FINAL PROGRESS REPORT
DEEP SOUTH CENTER FOR OCCUPATIONAL HEALTH AND SAFETY

UNIVERSITY OF ALABAMA AT BIRMINGHAM
BIRMINGHAM, ALABAMA
and
AUBURN UNIVERSITY
AUBURN, ALABAMA

Project Period: July 1, 1998 - June 30, 2001

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ABSTRACT

During the project period 1998 – 2001, the Deep South Education and Research Center for Occupational Safety and Health provided opportunities for graduate academic and continuing education training in the professions of occupational and environmental medicine, occupational health nursing, industrial hygiene, and occupational safety and ergonomics.

Entering its twentieth year as an NIOSH ERC, the Deep South Center includes academic programs in the Schools of Public Health, Nursing, and Medicine at the University of Alabama at Birmingham (UAB) and the Department of Industrial and Systems Engineering in the College of Engineering, at Auburn University. In addition to the occupational medicine residency offered by the School of Medicine, the three academic programs provide opportunities for study at both the masters and doctoral level. The Center also has a continuing education and outreach program, which includes a hazardous substance training component. The Center is administratively located in the UAB School of Public Health.

The academic programs in the Center have well established curricula in occupational health and safety education and research, that are taught by nationally-recognized faculty members. The research foci of the Center are the NORA priority health and safety hazards; especially those found in the forestry and related industries. During the reporting period, student and new faculty research projects were supported by the Pilot Project Research Training Program.

A high priority for the Center during the past three years has been the enhancement of interdisciplinary education and research activities. In addition to the quarterly interdisciplinary field trips and research seminars, students in the academic programs at both campus enrolled in courses together through interactive television and web-supported formats. Plans were developed to expand these activities through a multidisciplinary workplace evaluation course to be offered in the 2002 spring semester. In addition to these activities, students conducted interdisciplinary research that involved faculty from two or more of the academic programs.

During the project period 100 masters students, 50 doctoral students and 8 residents were enrolled in Center academic programs. There were 60 graduates from these programs during that time: 40 masters, 12 doctoral and 8 residents. The continuing education program offered 245 courses that reached over 5700 attendees, and 17 hazardous materials training courses that were attended by over 204 participants. In addition, the continuing education program conducted several needs assessments for the academic programs as well as the continuing education and hazardous substances training programs.

Through these activities, the Centers continued to be a "center of excellence that promotes occupational health and safety through interdisciplinary education and research" that served the needs of professionals in the Southeast.

SIGNIFICANT FINDINGS

During this project period the goals and objectives for the Deep South Center for Occupational Health and Safety were more clearly defined, and significant progress has been made toward becoming a "center of excellence that promotes occupational health and safety through interdisciplinary education and research." Graduates from the Center's academic programs continue to receive the exceptional educational opportunities for which it has become recognized. In addition, they have been involved in more interdisciplinary exercises that will broaden their perspectives and make them more effective practicing occupational health and safety professionals. Almost 70% of these graduates are currently practicing in Alabama, Mississippi, Georgia, Tennessee, and north Florida. Thereby, the Center continues to play an important role in meeting the professional occupational safety and health needs of this region. These needs are further met through courses offered by the Center's Continuing Education Program. The Center has kept abreast of these needs through needs assessments, focus groups, and most importantly, input from the Board of Advisors. Cohesion of the Center's academic programs has been enhanced by the adoption of a common research focus of the NORA research priorities and the health and safety hazards in forestry and related industries of this region. An important complement to these research activities has been the availability of Pilot Project Research Training funds to support students and new faculty in starting their research careers. All of these accomplishments have been achieved despite many challenges related to program and curriculum changes within the Center. However, a renewed sense of direction and purpose on the part of the faculty and staff of the Center has created an environment of optimism toward accomplishing new goals in the coming three years.

NOTEWORTHY ACCOMPLISHMENTS / EVENTS

Year 16

- Dr. Kent Oestenstad became the Center Director, and Dr. Ken Dillon became the program director for IH, HSAT, HST and PPRT.
- Dr. Matthew Reardon joined OEM faculty. This addition was intended to strengthen the research component of the program.
- OHN program becomes contractor for City of Birmingham workers' compensation clinic.
- The MSPH in industrial hygiene was re-accredited by the Related Accreditation Commission (RAC)
- The Department of Environmental Health Sciences moved to Frank and Kathleen Ellis Ryals building.
- The HSAT program was administered as MPH degree with no research project.
- A semester curriculum was drafted for OS&E courses, in preparation for university-wide conversion to the semester system in 2000-01.
- The OS&E Program received approval to hire a second full-time tenure track faculty member.
- Dr. Brian J. Carnahan, Ph.D. was hired as a visiting assistant professor in OS&E.
- Three research training projects were funded. One resulted in a publication and preliminary data for an RO1 application, the second project resulted in an award from the National Council on Air and Stream Improvement to continue the work, and results from the third project were used as the basis of a NIOSH Demonstration Project Grant application.
- The Continuing Education Program offered 64 CE courses that were attended by 1491 participants, and offered 7 HST courses that were attended by 78 participants.
- The CE program offered several new courses, including: Ergonomics of Occupational Vibration, Occupational Noise: Survey and Control, and Recordkeeping for OSHA Compliance and Workers' Compensation.

Year 17

- The OEM Program received 5-year ACGME accreditation.
- The School of Nursing enrolled its first PhD students.
- The clinical component of the OHN master's program was strengthened by instituting a quarterly tracking system.
- The Vernon E. Rose Endowed Scholarship was established by the alumni of IH program.
- Dr. Martin Harper joined the IH faculty.
- ENH 670—Fundamentals of Occupational Safety was presented as hybrid web/classroom course with greater emphasis on ergonomics.
- NIOSH funding ends for the HSAT program due to lack of course content and internship experiences related to hazardous substances.
- Two HSAT students were graduated but none were recruited for the following academic year.
- A national search was conducted for 2nd OS&E faculty member resulting in permanent hiring of Dr. Carnahan for the next (2000-01) academic year.
- The OS&E Program initiated trainee rotations at occupational health clinics.
- The OS&E Program Received University approval to offer nine graduate and two undergraduate courses in the new semester curriculum.
- Three research training projects were funded. Two of the projects resulted in two publications. The third was not completed due to equipment, and was granted a one-year no-cost extension.
- The Continuing Education Program offered 118 CE courses that were attended by 2756 participants, and offered 6 HST courses that were attended by 80 participants.
- The CE program developed and offered three in-house, safety and ergonomics programs for industries in Alabama.

