER

Jon W. Ousley, OSD Mgr.
Jon W. Ousley

BASIS FOR CERTIFICATION

B. S. Engineering

Nuclear Plant Testing, 3 years

Inspection and Technical Support, 1 year

RESULTS OF PERIODIC EVALUATIONS

Annual evaluations in October, 1982 and 1983.

RESULTS OF PHYSICAL EXAMINATIONS (Where required)

INITIAL CERTIFICATION 1/01/82

EXPIRATION 10/01/86

RE-CERTIFICATION

8/8/84

JEFFREY A. LARSON

Mr. Larson has six years of nuclear power plant experience. His experience includes operation and maintenance of navy power plant equipment. Mr. Larson also spent two years as a training instructor at a navy nuclear propulsion plant prototype site.

EDUCATION

Navy Nuclear Power School, 1980

EXPERIENCE

NUS Corporation, 1984 - Present

U.S. Navy, 1978 - 1984

NUS - Currently assigned as Field Technician at Waterford 3 S.E.S. (1160 MWe PWR) responsible for inspection of safety related/seismic pipe supports on various systems. Verify that pipe support structures and components satisfy criteria as specified in site Quality Assurance inspection procedures.

U.S. Navy - Served as Machinist Mate 1st Class on Trident class nuclear submarine. Qualified as Engineering Watch Supervisor. Responsible for operation and maintenance of power plant equipment and training of ships' personnel in these areas. Also served as instructor at Navy prototype reactor training site for two years.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

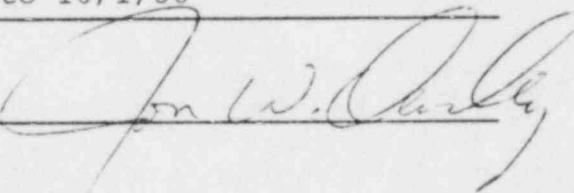
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Jeffrey A. Larson

ACTIVITY QUALIFIED TO PERFORM Mechanical Inspection and Walkdown

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 6/29/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate +
6 years Navy Nuclear Program

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 6/29/84

EXPIRATION 10/1/86

RE-CERTIFICATION

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JAMES R. ORGERON

Mr. Orgeron has ten years of instrumentation and control and electrical experience of which one year has been in the nuclear power generation industry. His experience includes performing loop calibrations, initial instrument calibrations, surveillance procedures, and instrument repairs. Other experience includes the installation, calibration, and testing of electrical, instrument, and pneumatic systems in the petro-chemical and construction industries.

EDUCATION

West Jefferson H.S., Harvey, LA

EXPERIENCE

NUS Corporation, 7/84 - Present
Cataract, Inc., 6/83 - 7/84
TCP Engineering & Construction, 5/81 - 1/83
Delta Safety Systems, 1/81 - 5/81
Petrotech, Inc., 2/80 - 12/80
Camcraft, Inc., 8/72 - 8/79

NUS - Currently assigned as an instrument technician to the Waterford 3 nuclear plant. Performs cable and raceway walkdown as part of a field inspection team. Reports deficiencies to Louisiana Power and Light for resolution by engineering and quality assurance groups.

Cataract - As a Level II I&C technician at the LaSalle Nuclear Station, performed final calibration and startup of instrument and control systems. Provided preoperational test support and performed instrumentation troubleshooting and repair. Was assigned responsibility for Radiation Monitoring Systems surveillance and calibration.

TCP - As premium instrument technician at the Good Hope Refinery, was responsible for installation, calibration, and maintenance of pneumatic and electronic instruments. Interfaced with Operations, Engineering, and manufacturers to resolve instrument error problems and to increase the reliability of on-stream and proximity analyzing equipment.

Delta - As a technical specialist, was responsible for procuring, installing, testing, and calibrating instrumentation for offshore production platforms.

Petrotech - As a technical specialist, tested and calibrated pneumatic and electronic instrumentation used in control and alarm functions for offshore platforms.

