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**ROCKY MOUNTAIN CENTER  
FOR  
OCCUPATIONAL  
AND  
ENVIRONMENTAL HEALTH**

**UNIVERSITY OF UTAH**

**Salt Lake City, Utah 84112**

**FINAL PERFORMANCE REPORT**

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## **CENTER ADMINISTRATION**

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### **ABSTRACT and OVERVIEW**

The Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) was established in 1977 in the Department of Family and Preventive Medicine (DFPM), at the University of Utah School of Medicine. The Center was established to provide occupational and environmental health and safety (OEHS) graduate and continuing education programs, to conduct OEHS research, and accomplish relevant service activities. In 1978, the RMCOEH was designated a National Institute for Occupational Safety and Health (NIOSH) Educational Resource Center (ERC) and has continued to be supported by NIOSH since the initial award. This report summarizes activities during the most recent grant period, July 1992 through June 1995.

Throughout the grant period, the Center provided education, research, and service programs in the four disciplines of occupational and environmental medicine, industrial hygiene, occupational health nursing, and ergonomics and safety. In addition to these program areas, the Center has a dynamic continuing education program and an agriculture health and safety program. During the 1992-1995 grant years, 115 students were enrolled in academic programs and 5,686 students attended continuing education programs. A major research program was initiated to study the effects of PM-10 particulates on health. A study of cumulative trauma disorders in a maquiladora was accomplished, and a number of other research efforts are underway. A national conference to discuss the results of PM-10 research efforts in this and other countries has been scheduled and funding support has been obtained from state health agencies as well as industries.

The members of the Center's very active Advisory Committee, complemented by professionals in RMCOEH program-specific advisory committees, have regularly evaluated RMCOEH activities. In addition to recommending specific program enhancements, the advisory committees were directly involved in establishing goals and objectives for the Center and for each program area for the period beginning in July, 1995. The efforts of the advisory committees, faculty interactions with senior OEHS professionals in this and other countries, results of a survey of all academic graduates, extensive needs assessments activities, and discussions with industry, labor, and legislative members have combined to help assure the Center's programs are relevant and current. These activities, in conjunction with improved financial strength and expanded faculty, make the Center well situated to meet current and future OEHS challenges.

The Administration section, created at the time the Center was established, had specific goals and objectives for the three years of the grant period in the same manner as each of the program areas. The following summarizes progress in achieving the Administration goals and objectives.

## SIGNIFICANT FINDINGS

The following is a summary of progress in accomplishing the overall goals for the Center Administration for the 1992-1995 grant period. Details regarding progress in achieving the specific objectives related to each goal are provided in the next section.

Goal 1: Maintain and expand nationally recognized OEHS education programs.

Results: Accomplished. Five academic courses were added to the curriculum and all other courses were regularly reviewed by faculty and Advisory Committees, with modifications incorporated as indicated. As a result of RMCOEH Advisory Committee inputs, comments from graduates, and initiatives by faculty, the environmental health components of a number of courses were expanded significantly. Over five thousand six hundred and eighty-six students attended continuing education programs, and nineteen new courses were added to the CE curriculum during the grant period. New faculty have been added to the OHN and IH programs, and an occupational medicine specialist will be joining the OM faculty in November, 1995.

Goal 2: Establish the RMCOEH as an international OEHS education resource center.

Results: Accomplished. An occupational and environmental health short course was presented at the National Institute of Public Health, Cuernavaca, Mexico. OEHS educational sessions were also presented at the Nordic Institute for Advanced Training in Occupational Health (Finland), in Indonesia, in Panama, and in Columbia. These efforts resulted in interchanges that provided information on international OEHS programs and activities that was incorporated in RMCOEH academic and CE courses.

Goal 3: Expand OEHS research training programs.

Results: Accomplished. A new OHN Ph.D. program, in nursing informatics, was initiated in conjunction with the College of Nursing. Students have been enrolled, and studies will be directed toward developing informatics programs relevant to OEHS activities in industries of varying size.

Goal 4: Expand Center outreach activities.

Results: Accomplished. Interactions have continued with academic institutions in Utah. Additionally, RMCOEH faculty have met with faculty of academic and medical institutions in Colorado to discuss the potential for joint, complementary programs. RMCOEH IH and OM faculty are scheduled to make a presentation at the next annual meeting of the Rocky Mountain Academy of Occupational Medicine in Denver, CO in January 1996. Faculty have also made presentations in Idaho and NV. Rocky Mountain Center faculty were selected to develop and present Segment I of the American College of Occupational and Environmental Medicine's Basic Curriculum in Occupational and Environmental Health. The first two-day session was presented to 57 physicians in Las Vegas in May, 1995. A correspondence course on management of OEHS programs was initiated, and IH faculty and students have

participated in secondary school information programs. These outreach efforts have been directed an increasing the visibility of OEHS programs and attracting more individuals to an OEHS career.

Goal 5: Expand Center research activities.

Results: Accomplished. A major research program in the health effects of exposures to PM-10 atmospheric pollutants was initiated during the grant period. The effort is funded by industry and academia, and it is an interdisciplinary effort involving RMCOEH faculty as well as epidemiologists and biostatisticians of the Department of Family and Preventive Medicine. A national research conference discussing the results of PM-10 studies by leading investigators has been scheduled for 1996, and state organizations and industry have committed funds to support the conference. Other research involved a study of cumulative trauma disorders in a maquiladora in Mexico, evaluation of Vitamin B-12 metabolism in dentists and dental assistants exposed to nitrous oxide, and studies of air quality in the U.S./Mexico border region. Proposals for other research studies have been submitted, and funding decisions are pending.

## BODY OF REPORT WITH CONCLUSION

As indicated in the Summary of Significant Findings section, five goals were established for the Center Administration. Specific objectives were established for each goal. The following details the progress in accomplishing these objectives:

Goal 1: Maintain and expand nationally recognized OEHS education programs.