Year 18

- The Center prepared and submitted a competing renewal application, and held a NISOH site visit in December 2000. The ERC grant was renewed for three years, with a two-year renewal for the OEM program.
- A Pilot Project Research Training competing application was prepared and submitted. Dr. Deodutta Roy of the Department of Environmental Health Sciences was named as the program director.
- Drs. Tim Key and Michael Muller resigned from the OEM Division in the Department of Family Practice Medicine.
- The OEM Division and residency program were administratively moved to the Department of Physical Medicine and Rehabilitation.
  Dr. Steve Hankins joined the OEM faculty as Division Director.
- Dr. Kathleen Brown became the Center Deputy Director, and Ms. Elizabeth Maples was named as the Assistant Director.
- The OHN program revised its curriculum in preparation for conversion to the semester system.
- MSN core courses became available in a web-based format.
- Students in all of the academic programs were provided with greater opportunities for interdisciplinary interaction with an enhancement of ENH 680—Field Interdisciplinary Studies.
- ENH 621—Fundamentals of Industrial Hygiene was presented as hybrid web/classroom course.
- ENH 624—Controls of Occupational Health Hazards was re-organized with greater emphasis on ventilation.

- The IH program revised its curriculum in preparation for conversion to the semester system.
- A revised MSPH HSAT program is funded by NIOSH as a competitive renewal. The new program required a research thesis as well as an internship related to the handling of hazardous wastes. Four students were enrolled in the program.
- The IH and HSAT degrees were changed to a MPH with thesis to conform to the School of Public Health guidelines for meeting CEPH accreditation requirements.
- OS&E courses were taught in a semester format
- An OS&E course (INSY 7060- Ergonomics I) was included in the Industrial and Systems Engineering Department core curriculum and required for all INSY graduate students.
- OS&E laboratory equipment was upgraded with approximately $115,000 of new equipment.
- OS&E doctoral student receives $8,275 research grant from ASSE.
- Dr. Gerard Davis joined the OS&E faculty as visiting assistant professor.
- The Continuing Education Program offered 63 CE courses that were attended by 1467 participants, and offered 4 HST courses that were attended by 46 participants.
- The CE program collaborated with other groups to develop a new offering: DOT Regulated Drug Alcohol Testing in the Workplace, co-sponsored by the Substance Abuse and Management Institute, and cosponsored the International Symposium on Thermal Desorption for Occupational, Environmental and Medicinal (to be offered October 2001) with the CDC and NIOSH.
- Offered the Practical Ergonomics Workshops Series, developed with the assistance of OS&E faculty.

BODY OF REPORT WITH CONCLUSIONS

Organizational Structure

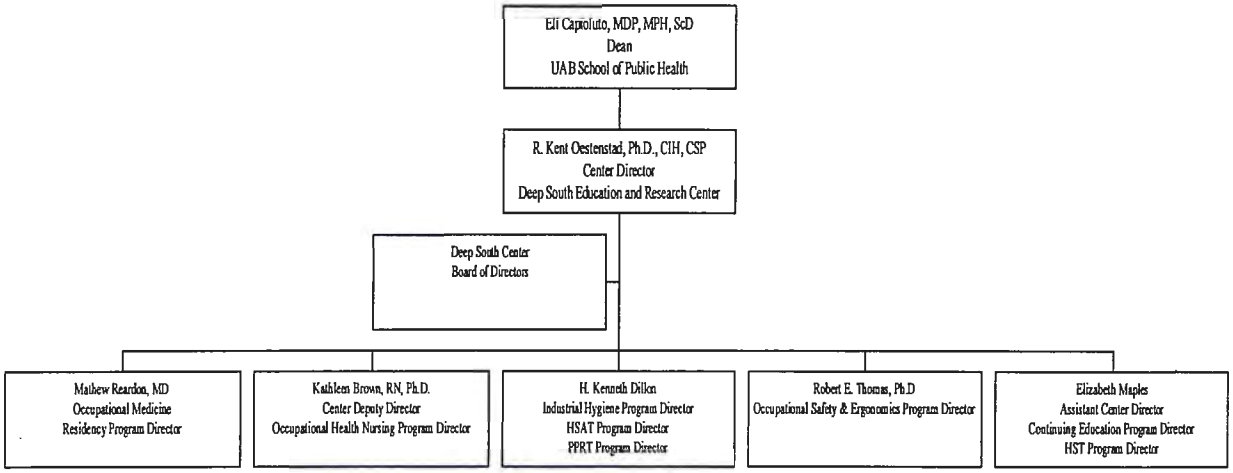
The Deep South Education and Research Center was established in October 1981 when the Tennessee Valley Authority (TVA) and UAB entered a cooperative agreement to develop resources to educate and train occupational health and safety professional for careers in the Southeastern United States. This effort was supported with resources from NIOSH. Two years later the Center was recognized as a NIOSH ERC, joining 13 other ERC's in existence at that time.

The Center consists of Center Administration in the UAB School of Public Health, four primary academic programs: Occupational and Environmental Medicine in the UAB School of Medicine, the Occupational Health Nursing in the UAB School of Nursing, the Industrial Hygiene Program in the UAB School of Public Health, and the Occupational Safety and Ergonomics Program in the Industrial and Systems Engineering Department at Auburn University and the Continuing Education Program in the UAB School of Public Health. In addition, there were supplemental programs in Pilot Project Research Training in Center Administration, Hazardous Substance Academic Training in the Industrial Hygiene Program, and Hazardous Substance Training in the Continuing Education Program.

