FINAL PERFORMANCE REPORT

INSTITUTION:	TEMPLE UNIVERSITY PHILADELPHIA, PA 19122
PROJECT TITLE:	OCCUPATIONAL HEALTH TRAINING PROGRAM
PROGRAM DIRECTOR:	ROBERT M. PATTERSON, SC.D., CIH
NIOSH GRANT NUMBER:	T01/CCT 310431-02
PERIOD:	7/1/93 - 6/30/96

ABSTRACT

The Environmental Health/Industrial Hygiene Program at Temple University is designed to educate industrial hygiene personnel to carry out the objectives of the Occupational Safety and Health Act of 1970. There is a continuing national shortage of such personnel. This objective is accomplished by training MS level students who are prepared to take responsible positions in government or industry, or to pursue further advanced study. Increasing numbers of today's students are working and approach the study of industrial hygiene based on a decision to pursue career growth or change. However, full, daytime study is not an option for them. Temple's Program has endeavored to meet their needs, as well as those of full-time students, by offering the complete curriculum in the evening, with each course offered once each year. Temple's Program is the only one serving a region of about four million people.

SIGNIFICANT FINDINGS

The approach adopted during the previous period, that of combining full-time and part-time students in evening classes, with each class available once each year, is a viable approach. It serves the needs of both full-time and part-time students, allowing each group sit in the same classes and to finish in an appropriate length of time. Program graduates enjoy employment as industrial hygienists across a broad range of industries and in government. Graduates eligible to sit for the IHIT or CIH examinations have likewise enjoyed good success. At the close of the reporting period, the Temple Program remains as the only one in a region of about four million people. Enhanced support from the NIOSH Training Project Grant will allow us to continue and improve our service to this population of students, workers, and their families.

BODY OF REPORT WITH CONCLUSIONS

1. BACKGROUND

The Temple University program prepares M.S. level industrial hygienists to meet the needs of government and industry - locally, regionally, nationally, and internationally. Just as important as meeting societal and employer needs, however, the program is structured to meet the needs of today's graduate students, who may be continuing their education directly from undergraduate school, but who more likely are returning for graduate study while maintaining full-time employment. Course schedules and the curricula are designed to accommodate both types of students. The program's academic focus is on preparing practitioners as opposed to researchers. This does not mean that theory and principles are slighted in favor of rote application, but rather that students are prepared, through emphasis on the basic principles that underlie the discipline, to embark on or continue in careers as problem-solving industrial hygienists.

Temple graduates fill responsible positions in the region in government and industry, with major employers being state and federal agencies, and pharmaceutical, chemical, oil, and general manufacturing industries. Continuing high student demand and ease of job placement demonstrate the regional need for the program. Eighty-two percent of current students are from the region; ninety-two percent of graduates since 1984 are employed here.

2. TRAINING

2.1 Program Leadership and Faculty

The program is located in the Department of Civil Engineering, one of three engineering departments in the College of Engineering. The program director, Dr. Patterson, reports through the department chair to the dean of the college. Matters of program resources and course scheduling follow this line. Questions related to students, such as admission, advising, and graduation, go through Dr. Patterson and other program faculty in the department, *viz.*, Dr. Komis, Drs. Higgins (who is the department chair and a former dean) and Humphreys (who is a former associate dean), through the graduate director for the college, to the dean of the graduate school of Temple University as necessary.

Three faculty in the department play an integral role in the program. These three, Drs. Patterson, Higgins, and Humphreys, are involved in and responsible for admissions decisions,

advising students on academic and professional matters, mentoring students in their independent project or internship, and ensuring the quality and continuing development of the program.

2.1.1 Faculty Commitment and Breadth

The true extent of faculty and university commitment to the program goes beyond numbers and words and is difficult to express in this proposal. The student response and the growth of the program could not have been achieved without real professional commitment to industrial hygiene education by the faculty. Dr. Higgins has been teaching in the program for twenty years, Dr. Patterson for the nine years he has been at Temple, and Dr. Humphreys for the five years that the program has been in the college. Dr. Komis, at Temple on an IPA from her position as regional industrial hygienist for OSHA, has twenty years' experience. Our adjunct faculty, some of whom have been with the program for well over a decade, are always willing and available to help students beyond the regularly scheduled times of their classes. Faculty in other schools and colleges gladly accept our students into their classes. The financial commitment of the university is evident from the total compared with the requested FTE on the budget page.

