PROPOSAL TO PERFORM A REQUIREMENTS ANALYSIS FOR AN OCCUPATIONAL HEALTH SURVEILLANCE SYSTEM (OHSS)

April, 1974

Prepared for:

B. F. GOODRICH COMPANY
500 South Main Street
Akron, Ohio 44318

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tabershaw/cooper associates inc.
2180 Milvia Street, Berkeley, California 94704. Telephone (415) 845-3355

April 5, 1974

B. F. Goodrich Company
500 South Main Street
Akron, Ohio 44318

Dear Sirs:

TCA/Informatics are pleased to submit a proposal concerning the performance of a Requirements Analysis for an Occupational Health Surveillance System pursuant to our recent conversations.

Sincerely,

Irving R. Tabershaw, M. D.
President

ACCEPTED:

B. F. Goodrich Company

Date

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SECTION I

UNDERSTANDING OF THE PROBLEM

The purpose of this proposal is to present an approach to carry out a Requirements Analysis (Phase 0) for a corporate-wide Occupational Health Surveillance System (OHSS). The general system development scheme in this proposal is designed to accomplish Phase 0 within a 3-months period.

It has become increasingly apparent in the course of TCA's health support and consulting activities for B. F. Goodrich that the development of an OHSS would help fulfill the company's needs regarding its health services. The development of such a system would change B. F. Goodrich's occupational health activities from a relatively passive, retrospective, and emergency response orientation to one of continuous surveillance and analysis, and would emphasize the prevention of disease, the maintenance of health, and the anticipation of work-related health problems rather than correction of such problems after the fact.

An effective occupational health surveillance system would accomplish the following:

1. Effective job placement through coordination of pre-placement and periodic medical examination with job requirements and environmental exposures.

2. Assist in proper organization and functioning of the medical program, industrial hygiene activities, and the administration of health-related insurance programs (Workmen's compensation and group health).

3. Assist in determining proper health standards for workers exposed to potential toxic agents.

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4. Assist in the prevention of non-occupational health problems and provide a follow-up system on those workers with disability.

5. Assist in the treatment of injured or ill workers by proper follow-up, rehabilitation, and replacement on the job.

6. Assist B. F. Goodrich in meeting the legal and statutory requirements regarding health of workers on a federal, state, and local basis.

In addition, two further objectives which must be incorporated into the Occupational Health Surveillance System for B. F. Goodrich are:

1. Continuing evaluation and improvement of the OHSS program; and

2. Be certain that confidentiality of medical information is maintained.

An effective OHSS will obtain information with reasonable facility and accuracy, will yield information justifying the cost and inconveniences of such a system, and will be a tool for making certain that the information generated is considered in the conduct of B. F. Goodrich operations.

TCA/Informatics has carefully structured its approach to this development effort in order to provide B. F. Goodrich management with logical control points in the development process. During each phase, as more is known about the system's parameters and operating characteristics, decisions can be made to expand, contract, or modify as appropriate.

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- Phase 0 Requirements Analysis

Determines in detail the objectives or requirements of the system, feasible approaches for developing such a system, and integration within the current operating environment.

- Phase I Design

A detailed definition of the system's components reflected in design specifications.

- Phase II Development

Actual production of computer programs, operating manuals, data collection instruments, input definition, and all other products or services needed for system operation.

- Phase III Test and Evaluation

The full-scale operation of the total system in a "test" environment. This phase is differentiated from the testing of individual system components (i.e., computer programs) during the development phase. The emphasis here is on total system test and evaluation.

- Phase IV Implementation and Operation

System "start-up" within the operating environment and actual operation of the system.

- Phase V System Maintenance

A continual process of change takes place in any

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operational environment requiring system maintenance.

Our preliminary analysis, based upon TCA's experience with B. F. Goodrich and also upon TCA's and Informatics' performance of past related efforts, discloses the overall relationships expressed in Figure 1.

The principal points expressed in the overview are that the major system components fall into three distinct areas which are quite different in nature. These being the maintenance of profiles in areas essential to occupational health surveillance; tocls for analysis; and technical information, essentially from exterior sources, which includes not only literature but also data.