Center Administration consists of the Center Director, Deputy Director, Director of Research Training, Assistant Center Director, and an administrative associate. As Center Director, Dr. Kent Oestenstad is responsible for the overall operation of the Center. As the Deputy Director, Dr. Kathleen Brown is primarily responsible for the development of interdisciplinary activities in the Center. Elizabeth Maples is the Assistant Center Director, and is responsible for planning and coordinating interdisciplinary field trips for the academic programs, coordinate the Center's Board of Advisors, and conduct impact and needs assessments for the Center. The Executive Committee consists of the Center Director, the Deputy Director, Assistant Center Director, and the program director. Its function is to establish goals, implement programs, and monitor progress of Center activities. These activities include, coordination of educational

programs, coordination of continuing education efforts, definition and coordination of interdisciplinary research, and maintaining effective administrative linkages. The organizational structure of the Center is illustrated in Figure 1.

Figure 1. Deep South Center Organizational Structure



The Board of Advisors consists of three individuals to represent each academic discipline and continuing education/outreach. In addition, advisors for Center Administration, forestry industries, and labor were also included. The names and affiliations of the members of the Board of Advisors are shown in Table 1 on the following page. The Board was essential in the development of the Center and has been helpful in projecting trends and needs in professional education, continuing education, and outreach for occupational health and safety in this region. In addition to their advisory capacity, many board members have also been actively involved in the education, research, and continuing education activities of the Center. Included in these activities were planning professional development or academic program activities, arranging internships for students and assisted them with industry contacts and selection of relevant research and project topics, serving as preceptors to students, providing intern sites for students, and instruction in academic courses.

Faculty

During the project period, the core disciplines of occupational and environmental medicine, occupational health nursing, industrial hygiene, and occupational safety and ergonomics are represented by 14 full-time faculty: 3 professors, 4 associate professors, 5 assistant professors, a nurse practitioner, and a teaching assistant. In addition 4 adjunct professors are utilized to teach parts of course. The following faculty left the Center during the project period: Dr. Tim Key (OEM), 2000, and Dr. Michael Mueller (OEM), 2000. The following faculty have joined the Center during that time: Dr. Matt Reardon (OEM), 1999, Dr. Brian Carnahan (OS&E), 2000, and Dr. Gerald Davis, (OS&E), 2001.

Center faculty that were recognized for honors or special achievements during the project period.

- Dr. Kathleen Brown served on the NIOSH Special Emphasis Panel in 1999.
- Michael Weaver was inducted as a Fellow of the American Academy of Nursing, in 1999.
- Dr. Ken Dillon was inducted as a Fellow of the American Industrial Hygiene Association in 1999.
- Dr. Martin Harper received the Evan Campbell Award from AIHA in 1999.

- Dr. Brown served as expert at AHRQ Worker Health Initiative 2000 meeting.
- Dr. Martin Harper received the Harriett A. Hurley Award from AIHA in 2000.
- Dr. Robert E. Thomas was presented the William F. Walker (Merit) Teaching Award for Excellence in Teaching by the College of Engineering in 2001.

Table 1: Board of Advisors

David Alexander, PE,CPE President Auburn Engineers Inc Auburn, AL	Jack Baccari State Director Commu Communications Workers of America Birmingham, AL	Frances Childre Director, Health Services/ Workers' Compensation Emory Hospitals Avondale, GA 30002
Terry L. Ermer, MSAH Manager, Env. & Safety Wellborn Cabinet Inc Ashland, AL 36251	Andy Fischer Director, Safety & Env. Hager Inc Montgomery AL 36105	Bob Forrester H HSE/Training Manager Schlumberger Tallassee, AL
Michael Jarrett Loss Control Manager State of Alabama Dept of Administrator Finance Montgomery, AL	Penny Nicholls, BS, RN, CCM COHN-S Concentra Occupational Health Clinic @ Honda Lincoln, AL	Gilbert W. Oden Safety Resource Weyerhaeuser Packaging & Recycling Thomasville, AL
Kenneth Oldfield, MSPH, CIH IH Services Manager Center for Labor Education & Research Birmingham, AL	Deb Oppenheim, CIH Senior Industrial Hygienist Alabama Power Company Birmingham, AL	Felicia Phillips, MSEM, CIH, CSP Laboratory Manager Technical Micronics Control Inc Huntsville, AL
Kara S. Reed, CHMM Environmental Scientist PPM Consultants Inc. Birmingham, AL	Randal H. Robertson, PhD, RRT Associate Professor, UAB Division of Healthcare Management and Info Sciences Birmingham, AL	Kevin Staudinger, MD, MPH Medical Director Baptist Health Center Birmingham, AL
Cheryl J. Szabo, MD, MPH Medical Director USS Fairfield Works Fairfield, AL		

Meeting Regional Needs

The Deep South Center is a regional resource for Alabama, Georgia, Florida, Mississippi, Tennessee, and north Florida. It is committed to providing graduate education programs and professional training needed by occupational safety and health professionals and to serving as a resource to schools, government organizations and industries in this region. Some examples of these services are during the project period are listed below.

- Almost 70% of the graduates from the Center academic programs during the project period practice in the region (See Appendix I)
- The Continuing Education program annually offers a significant number of discipline-specific, as well as interdisciplinary courses throughout the region. A number of these were new courses that were developed in response to recommendations received from needs assessments, focus groups, and the Board of Advisors. In addition, the Continuing Education program presented in-house training courses for industries in the region. The program also collaborated with a numbers of governmental agencies and other organizations to co-sponsor additional programs.
- The Center provided materials to help other educational programs teach or promote the field of occupational safety and health. This included providing faculty lecturers in courses or seminars, and providing materials for undergraduate career days.

- The Center has also provided industry with materials and videotapes to help develop in-house training courses, i.e., ergonomics. We have also presented lectures to regional workplaces, provided assistance to state and local health departments in developing workshops on occupational health and safety.
- Faculty and students in the Center have conducted numerous research projects to assist regional industries with occupational health problems such as hearing conservation, injury control, heat stress, cost containment, hazardous waste control, respirator fit, occupational skin disease, and ergonomics hazards. The Center Executive Committee has met with key stakeholders from the forestry and related industries (industry, labor, and government) to define and prioritize safety and health research opportunities.
- OS&E program courses are taught in a video-based format, thus permitting persons who are employed full-time in the region and elsewhere to pursue graduate work in OS&E. Significant progress has been made in the conversion of the IH The Fundamentals of Industrial Hygiene and Fundamentals of Occupational Safety and Ergonomics courses to web-support format. The industrial hygiene course is now taken by masters students at UAB and Auburn.
- All of the ERC faculty assist regional industry by providing numerous no-fee consultations on a variety of occupational safety and health issues.