Camcraft - As an electrical foreman, performed the installation, testing, and calibration of instruments and electrical equipment for a manufacturer of high speed aluminum crew boats.

JON W. OUSLEY
MANAGER
OPERATING SERVICES DEPARTMENT
AND
TECHNICAL SERVICES DEPARTMENT

EDUCATION

Aerojet Nuclear Training
 Engineer Test Reactor Qualification, 1974-1975
 High Vacuum Technology, 1975
 Liquid Metal Purification and Handling Course, 1975
 Test Reactors Instrumentation Technology Course, 1974
U.S. Naval Nuclear Power Schools and Prototype Training, 1969
U.S. Naval Electronics Schools, 1968

EXPERIENCE

NUS CORPORATION, 1977-Present
Johnson Controls Service Co., 1976
Aerojet Nuclear Corporation, 1974-1976
U. S. Navy, 1968-1974

NUS - As Manager of the Operating Services Department and the Technical Services Department, is responsible for providing client technical contact, department financial considerations, home office project management and NUS personnel management functions for several remote field projects at client power generation facilities. Responsible for sales to utility clients including startup assistance, control systems and electrical maintenance services, health physics technician and selected procedural preparation services.

As Section Supervisor in the Startup Services Department was responsible for staffing and project management of foreign and domestic startup engineering and operations support projects. Field tasks undertaken by subordinates included system startup engineering, onshift operations support, I&C consultation, and onsite bulk procedures preparation efforts.

While assigned at Shoreham Nuclear Power Station (820 MWe BWR) as Lead Project Engineer for NUS, assisted in the establishment of the instrumentation and control section. Supervised multi-discipline NUS effort in development of major portions of the plant operating manual. Served as alternate member to the plant safety review committee for the last two years of the field assignment. Procured safety related and non-safety related spare parts. Designed specialized test equipment for DC distribution systems. Represented plant staff on Shoreham's Project Maintainability Task Force. Prepared preventive maintenance, surveillance test, calibration, and administrative procedures. Provided technical direction to control system testing and administrative supervision to the I&C department during those times when the utility I&C engineer was away from the site. Initial assignment was to assist in the preparation of permanent plant procedures to be utilized during startup support.

J. W. Ousley

Page Two

Johnson Controls - As calibration engineer at the Brunswick Nuclear Power Station, was responsible for initial calibration and preoperational testing support for electronic and pneumatic control functions. Performed electrical checkout and startup testing of circulating water and various pumping systems, moisture separator and reheater level control system, valve control and checkout, and preoperational testing of balance-of-plant and NSSS systems. Also prepared instrumentation and electrical component specific and generic maintenance procedures. Performed system surveillance tests on the operating unit per revised technical specification requirements.

Aerojet Nuclear - As reactor instrumentation supervisor and Experimental Reactor Operator, supervised a technical group of day shift and backshift crews to support startup and preoperational testing of upgraded plant protection system. Was responsible for maintaining the new plant protection system, automatic shutdown system and plant parameter monitoring subsystems, maintained reactor console and experimental shutdown interfacing equipment. Served as operations liaison with engineering, quality control, training, and other supporting groups at the ETR facility during its modification to accept and operations with the Sodium Loop Safety Facility.

U. S. Navy - Reactor operator and prototype instructor, responsible for classroom reactor theory and on-the-job training of student operators. Maintained reactor control and shutdown maneuvering area watch on two pressurized water plants, performed hands-on maintenance of reactor control and shutdown systems. Participated in the first cycle overhaul at a commercial shipyard of an attack submarine.

REGISTRATION

AEC, Experimental Reactor Operator Certification, expired

MEMBERSHIP

American Nuclear Society

GREG L. RUSH

Mr. Rush has five years of instrumentation and control experience of which one year has been in the nuclear power generation industry. His experience includes performing surveillance procedures, loop calibrations, and individual instrument calibrations. Other experience includes performing pneumatic and electronic instrument installation, calibration, and repair for the chemical and refinery industries.