Objective 1a: To provide graduate and continuing education programs that were designed to enable graduates to maintain and enhance worker health, enhance worker safety, and increase productivity of workers.

Results: Accomplished. This has been accomplished with increased numbers of graduate and continuing education courses that have been developed to reflect current and projected occupation environmental health and safety challenges. Faculty used inputs from the Center and program advisory committees, results of a survey of academic graduates, data from needs surveys, and interactions with industry and labor leaders as well as other OEHS professionals in revising education programs and in developing new courses. A summary of the results of the survey of academic graduates, accomplished in January 1995, is presented in Table ADM-1. A copy of the survey is provided in Appendix ADM-1. Listings of students and faculty are provided in core appendices. A summary of numbers of students and a listing of new courses, by program, are provided in Appendices ADM-2 and ADM-3.

Objective 1b: Provide graduate and continuing education programs that will help graduates to control or prevent adverse environmental impacts from work activities.

Results: Accomplished. This has been accomplished through development of programs that emphasize environmental aspects of occupational environmental health and safety activities. Both academic and CE courses have been structured to reflect environmental health and safety needs. The environmental emphasis is underscored by the fact that eight academic courses now include environmental health in their titles, and changes for other courses have been submitted. The increased emphasis on environmental health directly reflected the input of the Center Advisory Committee, whose membership includes the Director of the Utah Department of Environmental Quality, as well as the expanding environmental health activities of Center faculty. (Please see Appendix ADM-4 for a listing of Advisory Committee members.)

Objective 1c: Expand the number of RMCOEH faculty in order to enhance education programs.

Results: Accomplished. As noted in the core reports, faculty have been increased in IH (to four full-time faculty) and in OHN (to one and one-half full time faculty). An OM specialist has committed to coming to the Center on a full-time basis in November, 1995, increasing the number of OM physicians to three full-time faculty. A faculty addition to the E&S program is pending.

Objective 1d: Enhance financial stability of the Center so that education programs can be expanded.

Results: Accomplished. The financial stability of the Center has been increased through the addition of state funding for the OM residency stipends as well as through the addition of grants and additional financial support from corporations. The PM-10 research project and ergonomic studies have received significant industry support. The PM-10 conference scheduled for 1996 has received commitments of financial support from industry and from state organizations.

Goal 2: Establish the RMCOEH as an international OEHS education resource center.

Objective 2a: Provide education programs for OEHS professionals in other countries.

Results: Accomplished. This has been accomplished through the provision of education programs at the National Institute of Public Health at Cuernavaca, Mexico and through short OEHS courses and presentations in Indonesia, Finland (under auspices of the Nordic Institute for Advanced Training in Occupational Health), Panama, Columbia, and other countries.

Objective 2b: Assist OEHS professionals from other countries in participating in faculty exchange, visiting scholar, and similar programs at the RMCOEH.

Results: Partially Accomplished. Proposals for such activities for scholars from Mexico were submitted to the Southwest Center for Environmental Research and Policy (SCERP), but funding has not yet been obtained for this effort. However, visiting scholars from the Republic of China and from Singapore have been scheduled to come to the Center in 1996, utilizing other funding sources.

Objective 2c: Prepare OEHS information and professional publications for use in other countries.

Results: Accomplished. A 305-page synopsis of the course presented at Cuernavaca, Mexico at the National Institute of Public Health was published and provided to the National Institute for distribution. Key portions of the document were prepared in English and Mexican versions. Publications were also provided to attenders at the Nordic Course in Finland as well as at the courses in Panama and Columbia.

Goal 3: Expand OEHS research training programs.

Objective 3a: Maintain and expand the current PhD Program in Ergonomics and Safety.

Results: Accomplished. This has been accomplished in that the PhD program has been maintained and the number of students expanded.

Objective 3b: Initiate efforts to establish other RMCOEH PhD programs.

Results: Accomplished. The new PhD program in Occupational Health Nursing (Informatics) admitted students in 1993. This is discussed further in the OHN core program. The proposal

for a DFPM PhD program in Occupational and Environmental Health has been identified as a priority effort for the DFPM by the new DFPM Chair. It is anticipated that a decision regarding the program will be made in 1996.

Goal 4: Expand Center outreach activities.

Objective 4a: Develop a definitive schedule for enhanced outreach activities with other portions of the University of Utah.

Results: Partially Accomplished. RMCOEH faculty have meet with representatives of the College of Law and the College of Business at the University of Utah. Due to pending faculty changes at these Colleges, a definitive schedule has not been developed to date.

Objective 4b: Increase interaction with other Utah academic institutions.

Results: Accomplished. RMCOEH members have interacted actively with colleagues at Utah State University, Brigham Young University, Weber State University and other Colleges and Universities in the State. It should be noted that the Utah State efforts have resulted in a joint program through the Agriculture Safety and Health effort.

Objective 4c: Expand interaction with other academic institutions in the region.

Results: Accomplished. Through numerous activities, including interactions as a result of the Center's ties with SCERP, RMCOEH faculty have been involved with numerous regional, national and international universities including:

Regional:

- University of Texas at El Paso
- Arizona State University
- New Mexico State University
- Idaho State University
- University of Wyoming
- University of Nevada
- University of California at San Diego
- University of California at San Francisco
- University of California at Los Angeles
- University of California at Irvine

National:

- University of Kansas
- University of Florida
- University of Cincinnati
- University of UMDNJ--Robert Wood Johnson Medical School
- University of Maryland
- Duke University
- University of Pittsburgh

International:

University of Kanagauna  
Instituto Tecnologico y de Estudios Superiores de Monterrey

It should also be noted that RMCOEH OM faculty presented two EPOCH-Envi (Educating Physicians in Occupational Health and the Environment) Workshops for faculty of primary care residencies. Fifteen physicians from residency programs in the West attended each workshop. Attendees gained information that should expand occupational and environmental instruction in primary care residencies.