With respect to faculty breadth, Temple has available much more than the necessary complement of academic disciplines and professional experience for a highly successful program in industrial hygiene. Among the three key individuals in the civil engineering department, Dr. Patterson brings a background in physical science, Dr. Higgins a background in engineering, and Dr. Humphreys a background in biological science to their experience and advanced training in environmental and industrial health and safety. Dr. Patterson has experience as a consultant and researcher with SRI International and the Electric Power Research Institute. Dr. Higgins, a professional engineer, has experience as a consultant with Roy F. Weston and with the U.S. Army Medical Services Corps, U.S. Army Environmental Hygiene Agency, Edgewood Arsenal. Dr. Humphreys also has experience with the U.S. Army Environmental Hygiene Agency, Edgewood Arsenal, and with educational materials development at the National Science Foundation. Dr. Higgins is a former dean and Dr. Humphreys a former associate dean of the college. All three are tenured, full professors. Dr. Komis is the regional industrial hygienist at OSHA, at Temple on an IPA.

2.1.2 Faculty Reputation and Strength

The program director, Dr. Patterson, has been certified in comprehensive practice by the ABIH for nearly twenty years. He serves as Vice Chairman of the Physical Agents Threshold

Limit Value (TLV) Committee of the ACGIH. He was an invited panelist at the NIOSH "Scientific Workshop on the Health Effects of Electric and Magnetic Fields on Workers," and is helping NIOSH set its research agenda in this area. He is past Chairman of the AIHA Non-ionizing Radiation Committee. He has been active on the AAIH/ABET accreditation committee and participated in the first site visit to accredit an industrial hygiene program. He has been an invited speaker at national as well as local meetings of the AIHA, and he has taught professional development courses (PDCs) at the AIHC&E for many years. In August of 1994 he made a presentation to the Hong Kong Institute of Occupational and Environmental Health on the ACGIH TLV development process. He is frequently called on to consult in industrial hygiene.

Dr. Patterson has the following recent publications:

Murray, W.E., R.T. Hitchcock, R.M. Patterson, and S. Michaelson, "Nonionizing Electromagnetic Energies" in *Patty's Industrial Hygiene and Toxicology*, J. Wiley, New York, 1995.

Hitchcock, R.T. and R.M. Patterson, *Radio-Frequency and ELF Electromagnetic Energies: A Handbook for Health Professionals*, Van Nostrand Reinhold, New York, 1995.

Dubeck, L.W., F.B. Higgins, R. M. Patterson, R. Tatlow, C. Ward, and B. Wright, *A World View of Environmental Issues*, Harcourt Brace College Publishers, Philadelphia, 1995.

K. N. Lambert and R. M. Patterson, "Health Physics Education for Industrial Hygienists," Proceedings, 28th Midyear Topical Meeting, Health Physics Society, Charleston, SC, January 1995.

T.D. Bracken and R. M. Patterson, "Variability and Consistency of EMF Occupational Exposure Measurements," *Journal of Exposure Analysis and Environmental Epidemiology*, 6:355-374, 1996.

Other full-time, Civil Engineering Department faculty participating in the Program include Drs. Higgins and Humphreys. Dr. Higgins is former dean of the college and is now the Director of Temple's Center for Environmental Studies and coordinator of the graduate environmental engineering program. He has served on the Philadelphia Air Quality Management Board. Dr. Humphreys is former associate dean of the college and currently coordinates the undergraduate environmental engineering technology program. He has extensive experience with industrial safety and hazardous waste activities, and with curriculum and educational materials development, most recently while on leave at the National Science Foundation in 1991 and 1992. Dr. Humphreys is frequently called on as a

consultant and an evaluator of science texts and other educational materials. He has developed a course on safety and health taken by undergraduate engineering students.

The adjunct faculty also bring a wealth of experience and expertise to the program. Mr. Klebes, a certified safety professional, has been a technical director in ergonomics with Liberty Mutual and more recently with Universal Health Services. He teaches ergonomics and human factors and has also been active in the program for well over a decade. Mr. Lambert, who teaches radiological health in the program, is a certified health physicist. He has been director of radiation safety and radiation safety officer at Temple, and he now holds that position at Hahnemann University. Dr. John Barry is with the OSHA regional office and teaches the environmental noise course.

A tabulation of core faculty and their specific areas of competence is presented below.