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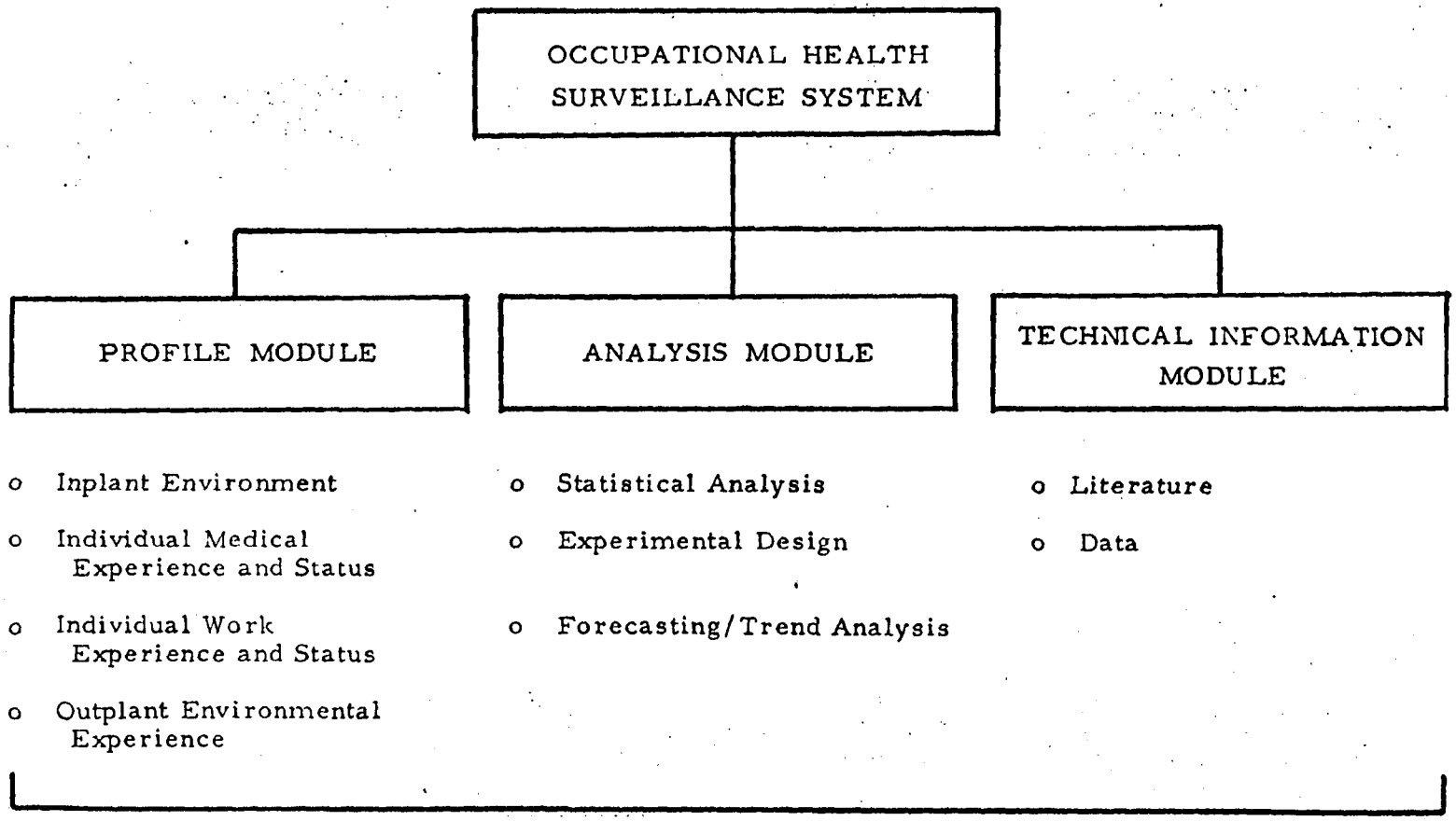

Figure 1. OHSS OVERVIEW

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SECTION II

WORK PLAN AND DELIVERABLES

As previously discussed, this proposal is concerned with the performance of a Requirements Analysis, or Phase 0, of the process described in the previous section.