The Center interacts with various professional organizations on the region including the Alabama Occupational and Environmental Medicine Association, local chapters of the American Association of Occupational Health Nurses, local sections of the American Industrial Hygiene Association and the American Society of Safety Engineers, and the North Alabama chapter of the National Safety Council.

Regional governmental agencies that the Center interacts with include the area and regional offices of the Occupational Safety and Health Administration, the Anniston Army Depot, the Alabama Department of Public Health, Alabama Department of Forensic Sciences, a number of county health departments across the region, and many local fire departments. The Alabama state OSHA consultation program, "Safe State," supports the Center and collaborates on a variety of programs. Our IH alumni form the majority of the Safe State staff.

Organizations representing workers, business and industry have expressed their interest in and support for Center activities. Unions that have worked with the Center during the project period include the The Alabama Labor Council and the United Paperworkers International Union. The Alabama state director for the Communications Workers of America serves on our Board of Directors. Business and industry groups involved with the Center have included the Birmingham Chamber of Commerce, the Association of Alabama Industries and the Alabama Loggers Council. There are numerous regional industries that support and interact with the Center. These companies include Wellborn Cabinets,General Electric Corporation, General Motors Corporation, U.S. Alliance, Amoco/BP, Solutia, Delphi, CIBA Specialty Chemicals, Lockheed, Kimberly Clark, South Central Bell, the Tennessee Valley Authority, International Paper, Arizona Chemical, USX Corporation, and Southern Power Company.

Interdisciplinary Activities

The Deep South Center comprises programs located at two Alabama universities, UAB, located in Birmingham, AL and Auburn University in Auburn, AL. Auburn is 125 miles southeast of Birmingham. However, the distance between the two universities has not hindered the interdisciplinary efforts of the Center. Interdisciplinary education continues to be an integral part of our Center's training efforts. During the past three years we have made extensive use of the Alabama Intercampus Interactive Telecommunication System (IITS). This is a network of 26 interactive television classrooms in 12 cities

across the state of Alabama including Auburn and UAB. This system has been utilized by the center to teach courses to all students on both campuses and to conduct seminars. In the 1998-1999 academic year, the safety and ergonomics faculty presented a three-part ergonomics seminar to students in all of the academic programs as well as undergraduate industrial hygiene students at the University of North Alabama. In the 1999-2000 academic year, a three-part worker training seminar series was presented to the same groups by the UAB Center for Labor Education.

During the reporting period, the Center has developed four primary methods of achieving interdisciplinary interaction. These included course requirements, field trips and seminars, research projects and clinical activities. Masters students in OEM, OHN, and IH were required to take Fundamentals of Industrial Hygiene, Fundamentals of Occupational Safety, Occupational and Environmental Toxicology, and Occupational and Environmental Diseases in the IH curriculum. In addition, many of these courses were required or were taken as electives by students in the OS&E program. Students in these programs were encouraged to take Principles of Occupational Health Management in the School of Nursing as an elective. The OEM, OHN, and IH faculty at UAB taught the Fundamentals of Industrial Hygiene course at Auburn via interactive television, and Faculty at Auburn presented ergonomics lectures in the Fundamentals of Occupational Safety course at UAB. The use of IITS has enhanced our interdisciplinary efforts and has reduced faculty travel time and expenses between the two campuses.

All Center students were required to participate in three one half-day interdisciplinary field trips per academic year. These experiences included industry field trips and/or seminars, and were selected by the Executive Committee at the beginning of each academic year. A variety of industries in Alabama and Georgia have served as field trip sites. Seminar experiences focused on issues or research in one of the disciplines and included presentations by students and/or faculty from all of the academic disciplines.

During the reporting period, students participated in the following interdisciplinary field trips:

1998

- Winter U.S. Alliance Paper Mill, Coosa Pines, AL
- Spring Anniston Army Depot, Anniston, AL

1998-1999

- Fall Russell Corporation, Alexander City, AL
- Winter U.S. Forest Service Research Station, Auburn, AL
- Spring Occupational Health and Safety Management Seminar, UAB School of Nursing

1999-2000

- Fall TapeCraft, Inc., Anniston, AL
- Winter International Paper Mill, Prattville, AL
- Spring Alabama Occupational Health, Safety & Environment Conference, Pelham, AL

2000-2001

- Fall USX, Birmingham, AL
- Winter Wellborn Cabinets, Ashland, AL
- Spring Occupational Health and Safety Management Seminar, UAB School of Nursing

As previously mentioned, students also participated in interdisciplinary seminars on ergonomics and worker training by interactive television during the 1998-1999 and 1999-2000 academic years. In addition, students from all of the academic programs attended the Alabama Occupational Health, Safety, and Environmental Conference in the spring of 2000. An IH Ph.D. student presented a paper on his dissertation research at this conference.

During the project period Drs. Brown (OHN) and Mueller (OEM) participated in a major research project on predicting back injury among female military recruits. This project also provided research opportunities for OHN graduate students to participate in research discussions and data analysis. Also, Dr. Brown served on the dissertation research committee of a DrPH student in the Occupational Health and Safety program. Dr. Oestenstad was his research advisor. The dissertation titled *State Safety Law and Workers' Compensation Loss Prevention Efforts as Predictors of Safety Performance* was successfully defended during the Spring term of 2000. Dr. Oestenstad serves on the research committee of an OHN Ph.D. student. Dr. Brown is her research advisor. The student is completing her didactic requirements, and plans to conduct a study of recognition of violent patients by emergency room nurses.

The UAB Occupational Medicine Clinic accommodates all Center medicine and nursing students in required rotations. Students have shared opportunities to perform assessments, elicit occupational histories, and discuss occupational disease entities with each other, the OEM faculty, and with Ms. Lenora Wade, occupational health nurse practitioner for the Clinic. In addition, the OHN Program had a contract to operate the City of Birmingham's occupational medicine program, and continued to support the City's Employee Wellness Program. Both of these programs provide clinical opportunities for OHN and OEM students. Beginning in the 1999-2000 academic year, clinic rotations were required of all residents, industrial hygiene, nursing, and safety and ergonomics students. Students were assigned to clinic rotations at the UAB Occupational Medicine Clinic, the School of Nursing/City of Birmingham Medical Services Unit, and Auburn University/Briggs & Stratton Clinic.