Core Faculty	Specific Areas of Competence
Robert M. Patterson, Sc.D., CIH	Comprehensive industrial hygiene, non-ionizing radiation, air pollution control
Frederick B. Higgins, Ph.D., PE	Industrial ventilation, air pollution measurement, water resources engineering
Donald W. Humphreys, Ph.D.	Biological science, industrial safety, hazardous waste
Chrysoula Komis, Ph.D.	Comprehensive industrial hygiene, biohazards

Supporting Full-Time Faculty	Specific Areas of Competence
Faculty of the Statistics Department (as assigned)	Biostatistics
Faculty of the Health Education and Health Administration Departments (as assigned)	Epidemiology
Faculty of the Human Resource Administration Department (as assigned)	Management

2.2 Program Plan

The program trains MS level industrial hygienists. It emphasizes training in the anticipation, recognition, evaluation, and control of health hazards in work environments while grounding students in the application of basic scientific and engineering principles to industrial hygiene problems. Thirty-four credit hours are required for the MS degree. Students may complete the program in twelve months; the university requires that they finish within five years of matriculating. Students having NIOSH support normally finish in twelve months, including a summer internship. Part-time students finish the program in about two to three years, and must complete an independent project. A formal report of the research project or the internship is required for graduation.

With the School of Business Administration, the department offers a joint MS/MBA degree for full-time students. The two-year curriculum is designed to strengthen the managerial skills of the industrial hygiene practitioner and provide the necessary academic credentials for movement into upper management positions.

The program has averaged an enrollment of about thirty-five students, about one-third of whom are full-time, for each of the past three years.

2.2.1 National and Regional Needs

There is a continuing need for personnel to carry out the goals and objectives of the OSHA Act of 1970. That contention is often made, but consider the following introductory paragraphs quoted from the document, "The New OSHA: Reinventing Worker Safety and Health," President Bill Clinton and Vice President Al Gore, May 1995.

> First, despite OSHA's efforts, every year over 6,000 Americans die from workplace injuries, an estimated 50,000 people die from illnesses caused by workplace chemical exposures, and 6 million people suffer non-fatal workplace injuries. Injuries alone cost the economy more than $110 billion a year. These numbers are too high, because many workplace injuries and illnesses are predictable and preventable. Workplaces must be encouraged to make breakthrough improvements in injury and illness rates.
>
> Second, in the public's view, OSHA has been driven too often by numbers and rules, not by smart enforcement and results. Business complains about overzealous enforcement and burdensome rules. Many people see OSHA as an

> agency so enmeshed in its own red tape that it has lost sight of its own mission. And too often, a "one-size-fits-all" regulatory approach has treated conscientious employers no differently from those who put workers needlessly at risk.
>
> Confronted by these two realities, in its next twenty-five years, OSHA must simultaneously do two things: increase the protection of worker health and safety, while decreasing red tape and paperwork. To do this, OSHA is committed to a reform of the way it does business, so that it can keep pace with the workforce and problems of the future. Above all else, **the new OSHA will seek to ensure that safety is promoted and protected by those in the workplaces themselves--managers and workers at the worksite.**

While the first paragraph supports the need for industrial hygienists and other occupational health and safety personnel, the second supports the need for educated personnel and programs such as the one proposed here. The third paragraph (emphasis added) further supports the need for educated personnel, and **expands that need** as more responsibility is shifted to employers, specifically managers and workers.

Temple offers the only graduate level full-time and part-time industrial hygiene program in the region. The facts that we are able to fill (and overfill) our classes without any form of marketing, and that returning, working students' tuitions are invariably supported by their employers, speak to the regional need and support for the program. As stated previously, eighty-two percent of current students are from the region; ninety-two percent of graduates since 1984 are employed here.

2.2.2 Program Goals and Curriculum

The program goals and objectives are to educate problem-solving industrial hygienists, practitioners who possess the necessary skills and judgment to work effectively to promote occupational safety and health, not just to meet regulations. To this end, the program provides the student not only with information, but also with knowledge and understanding of where that information came from and on what fundamental scientific and engineering principles it is based. Graduates thus are prepared not only to respond to problems for which they have been trained, but also to synthesize and apply their knowledge to novel situations. This preparation runs virtually throughout all courses in the curriculum, both in lectures and in the many projects that students must complete and report on, in writing or orally to the class. Such projects require students to find, organize, and present problem solutions on their own, whether they be to correct a safety hazard, design a local exhaust ventilation system,

design an epidemiologic study, prepare a response to a management issue, or find complete industrial hygiene information for a health hazard.