Figure 2 portrays a general workplan for this project.

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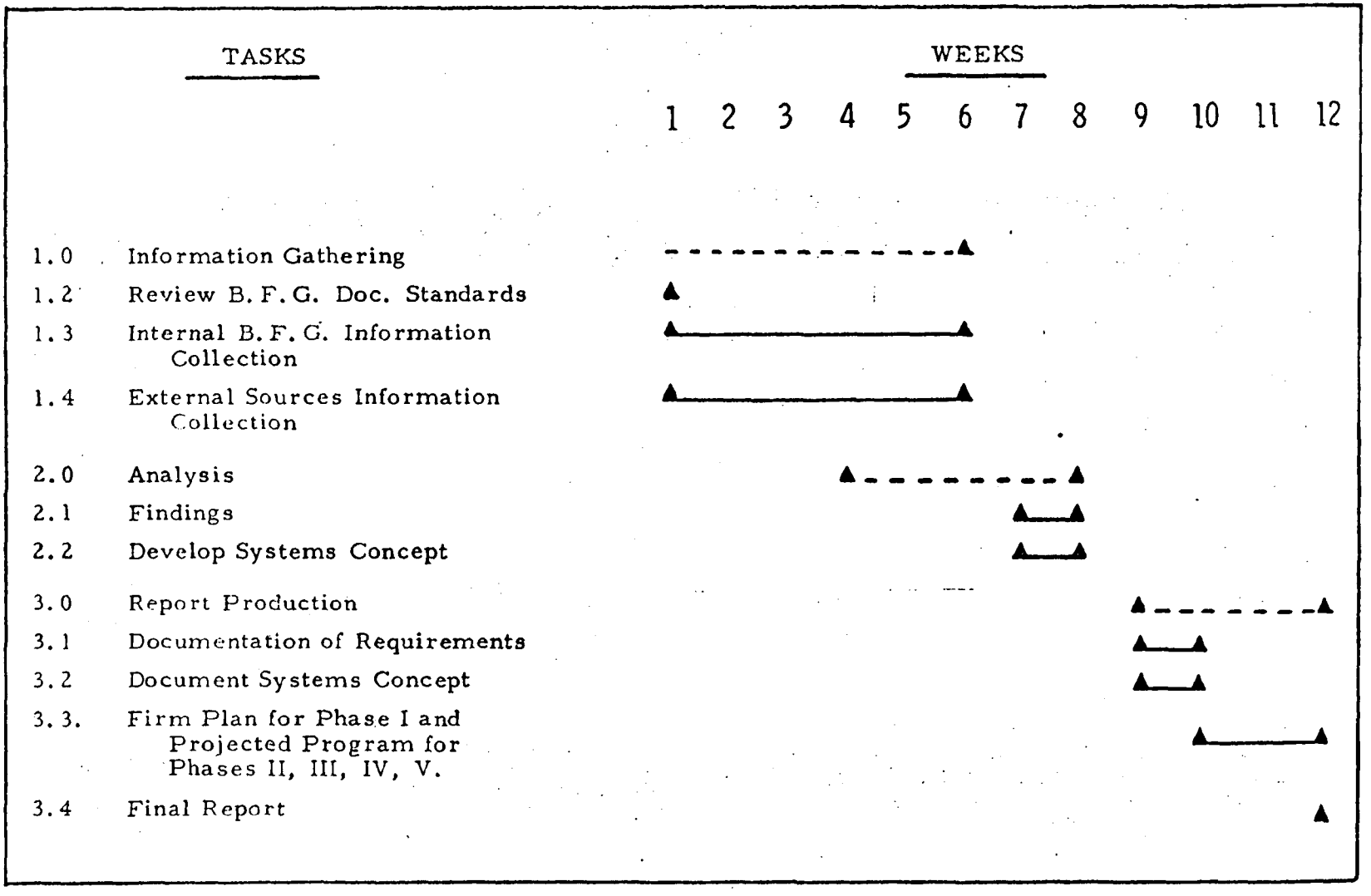

Figure 2. WORKPLAN

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SECTION III

MANAGEMENT PLAN AND DELIVERABLES

The purpose of this section is to describe the TCA/Informatics project management structure and suggested client interface. In addition, deliverables are specified.