EDUCATION

Southwest State Technical College, Instrumentation Course,
Graduated 1981 - Certificate

EXPERIENCE

NUS Corporation, 07/84 - Present
Cataract, Inc., 06/83 - 07/84
Brown & Root, Inc., 08/82 - 06/83
Oddity Construction Co., 03/82 - 08/82
Daniels Construction Co., 03/82
Dwight W. Prouty Co., 01/79 - 03/82

NUS - Currently assigned as an instrument technician to the Waterford 3 nuclear plant. Performs cable and raceway walkdowns as part of a field inspection team. Reports deficiencies to Louisiana Power and Light for resolution by engineering and quality assurance groups.

Cataract - As a Level II I&C technician at the LaSalle Nuclear Plant, worked in the surveillance crew. This group assisted the client technicians performing final calibration and surveillance procedures on system instrumentation. This task included the troubleshooting and repair of faulty instrumentation. Previously assisted in preoperational testing support group performing instrument loop calibrations, troubleshooting and repair on area radiation monitors and other system instrumentation.

Brown & Root - As an instrument technician at the Chevron Residuum Conversion Project, performed instrument calibration, loop calibrations, and pneumatic control system troubleshooting and repair.

Oddity Construction - Temporary job in the construction of residential homes.

Daniels - As an instrument technician with the Virginia Chemical Co., performed instrument and pneumatic valve installation, calibration, and repair.

Greg L. Rush
Page Two

Dwight W. Prouty - As an instrument technician, was responsible for instrument calibration, pneumatic valve repair, and control system troubleshooting for chemical plants and paper mills.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

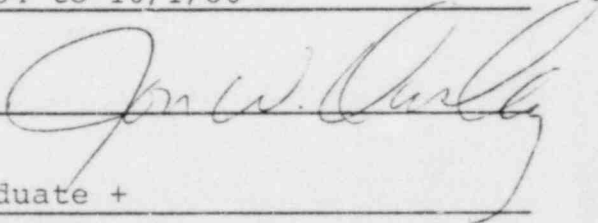
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Greg L. Rush

ACTIVITY QUALIFIED TO PERFORM Instrumentation Calibration, Testing,
and Walkdown

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 6/29/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate +
1 year Technical College +
1 year Commercial Nuclear Power
3 years Equivalent Instrumentation Experience

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 6/29/84

EXPIRATION 10/1/86

RE-CERTIFICATION

DEWARD GREGORY SEELYE

Mr. Seelye has seven years of instrumentation and control systems experience of which six months has been in the nuclear power industry. His experience includes performing loop calibrations, instrument calibrations, and startup tests and he has written I&C test and calibration procedures. Mr. Seelye has additional background in the petroleum and chemical industries.

EDUCATION

C.F. Vigor High School, 1977

EXPERIENCE

NUS Corporation, 07/84 - Present
Cataract, Inc., 05/83 - 12/83
Brown & Root Corp., 09/82 - 05/83
TCP Engineering & Construction, 12/80 - 09/82
McIntyre Electric Co., 07/77 - 12/80

NUS - Currently assigned as an instrument technician to the Waterford 3 nuclear plant. Performs cable and raceway walkdown as part of a field inspection team. Reports deficiencies to Louisiana Power and Light for resolution by engineering and quality assurance groups.

Cataract - As a Level II I&C technician at the LaSalle Nuclear Station, performed calibrations and startup tests on instrumentation and control systems. Provided support during preoperational testing and performed trouble-shooting and repairs on I&C systems. Prepared test and calibration procedures.

Brown & Root - As an Instrument Technician at a Chevron oil refinery performed check out of Taylor Mod III Distributed Control System and general testing of instrumentation systems prior to turnover to Chevron.