The curriculum presents a comprehensive education in industrial hygiene. Students are required to take the courses listed below, with possible substitutions and electives as noted. Course offerings are shown by semester, and students plan their course sequence from this list. Students supported by the NIOSH Training Project Grant complete the curriculum in twelve months. Most courses are available in the evening, and STAT 403 or 402, and HRA 401 are also available in the summer.

Fall Semester	SH	Spring Semester	SH
CE 517 Industrial Hygiene	3	CE 513 Analytical Instrumentation	3
CE 504 Industrial Safety	2	CE 509 Env Toxicology	3
CE 505 Industrial Ventilation	2	CE 515 Haz Waste Mgmt	2
CE 506 Radiological Health	3	CE 525 Ergonomics	2
CE 519 Medical Aspects	2	CE 518 Computer Applications[2]	3
STAT 403 Intro to Biostatistics[3]	3	HLTH ED 510 Epidemiology[4]	3
CE 521 Seminar	1	HRA 401 Mgmt & Org Behavior	3
		Externship[1]	0

Summer

Internship[1]

[1]Students supported by the NIOSH Training Project Grant complete the Externship and Internship. All other students complete CE 593, Independent Project (1-3 s.h.).
[2]Students may substitute an elective, normally CE 516, Air Pollution Control (3 s.h.), or CE 507, Environmental Noise (3 s.h.). These courses may be offered during the summer.
[3]Or STAT 402, Introduction to Statistics (3 s.h.)
[4]Or HLTH AD 501, Epidemiology and Public Health (3 s.h.), or CE 508, Epidemiology (2 s.h.). The sequence of Epidemiology and Statistics may be reversed in some years.

2.2.3 Distinctive Core Program Contributions

Temple's core program makes many distinctive contributions that directly benefit students, as described in the following paragraphs.

The program can be completed entirely through evening classes. This means that the program is fully accessible to working students who are upgrading their skills and marketability or making a career change. Just as important, eight core courses are offered only in the evening. This opens the classroom to a great mix of experience and disciplines, an opportunity not possible in a traditional, daytime program. Students with responsible industrial positions in industrial hygiene share information and opinions with more recent college graduates, to the benefit of both. Networking is enhanced, and the Temple program is established as unique in the region.

Temple's program has a very active, long-standing relationship with the NIOSH-sponsored occupational health nursing program at the University of Pennsylvania. The nursing students take industrial hygiene, industrial safety, and toxicology with the industrial hygiene students at Temple. Each group of students is thus exposed to and gains an appreciation for the activities, needs, and goals of the other. The interaction between the industrial hygiene and nursing students extends beyond the classroom, however, as the two groups make plant site visits together, further enforcing the information from the classroom with a look at what happens in practice.

The program is located in a college of engineering. Many of the courses in the program are cross listed in the environmental engineering MS program, and engineering students sit with the industrial hygiene students in classes. This again enriches classes because still other viewpoints are included. Just as important, however, is the program influence on undergraduate engineering students. The Accreditation Board for Engineering and Technology (ABET) accreditation criteria list "An understanding of the engineer's responsibility to protect both occupational and public health and safety" as an objective of the engineering curriculum. Also, "Instruction in safety procedures must be an integral component of students' laboratory experiences." The ABET definition of engineering design explicitly includes safety as a constraint that must be considered. And the ABET Code of Ethics for Engineers states, "Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties." As the locus for occupational and environmental safety and health, the industrial hygiene program is a resource to help the College meet these accreditation requirements. A course in safety is now part of the civil engineering curriculum, and we intend for this resource to be used in the other undergraduate engineering curricula as well.

Through coordination with the School of Business, we offer students a curriculum leading to the MS/MBA degrees in two years of study. This gives students the technical and management education they need to attain positions of technical/business decision making. As important, it educates future managers in the needs and goals of occupational health and safety, so that they bring that sensitivity to their careers. The MS/MBA curriculum is shown in Appendix I.

2.2.4 Interdisciplinary Interaction

Interdisciplinary interaction is not something that must be planned and coordinated at Temple; it is literally unavoidable. The industrial hygiene students come with educational backgrounds in life science, physical science, engineering, public health, and a host of less traditional entry points, from anthropology to communications. Physicians and nurses also matriculate in the program. Occupational health nursing students from Penn and engineering students from Temple participate in many classes with the industrial hygiene students, as described previously. The Penn nursing students and Temple industrial hygiene students make plant walk-throughs together. Students come from as near as Philadelphia and as far as China, with experience ranging from none to two decades of responsible industrial hygiene activity. Because they are not segregated by program in or out of the classroom, students naturally engage in interdisciplinary interaction with their classmates through such activities as assigned projects and classroom discussions.