Students and Graduates

Several of the Center students were recipients of several national honors.

- The UAB School of Public Health selected an Industrial Hygiene MSPH student, as the 1998-99 Masters Student of the Year.
- A Ph.D. student in the Industrial Hygiene program received the American Industrial Hygiene Foundation Clayton Award in 1999.
- A HSAT student, received an American Industrial Hygiene Foundation (AIHF) Award in 1999.
- A HSAT student, received a 3M Industrial Hygiene Scholarship in 1999.
- An IH MSPH student, received an AIHF Award in 2000.

Each year during the project period, the IH program sent all of its eligible students to the American Industrial Hygiene Conference and Exposition (AIHCE). For the past 11 years, the AIHCE has sponsored a Graduate Student Poster Session. This session was originally conceived and organized by Drs. Perkins and Rose of the UAB IH program and is currently headed by Dr. Oestenstad. Students' abstracts are based on project research completed as part of their degree requirements.

Curricula

There were a number of significant curricula changes in the Center's academic programs during the project period. In 1999 the School of Nursing initiated a Ph.D. degree. Doctoral students in the OHN program now are enrolled in that degree program rather than the DSN degree program. In 2000 the OHN program revised its curriculum in preparation for conversion to the semester system in the 2001-2002 academic year. In addition, the MSN core courses in the School of Nursing were made available in a web-based, distance learning format.

Table 2 Yearly Enrollment by Discipline and Degree Type

	1998-1999		1999-2000		2000-2001	
Discipline	Masters	Doctoral	Masters	Doctoral	Masters	Doctoral
OEM	2	0	3	0	3	0
OHN	10	6	11	7	10	9
IH	11	5	7	3	8	2
OS&E	14	6	13	5	16	7
TOTAL	37	17	34	15	37	18

Graduates

Table 3 Yearly Graduates By Discipline and Degree Type

	1998-1999		1999-2000		2000-2001		
Discipline	Masters	Doctoral	Masters	Doctoral	Masters	Doctoral	Total
OEM	3	0	2	0	3	0	8
OHN	4	0	4	0	4	1	13
IH	8	2	3	1	4	2	20
OS&E	6	2	3	2	4	2	19
TOTAL	21	4	12	3	15	5	60

In 1998 the HSAT curriculum was changed from a MSPH to a MPH without a research experience to accommodate curriculum requirements in the School of Public Health. As a result of these changes, this program was not funded in the next fiscal year. However, in June 2000 a competing application for HSAT was submitted which included a MPH degree with thesis as well as responding to other changes to respond to reviewers' comments. This application was accepted, and that HSAT program is now in place. In addition, the IH curriculum was changed from a MSPH to a MPH with thesis at the same time. These changes were required to conform to School of Public Health requirements for CEPH accreditation. At the same time, these curricula were revised to convert to the semester system in the 2001-2002 academic year.

In 1999 the OS&E program received approval for 9 graduate and 2 undergraduate courses to be offered under the semester system that was initiated at Auburn University in the 2000-2001 academic year.

Research Training

As mentioned earlier, the Center defined their research foci as the NORA priority areas: especially those that pertain to the forestry and related industries in the Southeast. The scope of the research conducted by

the various academic components of the Center during the reporting period was broad and provided the foundation for effective collaborative research in the future. The breadth of research interests of Center faculty are illustrated by the topics of their publications listed in Appendix B. Despite this diversity, there is great potential for development of projects that combine the talents and experience of faculty and students of all academic programs of the Center. For example, Occupational Medicine, Occupational Health Nursing, and Safety and Ergonomics have research experience in low back pain and injury. Occupational Medicine, Safety and Ergonomics, and Industrial Hygiene have research experience in thermal stress. Occupational Medicine, Occupational Health Nursing, and Industrial Hygiene conducted research on management practices of their respective disciplines. In addition, each component has also demonstrated individual strengths that may serve as a foundation for future research collaboration. Industrial Hygiene has a strong track record in exposure assessment and epidemiology; Safety and Ergonomics in repetitive trauma disorders and transportation safety; Occupational Medicine in the treatment of traumatic injuries and the integration of occupational health and environmental medicine, and Occupational Health Nursing in health risk identification and worksite health promotion.

The magnitude of the effort required to develop a focused collaborative research program is linked to the goals of doctoral research training of each component and, for Occupational Medicine, to the development of a medical resident research-training program.

The research activities of students and new faculty were greatly supplemented during this period by the Research Training Pilot Project Program. This program provided almost $90,000 to fund six research projects related to the NORA priorities and the health and safety hazards in forestry and related industries in the Southeast. These projects furnished preliminary data for three grant proposals and material for four publications. Additional publications based on these studies are still pending. the occupational health and safety needs of the largest group of industries in our region, i.e., the forestry and forestry products industries.

Continuing Education / Outreach

The Center's Continuing Education Program reached an average of about 1500 participants each year with a variety of professional development programs. Topics ranged from very specific subject matters to updates in occupational and environmental safety and health issues. All occupational health and safety disciplines were reached through the Center's CE programs. The majority of participants were from the southeast region, though the Center's programs draw attendance from throughout the US and foreign countries. New offerings were developed and offered each year with assistance from the Center's faculty and Board of Advisors.

The Center has been fortunate to have faculty support for its CE program. The Center faculty play an active role in various stages of CE offerings; they provide guidance in course topic selection, recommend and approve course faculty and assist in the evaluation of courses and provide input on the direction of the CE program – including marketing and promotion of CE offerings. In addition to the Center faculty, the CE program relied upon consultants in the field of occupational health and safety to serve as course directors and instructors. Before an individual was added to the faculty list, the Center Director and the appropriate Program Director reviewed biographical information, including education, credentials and work experience. The CE program reached all disciplines mandated by NIOSH.