TCP - As an Instrument Technician at the Good Hope refinery, installed, calibrated, and maintained pneumatic and electronic I&C systems.

McIntyre - As an Apprentice Instrument Technician at a chemical plant, worked on on/off control systems, alarm systems, and flammable gas detectors.

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

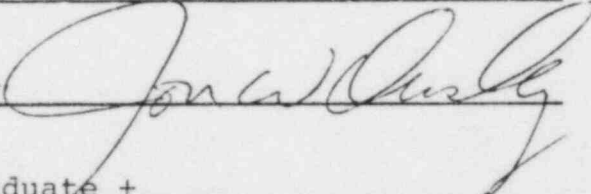
EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Deward G. Seelye

ACTIVITY QUALIFIED TO PERFORM Instrumentation Calibration,
Testing, and Walkdown

LEVEL OF CAPABILITY II

EFFECTIVE PERIOD OF CERTIFICATION 6/2/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley 

BASIS FOR CERTIFICATION High School Graduate +
1 year Commercial Nuclear Power
5 years Equivalent Instrumentation Experience

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 6/29/84

EXPIRATION 10/1/86

RE-CERTIFICATION

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STEVEN W. SMITH

EDUCATION

University of Arizona, B.S. Human Nutrition, 1963
Cochise College, A.S. Aviation Mechanics, 1972
U.S. Navy, Machinist Mate "A" School
U.S. Navy, Nuclear Power School and Prototype

EXPERIENCE

NUS Corporation, 1984-Present
University of Arizona, 1981-1983
Westinghouse Hanford, 1977-1981
University of Arizona, 1975-1977
Tucson Electric Power Co., 1973-1975
Magma Copper Co., 1973
Cochise College, 1971-1972
Pizza Hut, 1970-1971
U.S. Navy, 1964-1970

NUS - As an Engineer in the Maintenance Services Department, provides consulting engineering services to utility clients in the areas of plant maintenance, preventive and corrective maintenance procedure development and review, outage management, and general maintenance assistance.

Currently assigned to LP&L's Waterford 3 Nuclear Station as a member of a task force to resolve NRC concerns prior to issuance of an operating license. Specific duties consist of performing field walkdowns to verify hangar installations and electrical separation criteria. Additionally responsible for auditing inspection activities of LP&L and Ebasco.

University of Arizona - Student

Westinghouse Hanford - Assigned as a mechanical maintenance planner to the FFTF facility. Duties consisted of reviewing mechanical work packages, procuring required parts including specifying quality requirements and vendor interface, coordinating job performance with the crafts and resolving technical problems. Responsible for a crew of 20 millwrights and 20 pipefitters. Additionally, was responsible for revising maintenance procedures to meet specific job needs.

Was assigned as a power operator responsible for the operation and troubleshooting of the site water treatment and fire systems. Rewrote the power operator training manual and was responsible for the qualification of new operators.

Tucson Electric - Assigned as a power plant operator at the Irvington Station responsible for the operation of all plant systems including boiler, turbine generator, gas turbines and all auxiliary systems.

Magma Copper - Performed routine maintenance on mining equipment as a mechanic.

STEVEN W. SMITH
PAGE TWO

Pizza Hut - Assistant manager responsible for the supervision of a 15 member staff.

U.S. Navy - Assigned to nuclear submarines as a machinist mate responsible for the operation and maintenance of the nuclear propulsion system.

7/84

DAVID C. TATOUSEK

EDUCATION

Colorado School of Mines, Metallurgical Engineering Courses
San Diego State University, 1983
U.S. Navy, Nuclear Power Prototype Training
U.S. Navy, Nuclear Power School
U.S. Navy, Machinists Mate Class "A" School
U.S. Navy, Air Conditioning and Refrigeration School

EXPERIENCE

NUS Corporation, 1984-Present
VSE Corporation, 1982-1983
U.S. Navy, 1970-1982

NUS - As an engineer in the Maintenance Services Department, provides consulting engineering services to utility clients in the areas of plant maintenance, preventive and corrective maintenance procedure development and review, and maintenance assistance.