Another important component of education in Temple's program is the diversity of its student population. Of thirty-six students now enrolled, eleven are women, six are minorities, and three are international. Of fourteen degrees awarded in the past academic year, five were to women and three were to minority students.

2.3 Training Candidates

Candidates admitted to the program normally have a laboratory science or engineering baccalaureate major and meet the admission requirements of the Graduate School and the College of Engineering. Applications must include undergraduate transcripts, scores for the Graduate Record Examination (GRE), three letters of recommendation, and a statement of personal goals. An undergraduate grade point average of 2.8 out of 4.0 and combined verbal and quantitative GRE scores of 1000 are minimum requirements for an applicant to be considered for admission.

We have had excellent success with older, returning students who have work experience but

lack the nominal undergraduate discipline or GPA requirements. Unfortunately, such students will increasingly be denied access to the program because of the rigid undergraduate coursework requirements of ABET accreditation.

Over the last three years, the program has had ninety applicants, fifty-six of whom were admitted, and forty-seven of those fifty-six matriculated.

2.4 Training Facilities and Resources

Classroom and laboratory space in the engineering building are predominantly used for the program. This ranges from a small conference room to a two hundred seat lecture hall. Courses taken outside the college (eg., epidemiology, biostatistics, management and organizational behavior) use space in the home school or college. At the College of Engineering, the program has a class/demonstration room dedicated to its use. Next door are wet chemistry and instrumentation laboratory facilities, which are shared for mutual benefit with the Environmental Engineering program. Across the hall is the Civil Engineering Department Computer Laboratory used for the quantitative industrial hygiene/computer applications course. Students also have their own internet access accounts, which are used for news groups, such as SAFETY and OEM, and for information searches, such as OSHA regulations and sampling methods, and ATSDR data. Students are also introduced to the technology of the world wide web, and have the opportunity to build their own home pages. Ventilation studies can be conducted using the Mechanical Engineering Department's HVAC laboratory facilities. Laboratory exercises focussing on principles are augmented by vendors who demonstrate the most recent equipment and instruments used in industrial hygiene practice. The standard journals and reference books for industrial hygiene are available at the Engineering Library; other specialized books and journals, for example those covering toxicology, epidemiology, or analytical chemistry, are available at the main library, the medical library, or the other, specialized libraries such as biology or chemistry. Interlibrary loan provides access to virtually any book that a student may require.

Temple's program has received an award of $1000 for student scholarship support from the American Industrial Hygiene Foundation for 1995-96.

Equipment inventory has been significantly enhanced, in part through departmental purchases and corporate donations, and also through the help of Temple's Environmental Health and Safety Office. The following equipment has been added:

Biological Monitoring Biotest RCS Centrifugal Air Sampler

Chemical Monitoring	GasTech Carbon Monoxide Monitor GasTech Personal Carbon Monoxide Monitor Delphian Dangerous Gas Leak Detector MSA Combustible Gas Indicator Organic Vapor Monitor/Datalogger Jerome Mercury Vapor Analyzer Miran 1B IR Spectrophotometer
Air Movement	Kurz Velocity Meter (Thermo) Velometer Shortridge Flow Indicator Vaneometer
Pumps	MSA Escort Sampling Pumps 1-3 LPM (with accessories for 1.0 - 0.5 LPM) Staplex High Volume Sample Pump
Particulate Matter	TSI Piezobalance Respirable Mass Monitor
Noise	Quest Electronics Sound Level Meters

3. TRAINEES

Students who graduated during the reporting period are listed below, together with their last known employment. A superscript N, "^{N}," indicates a NIOSH training grant appointee.

	Graduate	Employment
1/93	John Bitman^{N}	Rust Remedial
	Chris Debuque	Consulting company
	John Pierdomenico	DuPont
	Mark R. Scheuer	Smith-Kline
	Sandra H. Schmidt	Pharaceutical company
	Steven W. Shaffer^{N}	Nuclear Regulatory Commission
5/93	William Crawford	AT&T
	Michael Murray	Philadelphia Electric
	Christopher B. Pilla	Environmental Protection Agency
	Patricia A. Stewart	Boeing/Vertol
	Samba Tata	Chrysler
8/93	Gerald F. Crosby	Pharmaceutical company