Objective 4d: Increase the use of volunteer and other faculty members who are not full-time RMCOEH faculty to expand outreach programs.

Results: Accomplished. The number of local and other volunteer faculty has increased significantly during the three years of the grant. At this time we have over 40 part-time or volunteer/clinical faculty who play active roles in RMCOEH programs. Additionally, significant faculty support is obtained from DFPM and the College of Nursing. (Please see faculty listings in core appendices).

Objective 4e: Expand in-place, current outreach activities with academia, industry, workers, government agencies, unions, and other organizations.

Results: Accomplished. Details of the outreach activities are provided in other portions of this report. As noted in the reports, the members of each programs have been activity involved in increased outreach activities. Of particular note has been participation in a number of national and international committees and boards. This experience has benefitted our education programs significantly. Similarly, our efforts with undergraduates and high school students are expected to pay dividends in increasing interest in, and applications for, our programs.

Goal 5: Expand Center research activities.

Objective 5a: Develop a focused approach to research to take advantage of faculty expertise in such areas as: occupational epidemiology, ergonomics and injury prevention, education methodology, and occupational and environmental toxicology.

Results: Accomplished. The Center's faculty have emphasized atmospheric pollution and ergonomics studies during this period. Investigators are studying the effects of various forms of PM-10 atmospheric pollution on morbidity and mortality. Baseline studies of morbidity and mortality attributable to PM-10 effects were accomplished. In addition, measurement of PM-10 levels both inside and outside of dwellings at different sites in the region have been accomplished. Results of the studies to date have been presented at a national meetings. It is of note that the presentations played a role in the Environmental Protection Agency's decision to delay revised PM-10 standards until such time as additional studies are accomplished. As noted in Objective 5b, the RMCOEH is planning a major PM-10 conference for 1996 to present results of RMCOEH research and those of other investigators.

A study of the incidence of cumulative trauma disorders in a maquiladora facility has been accomplished, and information obtained to help delineate etiologies and possible preventive measures for cumulative trauma disorders. A report of the investigation has been submitted for consideration for publication.

OM and IH faculty and students have accomplished preliminary fields studies of the effects on vitamin B-12 metabolism of nitrous oxide exposures in dentists and others working with this agent. Other research studies have included evaluation of air quality in the U.S./Mexico border region.

Objective 5b: Reinstate the Park City Research Conferences.

Results: Accomplished. A Park City Conference on management of OEHS programs was scheduled in 1993 but had to be canceled, due in large part to corporate reductions of travel funds. A Park City Conference to discuss the recent results of PM-10 studies at the RMCOEH, as well as at other institutions in this country and abroad, has been scheduled for 1996. Funding support has been obtained from state agencies in Utah and California as well as from industry.

Objective 5c: Increase publications of professional articles and books.

Results: Accomplished. One book and a significant number of research and other articles were published during this grant period. Please see for listings of publications in core appendices.

**CONCLUSION:** All five goals specified for the Administration section were accomplished. Of the 17 objectives specified in support of these goals, 15 were accomplished and 2 were partially accomplished. The Administration efforts have assisted the RMCOEH in increasing the number of faculty and students, expanding research efforts, and enhancing outreach and service programs. The demonstrated accomplishments and expanded activities of the Center make it particularly well-positioned to meet current and future OEHS challenges.

**TABLE ADM-1  
 SUMMARY OF RESULTS OF 1995  
 SURVEY OF GRADUATES OF RMCOEH ACADEMIC PROGRAMS**

	<b>Industrial Hygiene</b>	<b>Occupational Medicine</b>	<b>Occupational Health Nursing</b>	<b>Ergonomics and Safety</b>	<b>TOTAL</b>
<b>Number of Respondents by core:</b>	37	17	12	10	76
	<b>Industry</b>	<b>Government</b>	<b>Academia</b>	<b>Private</b>	<b>TOTAL</b>
<b>Employer of Graduates (Percentage of Respondents by Employer):</b>	48%	25%	11%	16%	100%
	<b>Full Time</b>	<b>Part Time</b>	<b>None</b>		<b>TOTAL</b>
<b>Percentage of Respondents Working Full, Part, or No Time in OEHS Activities:</b>	83%	12%	5%		100%
	<b>Excellent</b>	<b>Very Good</b>	<b>Adequate</b>	<b>Marginal</b>	<b>Poor</b>
<b>Overall Rating of Education Program (Percentage of Respondents by Category):</b>	28%	59%	13%	0%	0%

One hundred sixty-two surveys were mailed and seventy-six were completed and returned.

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## INDUSTRIAL HYGIENE PROGRAM

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### ABSTRACT

The Industrial Hygiene (IH) program was established in 1978 as part of the original ERC grant. It has been funded continuously since that time. During the 1992-1995 grant period, there were 54 students enrolled in the IH academic program, and there were 23 graduates. (Please see Appendix IH-1 for list of students.)

Graduates have been successful in obtaining responsible positions which reflect their advanced level training.

The academic curriculum has been regularly revised, utilizing results of evaluations by students and graduates, inputs from the RMCOEH and IH Advisory Committees, and information gained from interactions with other RMCOEH faculty and national leaders. These efforts have helped assure currency and relevance of the IH program, and graduates are well prepared to meet current and projected IH challenges.

The IH program is accomplished by four full-time faculty members assisted by 19 part-time and volunteer faculty. There were 2 new IH courses added to the academic curriculum and the program sponsored twenty-nine IH as well as forty-nine asbestos continuing education courses. Major research efforts included dose assessment for particulate air pollution. Thirteen professional articles were submitted or published (see Appendix IH-2).

## SIGNIFICANT FINDINGS

The following is a summary of progress in accomplishing the overall goals for the Industrial Hygiene program for the 1992-1995 grant period:

Goal 1: To maintain and continue to strengthen an internationally-recognized graduate program in industrial hygiene.