VSE - As a senior engineer evaluated inspection reports and pre-overhaul tests results and developed Ship Overhaul and Repair Package for the overhaul of mechanical components and systems of ship's propulsion, electrical generating, and auxiliary plants.

U.S. Navy - As Nuclear Propulsion Material Officer conducted inspection and training visits for administrative and procedure compliance for plant operation and safety. Conducted inspections on mechanical power generating components and systems.

As senior mechanical maintenance supervisor developed the planned maintenance procedures and program for the reactor mechanical division. Developed and supervised preoverhaul and postoverhaul testing of mechanical and fluid systems.

As an engineer on a new power plant developed and implemented the Planned Maintenance system for power generating and auxiliary systems.

MARK VISLAY

EDUCATION

University of Maryland, A.S., 1972

EXPERIENCE

NUS Corporation, 1984-Present

United Engineers and Constructors, 1984

Daniel International Corporation, 1978-1984

Boilermakers Local 154, 1974-1978

Self Employed, 1972-1974

U.S. Air Force, 1966-1972

NUS - As a Principal Engineer in the Maintenance Services Department, provides consulting engineering services to utility clients in the areas of plant maintenance, preventive and corrective maintenance procedure development and review, outage management, and general maintenance assistance.

Currently assigned to Louisiana Power and Light Company's Waterford 3 Nuclear Plant as a Technician Supervisor responsible for directing all activities of approximately 12 mechanical and electrical technicians. Specific tasks performed included field inspections of pipe hangers for final acceptance and verification of electrical raceway and cable separation criteria. Also developed inspection criteria for examining welds on raceway and pipe supports.

UE&C - Assigned to Seabrook Power Station as a Test and Startup Supervisor. Duties consisted of supervision of craft personnel performing flushing activities. Responsible for scheduling work, identifying required work activities and final documentation.

Daniel - Assigned to the Calloway Nuclear Station as the NSSS Superintendent responsible for all mechanical system erection and maintenance activities including direct supervision of Boilermakers, Millwrights and Sheetmetal Workers. Specific component installations included Reactor Coolant Pumps, all Fuel Handling Equipment, final setup of Reactor Vessel including internals installation and pressure testing of CRDM modules. Additionally responsible for startup support craft supervision including flushing of primary system installation and alignment of RCP seals, and final inspection of all NSSS pressure vessels including Steam Generators, pressurizer and accumulators. Also developed a preventive maintenance program for all reactor building equipment during the construction phase.

Previous duties at Calloway consisted of the supervision of the installation of all HVAC equipment and the Main Condensor.

Mark Vislay
Page Two

Boilermakers Local 154 - Employed as a Welding Superintendent, Mechanic and Rigger at various industrial and power plant job sites in the Pittsburgh, PA region.

Self Employed - Owner-operator of a fence contracting business.

8/84

FIELD PERSONNEL CERTIFICATION
FIELD OPERATIONS AND TRAINING DIVISION

EMPLOYER NUS Corporation

PERSON BEING CERTIFIED Mark Vislay

ACTIVITY QUALIFIED TO PERFORM Mechanical Inspection, Startup Testing,
evaluation of test results

LEVEL OF CAPABILITY III

EFFECTIVE PERIOD OF CERTIFICATION 7/13/84 to 10/1/86

NUS DEPARTMENT MANAGER Jon W. Ousley *MR Ousley*

BASIS FOR CERTIFICATION A.A. Degree +

6 years Commercial Nuclear Power

4 years Equivalent Mechanical Experience

RESULTS OF PERIODIC EVALUATIONS _____

RESULTS OF PHYSICAL EXAMINATIONS (Where required) _____

INITIAL CERTIFICATION 7/13/84

EXPIRATION 10/1/86

RE-CERTIFICATION

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