The Medical Director for this project will be Tracy E. Barber, M.D., and the Project Director, Mr. Charles H. Robbins, will be responsible for all aspects of this project including scheduling, task performance, and delivery of the final product. The project structure is portrayed in Figure 3. The suggested client and TCA/Informatics relationship is shown in Figure 4.

The deliverables for this project will be:

- Progress Reports – Each month the Project Director will furnish B. F. Goodrich with a summary progress report describing activities during the period and projected activities for the following month.

- Final Report – The final report will be delineated at the conclusion of the project and will include the results of the requirements analysis, a systems concept and a firm plan for Phase I, and a projected program for Phases II, III, IV, and V.

It is important to this project that the TCA/Informatics project staff interact with a client focal point and a client advisory group to provide assistance in acquiring data in the areas of

- Industrial Hygiene and/or Plant Operations,
- Medical Records, and
- Systems.

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CURRICULUM VITAE

CHARLES H. ROBBINS

EDUCATION

University of Maryland, B.S.
University of Maryland, MBA
George Washington University/American University,
Graduate work in Computer Science and Systems Analysis, Operations Research, Information Retrieval, Time Sharing Systems, and Communications Systems
U.S. Army Medical Field Service School, Advanced Course

EXPERIENCE

United States Army

1951 - 1961, Army officer. Performed variety of duties.

1961 - 1963, Programmer/Analyst, Surgeon General's Office. Developed a variety of management-oriented systems in addition to a system for mass oral health assessment.

1963 - 1967, Chief, Computer Systems, in the R&D element of the Army Medical Department.
One of the major responsibilities was the establishment of a scientific and technical information program in support of the Army Medical Department. In this capacity, he acted as project manager for the development of a system providing access to over 1 1/2 million abstracts from approximately 5,000 life science journals. In addition, he identified and developed methods for utilizing primary sources of support such as MEDLARS, SIE, DDC, etc. Internal systems were developed to maintain current awareness on over 1,200 research projects. A methodology was developed to determine state-of-the art before any new research project was initiated. He was Army Medical Project Manager for CEIR, on-site survey. He participated, as Army Medical Department Project Manager, on all major STINFO programs. Also served as project manager for the Walter Reed Chemstrucs System. During this period, he started exploratory development work in computer clinical applications. Areas included pattern recognition, EKG analysis, multiphasic screening, automatic abstracting of clinical data, and process control.

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United States Army (Continued)

1967 - 1968, ADP Consultant to the Surgeon, Vietnam. Developed the first computer based medical supply system in a theater of operations. The objective of the system was to maintain proper levels of biologicals and other medical material in widely diverse areas for a 500,000 man force. Participated as a consultant to the Wound Ballistic Research Group, Walter Reed Army Institute of Research. Also developed a system for correlating clinical laboratory test results with map grid coordinates to determine disease incidence in relation to geographic location.

1968 - 1971, Surgeon General's representative to the NIH Computer Research Study Section.

1968 - 1971, Director, R&D Computer Systems Development, U.S. Army Surgeon General.
Responsible for automated medical research support, research program management; and research, development, test and evaluation of clinically oriented automated systems. He was project manager for the acquisition, installation, and operation of a modern advanced computer system in a major medical research environment, the Walter Reed Army Institute of Research. Determined the requirements for, designed, and installed a national time-shared computer system in direct support of ten medical research laboratories. Directed a project for the application of full text processing techniques to the automation of clinical files at the Burn Center, U.S. Army Institute of Surgical Research. Identified, proved the feasibility, and managed a project concerned with the development of excess Minuteman D17B inertial guidance systems as medical instrumentation process controllers. As Technical Advisor to the Medical Instrumentation Linkage project at William Beaumont General Hospital, he developed the concept and provided technical management for a project concerned with the automation of a clinical laboratory and the establishment of an intra-hospital communications system in a 750-bed hospital. In addition, he was responsible for providing scientific and technical information support to over 2,000 researchers. This was accomplished through his establishment of a biomedical technical information

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United States Army (Continued)

support operation which used a variety of means, both automated and manual, for satisfying individual requests upon demand and through use of a current awareness system.