Results: Accomplished. Of the ten objectives identified for accomplishing this goal (see Body of Report below), eight were accomplished, one was partially accomplished and one was not accomplished. Overall, the program was substantially improved. The program retained ABET accreditation throughout the grant period.

Goal 2: To develop an international occupational and environmental health training program in industrial hygiene.

Results: Accomplished. Of the four objectives identified for accomplishing this goal (see Body of Report below), three were accomplished and one was partially accomplished. Substantial progress was made in advancing international training activities, including a presentation at the National Institute of Public Health, Cuernavaca, Mexico.

Goal 3: To present new continuing education course offerings in industrial hygiene while maintaining the same number of existing courses.

Results: Accomplished. Of the three objectives identified for accomplishing this goal (see Body of Report below), two were accomplished and one was not accomplished. Overall the IH continuing education program remains very strong and adaptable to changing CE needs. Five new CE courses were developed and presented during this grant period.

Goal 4: To expand research programs in industrial hygiene which support multidisciplinary research objectives of the Rocky Mountain Center and provide student research opportunities.

Results: Accomplished. Of the three above objectives identified for accomplishing this goal (see Body of Report below), all were accomplished. A major research effort to study health effects of PM-10 atmospheric pollution was initiated during the grant period. A substantial improvement has been made in completing student research projects and in submitting them for publication.

## BODY OF REPORT WITH CONCLUSION

As indicated in the Summary of Significant Findings section, four goals were established for the IH program. Specific objectives were established for each goal. The following details the progress in accomplishing these objectives:

Goal 1: To maintain and continue to strengthen an internationally-recognized graduate program in industrial hygiene.

Objective 1a: To improve and expand course offerings in industrial hygiene.

Results: Accomplished. As a result of supplemental funding for the Academic Hazardous Substances Program and the Agricultural Training Program, two advanced level courses in these areas were developed and presented for the first time in 1992 and again in 1994, respectively. In addition, a new course, "International Aspects of Occupational and Environmental Health", has been offered in the fall quarter of each year. The IH curriculum now totals a rigorous 75 quarter hours compared to 60 hours for the general MSPH degree. (See Appendix IH-4 for normal plan of study.)

The enrollment for "Fundamentals of Industrial Hygiene" was made open for the entire University in the fall of 1993, resulting in a total enrollment of 38 students. Of these, five were upper division undergraduates who subsequently applied to the graduate program for entrance in the fall 1994 class.

Objective 1b: To recruit an incoming student class of ten full-time students; to maintain ten full-time continuing students; and to maintain ten part-time students, for a total class size of 30 students.

Results: Partially Accomplished. Appendix IH-1 details the number of new, continuing and full-time students by year. There were a total class size of 26, 28, and 28 for the 1992-1993, 1993-1994, and 1994-1995 years respectively.

The program continued the widespread mailing of recruitment materials to science departments at regional colleges and universities. Annual visits were made to Utah State University to recruit eligible students.

Objective 1c: To increase available student support from sources in addition to NIOSH, such as the Industrial Hygiene Foundation and private corporations.

Results: Accomplished. The IH program received \$10,000 from the Shell Foundation for discretionary use in 1992, 1993 and 1994. In 1993, the program received a \$1500 grant, consisting of IH equipment used in training and research, from SKC, Inc. The Industrial Hygiene program also received \$3,000 and \$1,800 for the 1992-1993, and 1994-1995 years respectively from the American Industrial Hygiene Foundation. The RMCOEH IH Program is an approved training site for the Department of Energy's fellowship program. One 1994 incoming student (Flores) successfully competed for this scholarship. Finally, discretionary funds, derived principally from the IH portion of CE course profits, were also used where necessary, resulting in full support for all full-time students.

Objective 1d: To maintain accreditation as an Industrial Hygiene Program, by the Accreditation Board of Engineering and Technology (ABET) under the auspices of the American Academy of Industrial Hygiene.

Results: Accomplished. The IH Program was one of the three IH programs first accredited in 1989. The program was reaccredited in 1992 and remains currently accredited.

Objective 1e: To develop and implement a Doctoral program and to build to a minimum of two full-time doctoral candidates in industrial hygiene.

Results: Not Accomplished. The new Chair of the Department of Family and Preventive Medicine has identified a Doctoral Program as a priority area for study. We are optimistic that a PhD program will be approved by fall 1997.

Objective 1f: To maintain the number of IH faculty and to improve faculty qualifications.

Results: Accomplished. At the beginning of the grant period there were two full-time faculty (Lee and Wallace) and this number was increased to four (Lee, Wallace, Lillquist and Weis) by the end of the grant period. There was one additional IH full-time staff person (Ramsey) by the end of the grant period. All full-time certified faculty (Lee, Lillquist, Wallace) have maintained their Professional Board Certifications by accumulating re-accreditation points. Ms. Weis successfully passed her Industrial Hygienist in Training (IHIT) Board Examinations. Dr. Lillquist and Mr. Wallace served as officers in the Utah Section of the American Industrial Hygiene Association (Board of Directors and President respectively). Dr. Lee received the prestigious ACGIH Meritorious Achievement Award and has become a Board member of the national American Industrial Hygiene Association. All full-time faculty attend at least one professional conference each year. Dr. Lillquist was promoted to the rank of Assistant Professor and Dr. Lee successfully underwent his five year tenured faculty review. Mr. Wallace was appointed to a full-time permanent faculty position effective July 1, 1994. The regular faculty strength has been augmented by part-time and volunteer clinical faculty. (Please see listing in Appendix IH-3.)

Objective 1g: To increase students' skills in using computers for word processing, data analysis and presentation, and literature searching.