The Center has continually evaluated its offerings and searched for new directions for the CE Program. Input from course participants, Center faculty, course faculty and the Board of Advisors was considered in developing and implementing new CE programs. The CE program has conducted several needs assessments during the project period. In 1998, the Center, along with the Central Alabama Association

of Occupational Health Nurses, surveyed the CAAOHN's membership for their educational needs. The result of this needs assessment lead to an award winning one-day educational activity. In 1999, the Center collaborated with the Alabama chapter of the American College of Occupational and Environmental Medicine (AL ACOEM) to assess the educational needs of their membership. Several focus groups were offered in 2000 to assess training needs. Two focus groups were held at the American Industrial Hygiene Conference and Exposition in Orlando, FL. Industrial hygienists and safety professionals from various settings were involved in the meetings. Another focus group was held in Chattanooga, TN to assess the educational needs of occupational health nurses and physicians.

The CE program solicited input from attendees at programs through evaluation forms completed at the end of training programs. Attendees were also sent e-mail and letters encouraging them to complete the needs assessment form on the Center's website or to call with suggestions.

The Board of Advisors contributes greatly to the CE program. The Board provided suggestions on course content, ideas on CE advancement and qualified presenters. Many of the Board members have served as course directors for CE offerings or have provided lectures for the Center (Kenneth Oldfield, MSPH, CIH, Penny Nicholls, RN, BSN, CCM, COHN-S, Cheryl Szabo, MD, MPH, Randal Robertson, PhD, RRT, David Alexander, PE, CPE, Felicia Phillips, MSEM, CIH, CSP).

The Center continues to build on its reputation as a regional source of information by assisting other academic institutions, government agencies, non-profit associations, professional associations, unions and business and industry leaders with their occupational health and safety educational needs. The Center offers quality adult education programs and provides professional development points for all occupational health and safety professions.

Hazardous Substances Training

The Center's Hazardous Substances Training program has strived to meet the educational needs of those who work at hazardous waste sites or emergency response to hazardous substance spills. A major strength of the program is the offering of scholarships to state and local government agencies that need training, but have limited funds.

Since initial HST offerings in 1990, the HST progam has worked with experienced professionals in the field of management of hazardous substances in offering its training programs. Key faculty include consultants from outside of UAB and expert trainers from the Center for Labor Education and Research.

The HST Program has placed a great deal of emphasis on working with federal, state and local agencies in offering HST courses. Throughout the project period a major strength of the program has been its strong working relationship with the UAB Center for Labor Education and Research (CLEAR). CLEAR is a grantee of the National Institute for Environmental Health Sciences and specializes in training the adult learner in the area of hazardous materials emergency response. The HST program and CLEAR's efforts compliment one another. Marketing efforts, evaluation procedures, course instruction are collaborative efforts. The relationship with CLEAR enriches training programs and eliminates competition of limited government funds. The HST program also recognized the importance of fostering working relationships with government agencies and other organizations to continue to build on its successful HST offerings. In addition to working with CLEAR, the program collaborated with numerous local and state governments and their agencies throughout the region to develop, promote, and offer HST courses.

APPENDIX A. LISTING OF PROJECT PERIOD GRADUATES BY PROGRAM

Occupational Medicine

Male, MD, MPH, 1998
OEM Director
Decatur General Hospital
Decatur, AL
Meridian, MS

Male, MD, MPH, 1998
General Motors, Saginaw
Tuscaloosa, AL

Male, MD, MPH, 1999
OEM Clinic Director
Gadsden Hospital
Gadsden, AL

Female, MD, MPH, 2000
OEM Clinic Director
Carraway Methodist Hospital
Birmingham, AL

Male, MD, MPH, 2000
Lost to follow-up

Male, MD, MPH, 2001
U.S. Navy (Japan)
Occupational Medicine phyisician

Male, MD, MPH, 2001
NIOSH, West Virginia

Female, MD, MPH, 2001
OEM Clinic
Atlanta, GA

Occupational Health Nursing

Female, MSN, 1998
City of Birmingham Occupational Health Clinic/UAB School of Nursing
Birmingham, AL

Female, MSN, 1999
Pemco Industries
Birmingham, AL

Female, MSN, 1999
Kingman Medical Center Occupational Health Clinic
Kingman, AZ

Female, MSN, 1999
OHNP instructor, UAB School of Nursing
Birmingham, AL

Female, MSN, 2000
Summa Technology
Huntsville, AL

Female, MSN, 2000
Orthopedic Specialists of Alabama & U.S.Post Office
Birmingham, AL

Male, MSN, 2000
PhD Program, Occupational Health Nursing
UAB School of Nursing
Birmingham, AL

Female, MSN, 2000
Westinghouse
Decatur, AL

Female, DSN, 2001
Southern Adventist University School of Nursing
Chattanooga, TN
"Wellness Program Influence on Health Risk Factors and Medical Costs among Seventh Day Adventist Workers"

Female, MSN, 2001
Occupational Health Group
Huntsville, AL

Female, MSN, 2001
Tuscaloosa, AL
Seeking employment

Female, MSN, 2001
Birmingham, AL
Seeking employment

Male, MSN, 2001
Birmingham, AL
Seeking employment

Industrial Hygiene

Female, MSPH, 2001
Williams Environmental Service
Birmingham, AL
"Determination of the Effect of Oil Mist Exposure on the Efficiencies of N, R, and P series Respirator Filters"

Male, MSPH, 2001
U.S. Steel
Birmingham, AL
"An Evaluation of Total and Inhalable Samplers for the Collection of WoodDust in Three Wood Products Industries"

Male, MSPH, 2001
Southern Nuclear
Birmingham, AL
"Biological Monitoring of cell gorwth and DNA repair capacity of leydig cells exposed to occupational estrogen-like chemicals"

Male, MSPH, 2001
APEX Safety and Health Consultants
Aliso Viejo, CA
"PCR and Fluorogenic Probe Detection of Aspergillus fumigatus Using the Automated Smart Cyclerâ System"

Male, DrPH, 2001
Honda Manufacturing of Alabama
Lincoln, AL
"State Safety Law and Loss Prevention Efforts as Predictors of Safety Performance"