1971 - 1973, Manager of Life Sciences, Computer Sciences Corporation (CSC).

Responsible for all aspects of CSC's Life Sciences Program, to include technical and program management. The program which he developed included a clinical support system for the 3,000-bed U.S. Naval Hospital at San Diego, California, including such areas as computer assisted ECG analysis, clinical laboratory, ICU and other direct patient care oriented applications. Other clinically oriented areas which he supervised included a medical information system for the NASA Marshall Space Flight Center which consisted of three elements: automated health trend analysis and data retrieval; multivariate analyses of employee health status through use of mathematical model; and employee scheduling and notification of examinations.

Other projects included the analysis and development of a computer based biomedical research support system for multiple research laboratories with diverse missions. A project concerned with improving the effectiveness of the DoD CHAMPUS program; automated analysis and retrieval of autopsy data using the SNOP index; a data processing effectiveness audit of a 43 hospital chain; and hospital accounting and billing systems.

Served as CSC's monitor for the Life Sciences portion of a NASA technology utilization project, including such areas as sterilization and decontamination.

Responsible for developing the technical approach for such projects as the multiphasic screening system to be used in the DoD AFEES Stations; an integrated AE/SE approach for the New Generation DoD Hospital Project; an experimental system for radiation protection guidance; information support requirements for HMO's; a pilot sickle cell disease screening and education program for the City of Philadelphia; and a method of evaluating the effectiveness and techniques used in alcoholism treatment centers.

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1973 - Present, Technical Director, Health Care and Medical Information Systems, Informatics, Inc.
Senior consultant in medical systems on a contract with the National Cancer Institute concerned with the establishment of an International Cancer Research Data Bank. In addition, directs the health care and medical information systems program which includes projects in health screening, hospital systems, health education, laboratory systems, medical audit and health care evaluation and planning.

UNIVERSITY AFFILIATIONS

Lecturer, University of Virginia
Lecturer, Northern Virginia Community College
Lecturer, Walter Reed Army Institute of Research

PROFESSIONAL ORGANIZATIONS

New York Academy of Sciences
Research Society of America
International Institute of Medical Electronics and Biological Engineering
American Hospital Association
Association of Military Surgeons

Nominated and accepted for inclusion in the XI edition of *American Men of Science.*

PUBLICATIONS

Authored several technical publications and lectured numerous times before such groups as the American Hospital Pharmacy Association, the American Association of Microbiologists, etc.

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CURRICULUM VITAE

ERIC B. SANSONE, Ph. D.

EDUCATION

City College of New York, New York, B. Ch. E., 1960
University of Michigan, Ann Arbor, Michigan,
M. P. H. Radiological Health, 1962
University of Michigan, Ann Arbor, Michigan,
Ph. D. Industrial Health - Air Pollution, 1967

EXPERIENCE

1959 (June - September), Research Assistant, Montefiore Hospital, New York.
Worked in the Metabolic Laboratories in which the uptake and excretion of a variety of radioisotopes from human patients was studied. Responsibilities lay in calculating percent uptake and excretion by various routes.

1960 (June - September), Junior Health Physicist, Brookhaven National Laboratory.
Worked at the Medical Research Reactor performing routine surveying and monitoring, as well as providing coverage for personnel working within the reactor enclosure.

1964 (January - June), Research Associate, University of Michigan School of Public Health.
Responsible for laboratories in air pollution and some industrial hygiene courses. Performed data handling and evaluation of air quality measurements as part of the Tecumseh study. Worked on research project on adsorption and desorption of tetraethyl lead on silica gel.

1969 (July - September), Visiting Scientist, Lawrence Radiation Laboratory.
Responsible for completion and testing of a spinning disc aerosol generator and testing of a sodium flame filter test rig.