Results: Accomplished. An "Introduction to Computer Resources" course, was developed and begun Fall 1990. Since 1991, this course has been offered to all incoming students during their first quarter to familiarize them with available RMCOEH and University resources and database search techniques. Students are increasingly required to use computers in all industrial hygiene classes. Papers are required to be prepared through use of word processing programs; computerized literature searches using NIOSHTIC, OSHA-ROM, TOMES and NLM based systems (both on-line and CD-ROM technologies) are required; statistical analyses are required using appropriate software; and graphical and visual materials generated with computers are being encouraged. Students have excellent comprehensive computer facilities available on campus and at RMCOEH.

Objective 1h: To encourage professional growth of students beyond the University setting.

Results: Accomplished. Students are strongly encouraged to develop professionally outside of the University environment. Specifically, the IH Program pays, using non-government funds, for student membership in the local section of the AIHA and encourages presentation of student research at the student platform sessions at the American Industrial Hygiene Conference and Exposition (AIHCE). Two and five students presented poster papers at the 1993 and 1994 AIHCE's respectively and 5 students presented poster papers at the 1995 AIHCE. Students established the University of Utah, Student Chapter of AIHA in the spring of 1993. During 1994 the student chapter presented a session on *What is Industrial Hygiene?* at a local area high school and have continued the effort annually. Finally, it should be mentioned that students are strongly encouraged to take their ABIH examinations when eligible. Since graduating students generally have not accumulated enough years of experience at the time of graduation to take the comprehensive examinations, they are encouraged to return to the University to take the RMCOEH "Comprehensive Review of Industrial Hygiene" course at no cost when they do become eligible. As of August 1995, 82 students had graduated from the program; 25 (30%) passed the comprehensive CIH examination, and 9 (11%) have passed the Industrial Hygienist in Training (IHIT) exam.

Objective 1i: To review progress and goals with regular and clinical faculty.

Results: Accomplished. During the 1993-1994 year Dr. Lee suffered an extended illness which necessitated additional support from the other regular and clinical faculty. Regular and clinical faculty eagerly and wholeheartedly participated in academic and continuing education courses. Their efforts were instrumental in accomplishing the noted progress and in achieving the program's goals and objectives. The active, expanded participation by faculty while Dr. Lee was recovering from his illness illustrates the depth and commitment of the IH faculty.

The clinical faculty have been constituted as a formal IH advisory committee. The group now meets approximately three times per year.

Objective 1j: To increase graduation rate.

Progress: Accomplished. The number of graduates has substantially increased during the current grant period (see Appendix IH-1). For this grant cycle, 11 students graduated in 1992-1993; 8 graduated in 1993-1994; and 4 graduated in 1994-1995. During 1993, a tracking system was initiated to accomplish periodic contact with students who have left the University but have not yet formally finished their degree. The policy was established to allow individuals who have been gone from the University for over two years to switch to an MPH degree, which is identical to the MSPH with the exception of the research requirement. If such individuals have been gone for over five years they have been encouraged to switch to the MPH. The policy to accept incoming students only into the MSPH remains unchanged, and students are discouraged from leaving the University prior to finishing their degrees.

Goal 2: To develop an international occupational and environmental health training program in industrial hygiene.

Objective 2a: To develop and offer course offerings in international aspects of industrial hygiene.

Results: Accomplished. The academic course "International Aspects of Occupational and Environmental Health" was offered in the fall of each of the grant years. In addition, the course "International Health Issues", was offered by the Department of Family and Preventive Medicine each year and was available as a student elective. The course "Training Workshop for Environmental and Occupational Health Inspectors" was presented in Cuernavaca, Mexico in July 1993.

Objective 2b: To recruit and train students (both U.S. citizens and foreign students) who are interested in international aspects of occupational and environmental health.

Results: Partially accomplished. Four foreign students enrolled in the IH program in 1992-1993 and one did so for 1993-1994. A major international training grant was prepared and submitted for funding to the Foegerty Center in 1994. The grant was approved but not funded, and private foundation funding will be pursued during the 1995-1996 year.

Objective 2c: To host visiting professors/scientists from foreign countries who will actively contribute to the program.

Results: Accomplished. Bernice Goelzer, CIH, Industrial Hygienist for the World Health Organization, was brought to the RMCOEH as a participant in the *Giants in Occupational Health Lecturer Series* in the spring of 1993. She subsequently interacted formally with students in three sessions and informally over the course of a two-day visit to the Center. During the 1994-1995 year, Dr. Wang Sheng from Beijing Medical University visited to discuss possible research projects and training of international students from China. Visiting scholars from the Republic of China and Singapore are scheduled to participate in the RMCOEH IH program in 1996-1997.

Objective 2d: To develop international training and experiences for faculty and students in industrial hygiene.

Results: Accomplished. Students are encouraged to consider international as well as U.S. preceptorship opportunities. Dr. Lillquist gave an invited presentation at the *2nd International Symposium on Industrial Toxicology* in Rennes, France in the summer of 1993. Dr. Lee gave keynote speeches at the International Occupational Hygiene Association Conference in Hong Kong in November, 1994 and at the Australian Occupational Hygiene Association Conference in Australia in December 1994. Dr. Lee continued in his position as an official advisor to the International Occupational Hygiene Association and regularly participated in IOHA Board of Director's meetings and IOHA programs. One IH student participated in SCERP-sponsored research during summer 1993, in Mexico. The research focused on IH aspects of biomedical manufacturing in maquiladora industries in the U.S./Mexico border region. One additional student spent her summer preceptorship (1995) in Colombia working for 3M Corporation and helping to develop a graduate level training program at the Colombia School of Medicine.

Goal 3: To present new continuing education course offerings in industrial hygiene while maintaining the same number of existing courses.

Objective 3a: To continue to present current, informative CE courses in occupational hygiene.