	Marigrace Harkins[N]	Consulting company
	Kelly Lynne Kushto[N]	The Woodbridge Group
	William N. Heil	Philadelphia Water Departmenr
	Letitia M. Holloway[N]	Conrail
	Richard Jones[N]	Sun Oil
	Richard Opiekun[N]	Ph.D. candidate, Rutgers University
	Kimberly J. Schuler[N]	
1/94	Joan Bettendorf	Temple University
	Bridget Hoffman	Hoffman Environmental, Inc.
	Francis Roth	Abington Hospital
5/94	Elliott Carter	State of New Jersey, DEP
	Stephen Hart	Consulting Company
	Monica Mizgerd-Rath[N]	Sun Oil Co.
	Joseph Suder	Consulting Company
8/94	Karen Dissinger[N]	
	John Lagomarsino[N]	Food Industry
	Asma Mirza[N]	
	Pamela Shirey[N]	Mobil Oil
	Kelley Williams[N]	Pharmaceutical Company
1/95	Vijay Byngari	Wistar Institute
	Cynthia O'Brien[N]	Hudson Environmental
5/95	James Kershner	AT&T
	Jamie Smith	Temple Univ
	Teresa Williams	OSHA
8/95	Greg Assenmacher[N]	Johnson&Johnson
	Kimberly Bell	Betz Laboratories
	Jonathan Chase[N]	Synertech
	Jeff Evans[N]	Mobil Oil
	Marc Hamedani	Temple University
	Zhiwen Hou	Star Enterprises
	Ronald Morosse	Betz Laboratories
	Karen Roach[N]	Merck
	Stephen Sharp[N]	Temple University

4.0 PUBLICATIONS

Murray, W.E., R.T. Hitchcock, R.M. Patterson, and S. Michaelson, "Nonionizing Electromagnetic Energies" in *Patty's Industrial Hygiene and Toxicology*, J. Wiley, New York, 1995.

Hitchcock, R.T. and R.M. Patterson, *Radio-Frequency and ELF Electromagnetic Energies: A Handbook for Health Professionals*, Van Nostrand Reinhold, New York, 1995.

Dubeck, L.W., F.B. Higgins, R. M. Patterson, R. Tatlow, C. Ward, and B. Wright, *A World View of Environmental Issues*, Harcourt Brace College Publishers, Philadelphia, 1995.

K. N. Lambert and R. M. Patterson, "Health Physics Education for Industrial Hygienists," Proceedings, 28th Midyear Topical Meeting, Health Physics Society, Charleston, SC, January 1995.

T.D. Bracken and R. M. Patterson, "Variability and Consistency of EMF Occupational Exposure Measurements," *Journal of Exposure Analysis and Environmental Epidemiology*, 6:355-374, 1996.

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	PB97-147276

4. Title and Subtitle Final Performance Report, Temple University, Occupational Health Training Program	5. Report Date 1996/00/00
	6.
7. Author(s) Patterson, R. M.	8. Performing Organization Rept. No.
9. Performing Organization Name and Address Department of Civil Engineering, Temple University, Philadelphia, Pennsylvania	10. Project/Task/Work Unit No.
	11. Contract (C) or Grant(G) No. (C) (G) T01-CCT-310431
12. Sponsoring Organization Name and Address	13. Type of Report & Period Covered
	14.

15. Supplementary Notes

16. Abstract (Limit: 200 words) The purpose of the Environmental Health/Industrial Hygiene Program at Temple University is to educate industrial hygiene personnel to carry out the objectives of the Occupational Safety and Health Act of 1970. Students at the MS level who are prepared to take responsible positions in government or industry or to pursue further advanced study are accepted to the course. The complete curriculum is offered in the evening, with each course offered once each year, in an effort to serve those who are working full time. This report describes the program and faculty responsible for its development and administration. Areas of particular competence include comprehensive industrial hygiene, nonionizing radiation, air pollution control, industrial ventilation, air pollution measurement, water resources engineering, biological science, industrial safety, hazardous waste, comprehensive industrial hygiene, biohazards, biostatistics, epidemiology, and management. The program emphasizes training in the anticipation, recognition, evaluation, and control of health hazards in work environments while grounding students in the application of basic scientific and engineering principles.

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms NIOSH-Publication, NIOSH-Grant, Grant-Number-T01-CCT-310431, End-Date-06-30-1996, Training, Industrial-safety, Occupational-health, Education, Industrial-hygiene-programs

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages 17
	22. Security Class (This Page)	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272(4-77)
(Formerly NTIS-35)
Department of Commerce