1967 - Present, Consulting Engineer.
Professional services in the areas of industrial hygiene and air resources management were provided to

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government agencies, law firms, insurance firms, research and consulting groups, and industries which included paper, fibrous glass, foundries, shipbuilding, coating, communications, machining, power generation, and primary metal fabrication.

These services involved responsibility for planning, execution and evaluation of surveys designed to assess environmental stresses such as heat, noise, particulates, gases and vapors in the work and ambient environments. Survey results and conclusions and recommendations based on these were forwarded to the appropriate parties in the form of written reports.

1967 - Present, Associate Research Professor, Department of Occupational Health, University of Pittsburgh, Graduate School of Public Health.

Responsibilities included major portions of the teaching program in industrial hygiene engineering and air resources management. Had complete or partial responsibility for the organization and/or execution of Introduction to Occupational Health, Industrial Hygiene, Analytical Methods in Industrial Hygiene, Industrial Ventilation, Industrial Hygiene Practice, Air Resources Management Principles, Air Resources Measurements, Air Resources Management Practice, and Properties of Dusts, Smokes, and Mists.

Supervised the research of about fifteen graduate students in the past five years; five of the resulting theses have been published in the scientific literature and two more are in preparation (see below.) Currently sit on four Doctoral Committees. Served on the following School Committees: Executive, Educational Policies, Budget and Administration, Student-Faculty Relations, Continuing Education, Library.

SPECIALTY BOARDS

American Board of Industrial Hygiene, Comprehensive Practice; Certificate No. 667
Board of Certified Safety Professionals; Certificate No. 3638.

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MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Association for the Advancement of Science, 1968 - Present
American Conference of Governmental Industrial Hygienists, 1972 - Present
American Industrial Hygiene Association, 1965 - Present
Air Pollution Control Association, 1965 - Present
British Occupational Hygiene Society, 1968 - Present
Sigma Xi, 1973 - Present

COMMITTEE PARTICIPATION

American Industrial Hygiene Association
Member, Local Sections Committee, 1970 - 1971
Member, Aerosol Technology Committee, 1971 - Present

LISTINGS

American Men of Science

PUBLICATIONS

Sampling Airborne Solids in Ducts Following a 90° Bend. Amer. Indust. Hyg. Assoc. J. 30: 487, 1969.

Assessment of Inhalation Hazards Aboard Inland River Towboats, (with M. Corn). Amer. Indust. Hyg. Assoc. J. 32: 313, 1971.

A Note on the Penetration of a Circular Tube by an Aerosol with a Log Normal Size Distribution, (with D. Weyel). Aerosol. Sci. 2: 413, 1971.

The Relationship Between Transmittance and Reflectance Measurements of "Soiling Index," (with J. Y. Saucier). Atm. Environ. 6: 37, 1972.

The Relationship Between "Soiling Index" and Suspended Particulate Matter Concentrations, (with E. A. Pedace). Air Poll. Contr. Assoc. J. 22: 348, 1972.

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Problem Severity Model and Implementation Plan for Occupational Health and Safety; A Case Study of Allegheny County, Pennsylvania, (with N. R. Brown and M. Corn). Amer. Indust. Hyg. Assoc. J. 33: 813, 1972.

A Technique for the Redispersion of Fine Powders. Powder Tech. 7: 355, 1973.

The Effect of Varying Inlet Geometry on the Collection Characteristics of the 10 mm Nylon Cyclone, (with W. Pickett). Amer. Indust. Hyg. Assoc. J. 34: 421, 1973.

The Effect of "Electroviscosity" on Liquid Sedimentation Analysis, (with R. Pavlik). Powder Tech. 8: 159, 1973.

Diffusion Losses of Sulfur Dioxide in Sampling Manifolds, (with A. Slowik). Air Poll. Contr. Assoc. J., in press.

Determination of Total Suspended Particulate Matter and Airborne Fiber Concentrations at Three Fibrous Glass Manufacturing Facilities, (with M. Corn). Environ. Res., in press.