Results: Accomplished. Two new courses were presented by IH as part of the CE effort in lead abatement (for supervisors and for inspectors) during the 1992-93 year. A new course on Air Monitoring was also developed and presented in January of all three grant years. Advanced-level courses were planned and conducted by IH faculty in the area of hazardous materials as part of the Center's initiative in this area. A one-day professional development course in noise was presented at the Joint Utah Conference on Industrial Hygiene in the fall of 1994, and in computer resources on the Internet in 1995 (see CE section).

Joint efforts for continuing education in IH have been presented in cooperation with the Utah Industrial Commission (Utah Occupational Safety and Health Administration), the Utah Safety Council, and the Utah State Division of Risk Management. Seven outreach courses, 1.5 days each, were conducted throughout Utah during the three year grant period (1993-1995). A one-day course on lead hazard evaluation for state and local health department personnel was developed and presented in November 1993. Further details on these courses can be found in the CE section of this Report.

Objective 3b: To present guest lectures in other Colleges of the University of Utah.

Results: Accomplished. Presentations have been made at the College of Nursing ("Introduction to Occupational and Environmental Health and Safety", NURS 480/574). Preliminary meetings have been held with faculty of the Colleges of Business and Law to discuss potentials for other presentations.

Objective 3c: To develop a collaborative training program with the College of Law targeted primarily at law students.

Results: Not Accomplished.

Goal 4: To expand research programs in industrial hygiene which support interdisciplinary research objectives of the Rocky Mountain Center and provide student research opportunities.

Objective 4a: To encourage students to conduct original research and to publish and present their findings.

Results: Accomplished. Incoming students continued to be accepted only into the MSPH degree program, which requires the completion of an original research project for the degree. Students must present a formal oral defense of their research, which must be of high technical quality. Students must also prepare a manuscript suitable for publication or a traditional thesis. Students are encouraged to present papers at the AIHCE student poster session in May each year (see progress on Objective 1h above).

Objective 4b: To develop and conduct research in the area of occupational and environmental health problems in the U.S./Mexico border region.

Results: Accomplished. Faculty and students of the IH Program participated in a multidisciplinary Center research effort investigating cumulative trauma risk factors and

organic solvent exposure in maquiladora industries in the U.S./Mexico border region in 1993. A paper describing this research was submitted for publication in 1995 (see Appendix IH-2). An additional research project looking at lead exposures was conducted in 1995 and is expected to be submitted for publication in the 1995-1996 year.

Objective 4c: To develop and conduct environmental hygiene research, principally involving air pollution in Utah County.

Results: Accomplished. Several research efforts investigating environmental hygiene aspects of PM-10 air pollution were initiated during the current grant period. These efforts include: quantification of indoor and outdoor exposures around hospitals, comparing standard industrial hygiene particulate sampling techniques to standard environmental air pollution techniques, investigating loss of moisture from particulate filters, and dose assessment for PM-10 morbidity and mortality studies. Results of studies have been, or are in the process of being, submitted for publication (see Appendix IH-2).

#### CONCLUSION:

All four goals specified for the IH program were accomplished. Of the 20 objectives specified in support of these goals, 16 were accomplished, 2 were partially accomplished, and 2 were not accomplished. Overall the IH program continues to grow and become stronger in terms of overall quality, qualifications of faculty, number of enrolled students, number of graduates, number of continuing education courses and, extent of research efforts.

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## OCCUPATIONAL MEDICINE PROGRAM

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### ABSTRACT

Since its beginning in 1978, the occupational and environmental medicine program has been a significant component of RMCOEH. The OM program has been a progressive academic and clinical teaching program and had developed links to other disciplines within the University. OM program faculty have key teaching roles in MSPH and MPH programs. The OM clinic provides tertiary consultation services to the Intermountain West region.

During the grant period 1992-95, there were 10 residents enrolled in the program and an additional MSPH student and 3 MPH students who were not OM residents. Additional preceptorship experiences in private industry and government were added. One new academic course was introduced, and 3 new continuing education courses were developed. OM faculty received seed money for occupational and environmental research efforts and prepared and submitted an NIH R01 proposal for future funded research. Preliminary studies of musculoskeletal disorders at a maquiladora plant, the effects of nitrous oxide on dental assistants, and environmental pollution along the U.S./Mexican border were conducted. Reflecting the strong interdisciplinary emphasis of RMCOEH, teaching, course development, and research activities routinely involved one or more of the other Center disciplines. There were 16 professional articles submitted or published (see Appendix OM-2).

## SIGNIFICANT FINDINGS

The following is a summary of progress in accomplishing the overall goals for the Occupational Medicine program for the 1992-1995 grant period:

Goal 1: To maintain and expand nationally-recognized OM education programs.

Results: Accomplished. The OM residency was surveyed by ACGME in July 1992 and was accredited for five years, the maximum length of accreditation. In July 1993 Anthony J. Suruda, M.D., MPH was appointed OM program director and associate OM residency director. In conjunction with these changes, the ACGME continued the accreditation of the OM residency for the remainder of the five year period. Six residents completed the OM residency during the period July 1, 1992 - July 1, 1995; and 4 additional completed the PGY-2 year and will complete the PGY-3 year in 1996.

Goal 2: To expand OM teaching programs.

Results: Accomplished. Continuing education courses in Occupational Medical Management, Occupational & Environmental Reproductive Hazards, and Occupational Medicine for Primary Care Providers were developed and successfully presented. A new academic course in Injury Control was developed, approved by the Graduate School, and added to the curriculum.

Goal 3: To expand OM research training programs.

Results: Accomplished. In collaboration with E&S, OHN, and IH, a study of cumulative trauma disorders at a maquiladora manufacturing plant in Nogales, Mexico was done and submitted for publication. OM residents assisted with this study. A pilot study of the effects of nitrous oxide on vitamin B<sub>12</sub> metabolism was done, with OM and IH graduate student participation. Funding was obtained from the EPA to conduct a small study of air pollution in the El Paso/Ciudad Juarez area, with IH student participation. Grant proposals for injury research were submitted.