Male, DrPH, 2001
East Tennessee State Imoversotu
Johnson City, TN
"Institution of a Behavior-Based Safety System in a Mid-Sized Corporation"

Male, MSPH, 2000
North Mississipp Health Services
Tupelo, MS
"An Evaluation of the Humidity Copensation Feature of the Foxboro SaphIRe tm 205B Infrared Spectrometer"

Male, MSPH, 2000
US Navy
"Percutaneous Penetration of Atrazine"

Male, MSPH, 2000
Attending UAB School of Medicine
"Biological Monitoring of Reproductive Health: The Effect of Occupational Estrogenic Chemicals on Testicular Cell Proliferation"

Female, PhD, 2000
Seeking Employment
Baltimore, MD
"Development and Evaluation of a Molecular Exposure Assessment Tools to Study the Potential for Horizontal Transmission of P.Carinii"

Female, MSPH, 1999
UAB, School of Public Health, Dept. of Epidemiology.
Birmingham, AL
"A comparison of noninvasve oropharyngeal wash and nasal lavage in the diagnosis of pneumocystis corini when analyzed by PCR"

Male, MSPH, 1999
CONDEA Co
Aberdeen, MS
"An investigationof ergosterol levels in dusts generated during work activities in 10 horse stables"

Male, MSPH, 1999
Motorola - Semiconductor Products Sector
Austin, TX
"A comparative study of nitrous oxide area concentrations using a passive dosimeter and an infared spectophotometer"

Female, MSPH, 1999
Motorolla
Mesa, AZ
"Evaluation of a bubbling aerosol generator for future use in generating bioaerosols"

Male, MSPH, 1999
Walt Disney World
Lake Buena Vista, FL
"An investigation of airborne aflatoxin in dusts from various activities in agricultural environments"

Male, MSPH, 1999
US Army Cnter for Health Promotion & Preventive Medicine.
Fort Lewis, WA
"Comparison of predicted hearing loss based on 3dB and 5dB exchange rate noise exposures to measured hearing loss among industarial welders"

Female, MSPH, 1999
Navy Environmental Health Center
Norfolk, VA
"An evaluation of the prevalence of latex responsiveness among atopic nurses and nursing students versus intensive care workers"

Female, MSPH, 1999
Georga OSHA consultation Program
Atlanta, GA
"A comparative evaluation of exposure assessment models"

Male, PhD, 1999
University of North AL
Florence, AL
"Determination of the Feasibility of Using Open-Path FTIR to Monitor Levels of 3-Methylfuran and 1-Octen-3-01 for the Purpose of Detecting Microbial Contamination in Indoor Environments"

Male, DrPH, 1998
Environmental Health Services
Fortitude Valley, Queensland, Austrailia
"Environmental and Occupational Exposure to Ultraviolet Radiation and Associated Health Risks"

Occupational Safety and Ergonomics

Male, MISE, 1998
U.S. Marine Corps
Japan

Male, MISE, 1998
Amoco Polymers Inc.
Alpharetta, GA

Male, PhD, 1998
Deere & Co.
Iowa
"Evaluation of the Effect on Spinal Curvature of Various Lifting Regimens and Recovery"

Male, PhD, 1998
Hewlette-Packard, Inc.
Alpharetta, GA
"Experimental Analysis of Finger Blood Flow in Workers Exposed to Hand-Arm Vibration"

Male, MISE, 1999
U.S. Navy
Pensacola, FL

Female, MISE, 1999
Owens Corning, Inc.
Aiken, SC

Male, MISE, 1999
Atlantic Marine Inc.
Mobile, AL

Male, MISE, 1999
Southern Nuclear Inc.
August, GA

Male, PhD, 1999
Penn State University
State College, PA
"Effectiveness Evaluation and Optimization of Loss Prevention Intervention and System Design"

Female, MISE, 2000
General Motors
Detroit, MI

Female, MISE, 2000
Michelin Corp.
Dothan, AL

Male, PhD, 2000
Memphis State University
Memphis, TN
"Ergonomic Evaluation of Cellular Versus Functional Manufacturing Systems"

Male, MISE, 2000
Bell South
Birmingham, AL

Male, MS, 2000
Bridgestone Tire Corp.
Nashville, TN
"An Evaluation of Ergonomic Screening Tools for Identifying Cumulative Trauma Disorders in the Meatpacking Industry"

Male, MISE, 2000
Intel, Inc.
Hillsboro, OR

Male, MS, 2000
Southern Nuclear, Inc.
Birmingham, AL
"The Effects of Carrying Security Weapons and Associated Equipment and Selected Biomechanical Parameters"

Female, PhD, 2000
NASA
Huntsville, AL
"Evaluation of the Effect of Spinal Curvature and Selected Cardiovascular Responses on Females Wearing an Industrial Belt at Two Levels of Tension During Lifting"

Male, MS, 2001
Kellwood Inc.
Heflin, AL
"The Impact of Ergonomic Training on Work Related Decision Making"

Male, PhD, 2001
Auburn University
Auburn, AL
"Biomechanical and Cardiovascular Response to Wearing an Industrial Backbelt"

APPENDIX B. LISTING OF PROJECT PERIOD FACULTY / STUDENT PUBLICATIONS

Occupational Medicine

Knochenhauer E, Key T, Kahsar-Miller M, Waggoner W, Boots L, Azziz R. Prevalence of the Polycycstic Ovary Syndrome in Unselected Black and White Women of the Southeastern United States: A Prospective Study. Journal of Endocrinology and Metabolism. September 1998.

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Key, Timothy, McMurry, Fred and Roth, Victor. Chapter 7, "Medical Surveillance Guidelines", Occupational and Environmental Infectious Disease: A Practical Guideline, OEM Press, Boston, In press.

Key, Timothy, McMurry, Fred. Chapter 14, "Medical Surveillance of Animal Handlers", Health and Safety Concerns of Animal Handlers, STAR. Hanley- Belfus, New York, March 1999.

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Reardon MJ, et al. Heat Stress Evaluation of SOAR and Air Warrior Concept 1 & 3 Aviator Ensembles in a UH-60 Simulator. Ft. Rucker, AL: U.S. Army Aeromedical Research Laboratory, Technical Report, Mar, 1999.