Asbestos Cement Pipe: A Source of Chrysotile in Tap Water, submitted to Environ. Sci. Technol.

Penetration Characteristics of the 10 mm Nylon Cyclone with a Coal Aerosol, in preparation.

The Effects of Particle Size and Electrolyte Concentration on Liquid Sedimentation Analysis, in preparation.

Theses:

The Use of Radioisotopes in the Detection and Treatment of Cancer. (Undergraduate Thesis).

The Design and Operation of an Extrapolation Chamber. (Master's Thesis).

Sampling Airborne Solids in a Duct Following a 90° Bend. (Ph. D. Thesis).

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1968 - 1972, Assistant Professor, Epidemiology and Microbiology, University of Pittsburgh.
In charge of teaching and research in area of chronic and non-infectious disease epidemiology. Epidemiologist and co-investigator in AID Contract for Research Services directed toward the development of a Combined Agent for Disease Prophylaxis and Contraception.

Consultant in Biostatistics and Epidemiology to Industrial Health Foundation of America Inc.

1972 - Present, Occupational Physician, Tabershaw-Cooper Associates, Inc., Berkeley, California. Consultants in Occupational Medicine.

LICENSURES

Licensed to practice Medicine and Surgery in the Commonwealth of Pennsylvania and in Great Britain.

SOCIETIES

Overseas Member, British Medical Association
Overseas Member, Society of Occupational Medicine (Great Britain)
University of Pittsburgh Chapter of the Society of the Sigma XI
Society of Epidemiologic Research, USA
American Conference of Governmental Industrial Hygienists
The Medical Society for the Study of Veneral Diseases (Great Britain)
Industrial Medical Association (Western Branch), USA

SPECIAL COMMITTEES AND ACTIVITIES

Health Center Task Force of Western Pennsylvania Regional Medical Program
American Cancer Society Institutional Research Grant Committee, University of Pittsburgh
Committee on International Dimensions (Graduate School of Public Health, University of Pittsburgh)
Member of Pittsburgh Student Health Service Advisory Committee.

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PUBLICATIONS

Utidjian, M. D., Gross, P., and de Treville, R. T. P.: Ferruginous Bodies in Human Lungs – Prevalence at Random Autopsies. Arch. Environ. Health 17: 327-333, September 1968.

Utidjian, H. M. D., and Cooper, W. C.: Sputum Cytology and Occupational Pulmonary Disease. J. Occup. Med. 15: 253-254, 1973.

Editorial: Watch Sick Absence in 1968. Indust. Hyg. Dig. Vol. 32, No. 6, June 1968.

IHF Statistical Studies of Fibrous Glass Workers. Proc. Third Fibrous Dust Seminar, Mellon Institute, November 1968.

Pathological Studies of Ferruginous Bodies. Proc. Third Fibrous Dust Seminar, Mellon Institute, November 1968.

Utidjian, H. M. D., and de Treville, R. T. P.: Fibrous Glass Manufacturing and Health, Report of an Epidemiological Study: Part I. Trans. Bull. No. 44, Industrial Health Foundation, Inc., pp 98-102, October 1970.

Utidjian, H. M. D., Suris, A., and Ashmun, V. A.: The Epidemiology of Congenital Hydrocephalus, Anencephaly and Spina Bifida Aperta in Allegheny County, Pennsylvania, 1960 through 1968, in press.

Garrett, P. A., and Utidjian, H. M. D.: The Epidemiology of Drug Use and Abuse in an Undergraduate College Population, in press.

Singh, B., Cutler, J. C., and Utidjian, H. M. D.: Studies on the Development of a Vaginal Preparation Prophylaxis Against Veneral Disease, Other Genital Infections and Contraception. II. In Vitro Effect of Vaginal Contraceptive and Non-Contraceptive Preparations, on Treponema pallidum and N. gonorrhoeae. Brit. J. Ven. Dis. 48: 57-64, 1972.