Goal 4: To expand OM outreach.

Results: Accomplished. OM faculty, staff and residents were on local television in 1993 and 1994 to discuss the health effects of asbestos. OM faculty provided technical assistance to the Utah Department of Health for blood lead surveillance, and to county health departments for assistance with various environmental contamination episodes such as herbicides and leaking underground storage tanks. The OM program provided speakers for the local area on topics of current interest, such as child labor. Arrangements were made to expand outreach into Colorado and Idaho.

Goal 5: To expand OM research activities.

Results: Accomplished. Two awards of "seed" money were made by DFPM to the OM program in 1993-1994 for research on nitrous oxide and on folic acid metabolism. The EPA, via SCERP, funded an award to \$23,000 in Spring 1995 to study environmental pollution on the U.S./Mexican border. This work will be completed in Fall 1995. Applications for Fiscal

Year 1996 NIH funding for injury research were submitted by Dr. Suruda. Funding was also requested for a study of construction injuries from the Center to Protect Workers Rights. Although little research was completed during the period, preliminary steps are in place for a successful OEM research program.

## BODY OF REPORT WITH CONCLUSION

As indicated in the Summary of Significant Findings section, five goals were established for the OM program. Specific objectives were established for each goal. The following details the progress in accomplishing these objectives:

Goal 1: To maintain and expand nationally-recognized OM education programs.

Objective 1a: To maintain an Accreditation Council for Graduate Medical Education (ACGME)-accredited OM residency and expand the number of residents to four each at the PGY-2 and PGY-3 levels.

Results: Accomplished. The OM residency was surveyed by ACGME in July 1992 and was accredited for five years, the maximum length of accreditation. However, in April 1993 the residency director and OM program director, Patricia Barrier, M.D., MPH, resigned, and Royce Moser, Jr., M.D., MPH, became residency director. In July 1993 Anthony J. Suruda, M.D., MPH was appointed OM program director and associate OM residency director. In conjunction with these changes, the ACGME continued the accreditation of the OM residency for the remainder of the five year period.

Six residents completed the OM residency during the period July 1, 1992 - July 1, 1995; and 4 additional completed the PGY-2 year and will complete the PGY-3 year in 1996. Please see Appendix OM-1 for listing of enrolled students.

Funding from the Salt Lake City VA hospital for resident stipends was increased to 0.75 FTE for 1994-1995. Funding from the School of Medicine GME council was obtained for 0.5 FTE resident stipends.

Objective 1b: To improve and expand the clinical rotations and industrial preceptorship opportunities.

Results: Accomplished. We established industrial preceptorships at several sites in order to provide a quality preceptorship experience for PGY-3 residents. The preceptorships sites are: Hanford Environmental Health Foundation (Richland, WA), American Airlines (Dallas, TX), Boeing (Everett, WA), General Mills (MN), and the Federal Occupational and Environmental Health Unit of the US Public Health Center (Denver, CO). In addition, a rotation has been established at a freestanding occupational medicine clinic (WorkCare) in the local area. The industrial rotations at Hill AFB, Utah and at Hercules (now Alliant Techsystems) continue. (Please see Appendix OM-3 for listing of volunteer faculty preceptors.)

Objective 1c: To maintain and strengthen the interdisciplinary nature of the OM residency program.

Results: Accomplished. The OM program has had great success in fostering the interdisciplinary nature of the OM residency program throughout its existence. Residents attend classes and provide consultative services along with their colleagues in the IH, OHN, and E&S cores. (Please see Appendix OM-4 for normal plan of study.) The structure of the MPH/MSPH program, and the academic collaboration of the RMCOEH faculty, assure that this objective will continue to be achieved in the coming years. Residents have actively worked with members of the other disciplines in research efforts, such as the study of cumulative

trauma disorders in maquiladora industries. All OM residents realize that occupational and environmental health requires a "team" effort.

Objective 1d: To develop OEHS offerings as part of formal primary care residency programs at the University of Utah, and, depending on results, consider providing these to residencies in other locations.

Results: Accomplished. Two EPOCH/Envi (Educating Physicians in Occupational Health and the Environment) workshops were successfully conducted at RMCOEH in June 1994 and in June 1995. The attendees, who were residency directors of primary care programs, learned a variety of topics concerning occupational and environmental health that could be introduced into their residency curricula. Fifteen, residency faculty attended the 1994 (basic) workshop and fifteen attended the 1995 (advanced) workshop. In addition, twenty residency faculty attended workshops accomplished through a sub-contract at the University of California at San Francisco. We plan to build upon our experience in EPOCH/Envi and introduce occupational and environmental health topics into primary care programs at the University of Utah.

Objective 1e: To develop a part-time residency program in occupational medicine.

Results: Partially Accomplished. There are many physicians who evaluate and treat patients with occupationally-related health problems who have not completed a formal residency program. Those physicians who graduated from medical school after 1984 must complete a formal residency in occupational medicine in order to qualify to take the occupational medicine board examination. Many physicians in practice find it difficult to leave their practices and return full-time to a training program.

RMCOEH has initiated efforts to develop a half-time residency in OM. Applicants would have the option of completing the basic academic year (MPH) at RMCOEH half-time or matriculating in one of the MPH programs (e.g. the University of Wisconsin) which offers a part-time, off-site, degree program. Once having received the MPH, physicians could complete the practicum year, over a two year period, as part of the RMCOEH program. The program would be structured to meet all ACGME requirements. We are currently exploring funding mechanisms for part-time residents as well as additional preceptorship sites for such students.

Goal 2: To expand OM teaching programs.

Objective 2a: To develop short courses in OM at the RMCOEH for international physicians.