Reardon MJ and Katz L. Physiological, Psychological, and Endurance Benefits of a Water-Cooled Microclimate Vest for Extended Hot Weather Operations. Proceedings of the 1999 Helicopter Safety Conference, Feb, 1999.

Reardon MJ. Designing Complexity into Biomedical Models. Phalanx. Alexandria, VA: Military Operations Research Society; Dec, 1998.

Reardon MJ. Biomedical Modeling and Simulation: A Review of Basic Concepts. Phalanx. Alexandria, VA: Military Operations Research Society; June 1998.

Reardon MJ, Fraser B, and Omer J. Physiological Effects of Thermal Stress on Aviators Flying a UH-60 Helicopter Simulator. Military Medicine, May 1998.

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Weaver, M., Brown, K., Hilyer, J. (1998). Outcomes-based evaluation of occupational health services. In Evaluation and Development of Occupational Health Practice (E. Menckel & P. Westerholm, Ed.). Oxford: Butterworth & Heinemann Publishers.

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Brown, K., Weaver, M., Artz, L., Hilyer, J. (1999). Health promotion and disease prevention at the worksite. In Handbook of Health Promotion and Disease Prevention (J. Raczynski & R. DiClemente, Ed.). New York: Plenum Publishing Co.

Kell, S., Allison, J., Brown, K., Weissman, N., Farmer, R., Kiefe, C. Measurement of mammography rates for quality improvement. Quality Management in Health Care. 1999;7:2;11-19.

Turner, J., Kolenc, K., Docken.L. Job analysis 1996: infection control professional. American Journal of Infection Control. 1999;27:145-157.

Weissman,N., Allison,J., Kiefe,C., Farmer,R.,Weaver,M., Williams,O., Child,I., Pemberton,J., Brown,K., Baker,C. Achievable benchmarks of care: The ABCs of benchmarking. Journal of Evaluation in Clinical Practice. 1999;5:3;269-281.

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Weaver M, Forrester B, Brown K, Phillips J, Hilyer J, & Capilouto E . Health risk influence on medical care costs and utilization among 2898 municipal employees. American Journal of Preventive Medicine. 1998;15:3;250-253.

Kiefe C, Weissman N, Allison J, Farmer R, Weaver M, & Williams O. Methodology matter XII. Identifying achievable benchmarks of care: concepts and methodology. International Journal for Quality in Health Care. 1998;10:5;443-447.

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Kiefe C, Allison J, Williams O, Person S, Weaver M, Weissman W. Improving Quality Improvement Using Achievable Benchmarks For Physician Feedback A Randomized Controlled Trial. JAMA. 2001;285:2871-2879.

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Stubner, A.H., H.K. Dillon, and C.L. Kohler. Home Remediation for Respiratory health: A Feasibility Study. Family and Community Health. 2000;22:4:1-15.

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HARPER, M, FANG, C-P, BARTLEY, DL and COHEN, BS: Calibration of the SKC, Inc. aluminum cyclone for operation in accordance with ISO/CEN/ACGIH respirable aerosol sampling criteria. J. Aerosol Sci. 29 Suppl. 1:S347-S348 (1998).

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HARPER, M: AIHA Laboratory quality programs go global. Synergist 9(12): 15-16 (December, 1998).

REPONEN, T, LIN, X, WILLEKE, K, GRINSHPUN, SA and HARPER, M: New method for long-term sampling of airborne bacteria and fungi, in Indoor Air 99: Proceedings of the 8th International Conference on Indoor Air Quality and Climate, Vol. 4, BRE/Construction Research Communications, London, UK, 1999, pp. 880-885.

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Boehlecke, B., R.R. Jacobs and L. Perkins: Increased bronchial reactivity after cotton dust exposure: relationship to endotoxin content. Submitted to Chest, 1999.

Young, Shih-Houng, Wen-Ji Dong, R.R. Jacobs: Observation of a partially opened Triple-Helix Conformatin in 1-3 Beta Glucan by Fluorescence Resonance Energy Transfer Spectroscopy. Submitted to Journal of Biochemistry, August 1999

Gao, P., H.K. Dillon, J. Baker, and R.K. Oestenstad: Numerical Prediction of the Performance of a Bioaerosol Sampler with a Circular Slit Inlet in Turbulent Flow. J. Aerosol Sci. 30(3):299-312 (1999).

M. L. Dunham, W. H. Bullock and R. K. Oestenstad: A Practical Approach to Exposure Assessment Programs in the Private Sector: A Partial Validation Study of a Qualitative Chemical Exposure Assessment Model, Appl. Occ. & Env. Hyg. 2001;16(2): 257-262.

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R.K. Oestenstad, Y. Honda, E. Delzell, I Brill: Assessment of Historical Exposures to Talc at a Mining and Milling Facility, Am. J. Med. (Submitted March 2001)

Occupational Safety and Ergonomics

Pentikis, J. and Thomas, R.E., "Mapping made Safer," *Ergonomics in Design*, July 1999, pp. 10-15.

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Carnahan, B.J., Redfern, M.S. (2001) "Evaluating Back Injury Risk Using Genetically Evolved Neural Networks," *Human Factors* (accepted upon revision).

DEPARTMENT OF HEALTH & HUMAN SERVICES

Memorandum

Date July 23, 2002

From Principal Engineer, OEP, NIOSH

Subject Final Progress Report for entry into NIOSHTIC2/NTIS for NIOSH Training Grant No. T42 CCT 410429

To Vern P. Anderson, Chief, IRB, EID (C-18)

The enclosed report has been received from the Center Director to document work performed during the specified grant project period. The following information applies to the designated Education and Research Center (ERC):

Title: Deep South Center for Occupational Health and Safety

Center Director: R. Kent Oestenstad, Ph.D.
School of Public Health
University of Alabama at Birmingham
Birmingham, AL 35294

Grant No.: T42 CCT 410429

Project Period: 7/1/98 - 6/30/2001

Please place the report in DIDS and I also recommend it for entry into NIOSHTIC2 and submission to NTIS.

Thanks for your assistance.

John T. Talty, P.E., DEE

cc: S. Board/B. Kuchinski, OEP

Enclosure

fpr.uab