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Cutler, J. C. C., Utidjian, H. M. D., Singh, B., Arnold, R. C.: Studies on Development of a Vaginal Preparation Providing Both Prophylaxis Against Veneral Disease, Other Genital Infections, and Contraception. I. Veneral Disease Prophylaxis, Past Experience, Present Status and Plans for Future Studies. Mil. Med. 138: 88-91, 1973.

Singh, B., Cutler, J. C., and Utidjian, H. M. D.: Studies on Development of a Vaginal Preparation Providing Both Prophylaxis Against Veneral Disease, Other Genital Infections and Contraception: III. In Vitro Effect of Contraceptive Preparations on Candida albicans and Trichomonas vaginalis. Contraception 5: 402-411, 1972.

Lee, T. Y., Utidjian, H. M. D., Singh, B., Carpenter, U., and Cutler, J. C.: The Potential Impact of Chemical Prophylaxis on the Incidence of Gonorrhea. Brit. J. Ven. Dis. 48: 376-380, 1972.

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CURRICULUM VITAE

A. RICHARD WALTER

EDUCATION

Rutgers University, A.B. Psychology (honors), 1968.

EXPERIENCE

1959 - 1968, Clinical Laboratory Director, Clara Maass Hospital, Belleville, New Jersey.
(420-bed, acute and intermediate care, general community hospital.) Duties and responsibilities were: overall policy and technical direction of clinical laboratory, including systems and methods for both analytical procedures and information processing. Administrative responsibility for personnel and general operating policy. Reported to chief pathologist and assistant administrator.

1968 - 1969, Chief Medical Systems Analyst, Automedic Systems, East Orange, New Jersey.
Responsible for design and implementation of clinical laboratory information system on IBM 360-20 linked to central 360-60 remote computer in shared mode.

1968 - 1970, Vice President for Biological Systems, Physiodata, Inc., East Orange, New Jersey – subsidiary of S.F. Durst Inc., Cleveland, Ohio.
Duties and responsibilities were: development, marketing, and implementation of medical information systems, both for use internally by the company and for sale in the marketplace.

1970 - 1972, Vice President, INTEC, Inc., adjunct of Bio/Dynamics Inc., East Millstone, New Jersey.
Responsible for systems analysis, program designs, system implementation, direction and new device functional specifications, systems and marketing in the field of biological information systems.

1972 - 1974, Senior Health Planner, New Business Development Group, Health Systems Division, Westinghouse Corporation, Pittsburgh, Pennsylvania (Columbia, Maryland, site).

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SPECIALTY BOARD CERTIFICATION

Certified: New Jersey State Board of Medical Examiners, Bio-Analytical Laboratory Director, 1964 (No. 164) by examination.

SOCIETIES

Member, Society of Computer Medicine, 1972 - Present
Member, PSI CHI, National Honor Society in Psychology, 1969 - Present

SELECTED PUBLICATIONS

Walter, A.R.: A New and More Precise Way of Counting Platelets. Technical Bulletin. J. Amer. Soc. Clin. Path. 26: 17-21, December 1963.

Walter, A.R., and Gerarde, H.P.: Clinical Evaluation of the Unopette Used with the Coulter Counter. Esso Toxicol. Bull. 98: 86-109, July 1964.

Walter, A.R., and Gerarde, H.P.: Further Evaluation of the Unopette Used for WBC and RBC Counting. Esso Toxicol. Bull. 99: 12-36, January 1965.

Walter, A.R.: A Statistical Analysis of the Incidence of Elevated Random-Specimen Blood Sugars Among General Hospital Inpatients. Lab.Procedures of Amer. J. Publ. Health 1: 17-23, March 1965.

Walter, A.R.: What to Look for in a Computerized Laboratory Information System. Part I. Lab. Med. 3: 31-38, December 1972.

Walter, A.R.: What to Look for in a Computerized Laboratory Information System. Part II. Lab Med. 4: 32-38, January 1973.

Mr. Walter is the author of some dozen additional articles and has been guest lecturer at many professional society meetings on the general topic of health care.

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SECTION V

COST REQUIREMENTS

The cost to perform this effort on a time and materials basis is $41,000.00. This includes professional labor, overhead, profit, and all other items except travel. Travel costs will be billed as incurred.