Results: Accomplished. Center faculty contacted a number of US and Mexican health professionals in efforts to develop course offerings. As a result of these efforts, OM faculty, in conjunction with IH members and faculty of the Mexican National Institute of Public Health, developed and presented the course "Training Workshop for Environmental and Occupational Health Professionals" in July 1993. A 305 page summary of the proceedings, including translations in English and Spanish, was prepared and provided to the National Institute of Public Health for dissemination.

Objective 2b: To establish a faculty exchange to develop and conduct OM courses in other countries.

Results: Not Accomplished. OM faculty have discussed possible faculty exchanges with medical members of the Instituto Tecnológico y de Estudios Superiores de Monterrey and with faculty of the Mexican National Institute of Public Health. We had planned to use SCERP funding for this effort but did not secure it.

Goal 3: To expand OM research training programs.

Objective 3a: To increase PGY-2 and PGY-3 residents' initiative and involvement in designing and implementing research projects.

Results: Accomplished. OM residents have assisted with faculty research studies. A PGY-2 resident assisted with screening for cumulative trauma disorders at a maquiladora plant in Mexico. Two PGY-3 residents assisted in recruiting subjects and obtaining specimens for a study of the effects of nitrous oxide on folate and vitamin B<sub>12</sub> metabolism.

Objective 3b: To support the RMCOEH proposal for a PhD program.

Results: Partially Accomplished. A proposal for a PhD program was approved by the DFPM and the School of Medicine and submitted to the University. However, lacking a source of financial support for PhD candidates, the proposal has not been acted upon. The new DFPM Chair has established the PhD program as a priority area for evaluation and delineation of sources of financial support.

Goal 4: To expand OM outreach.

Objective 4a: To expand OM teaching involvement in the School of Medicine and in related residencies, such as internal medicine and family medicine, through elective rotations, didactic sessions, and use of interactive videodisc and computer-assisted diagnostic programs.

Results: Accomplished. OM faculty have lectured to family practice residents and to first year medical students at the School of Medicine. Members have also provided consulting services to internal medicine, neurology, and dermatology. The Assistant Dean for Medical Education has assembled a committee to review the medical school curriculum, including the need for additional environmental health training.

Objective 4b: To develop additional physician OEHS continuing education courses.

Results: Accomplished. Dr. Moser accomplished a survey of a number of directors of national corporate and government OEHS programs to ascertain the major management challenges facing the directors. Information from the assessment was used to develop a correspondence course in management of OEHS programs in 1994. Co-sponsorship has been obtained from the American College of Occupational and Environmental Medicine (ACOEM) and 89 students took the course during 1994-1995.

Dr. Suruda developed an introductory course in occupational medicine for primary care practitioners which was successfully held on May 18, 1994 and a course on reproductive hazards that was successfully presented in September 1994.

Dr. Suruda developed a course "Reproductive Hazards in the Workplace and the Environment" in cooperation with the Association of Occupational and Environmental Clinics and ACOEM. The course featured nationally-recognized experts and was held in Salt Lake City on October 7, 1994. ACOEM provided AMA category 1 credit to the 25 physician participants.

RMCOEH OM faculty were selected to develop and present Segment I of ACOEM's Basic curriculum in Occupational and Environmental Medicine. Segment I was presented to 57 physicians in Las Vegas, NV in May 1995. AMA category 1 credit was provided by ACOEM.

Objective 4c: To increase community and regional awareness of the Center's occupational medicine capabilities, including OM's tertiary clinical referral service.

Results: Accomplished. The OM Program continues to maintain a referral clinic based at the University Hospital. The clinic provides consultation to private physicians, the Workers' Compensation systems of Utah, Idaho, and Nevada; the Industrial Commissions of Utah; legal representatives; and private Workers' Compensation carriers. In addition, the OM clinic receives referrals from the Utah Department of Health and Department of Environmental Quality for evaluation of victims of toxic exposures. The EPOCH-Envi project described above has increased RMCOEH contact with primary care providers in the Intermountain West area. Interactions with freestanding OM clinics in the local area have expanded. The OM clinic's capacity to provide tertiary service is limited only by space and provider time.

In January 1994, the University of Utah Health Sciences Center sent a bulk mailing to 900 primary care practitioners in Utah and surrounding states which described the OM program and provided a Rolodex card with the OM program number for consultations and questions concerning occupational or environmental exposures. The mailing generated numerous inquiries and patient referrals. Additional mailings will be done in subsequent years.

Goal 5: To expand OM research activities.

Objective 5a: To actively seek new funding opportunities for faculty research efforts.

Results: Accomplished. Two awards of "seed" money were made by DFPM to the OM program in 1993-1994 for research on nitrous oxide and on folic acid metabolism. SCERP funded an award to \$23,000 in Spring 1995 to study environmental pollution on the U.S./Mexican border. This work will be completed in Fall 1995. Applications for Fiscal Year 1996 NIH funding for injury research were submitted by Dr. Suruda.

**Objective 5b:** To increase collaborative research efforts with other occupational health professionals, including faculty of the RMCOEH, other ERC's, DFPM, other University of Utah departments, and other universities as well as agencies such as the State Health Department and the Poison Control Center.

**Results:** Accomplished. Considerable progress has been made in this regard. The SCERP projects described above are collaborative projects involving faculty and students in the OM, IH, OHN, and E&S Programs. Air pollution studies are planned in collaboration with faculty and students in the IH Program as well as with an epidemiologist in the DFPM and a pulmonologist at the University of Utah School of Medicine. In addition, the OM Program is taking part in a cooperative grant with the Utah Department of Health for surveillance of elevated blood lead levels in adults, providing review and consultative services as needed. Dr. Suruda has also arranged a pilot study of folic acid deficiency in pregnant women along the U.S./Mexico border in the El Paso-Ciudad Juarez area. This was funded by DFPM and was done in collaboration with investigators at the University of Texas at El Paso.

**Objective 5c:** To participate in RMCOEH occupational and environmental health research efforts in other countries.

**Results:** Accomplished. OM program physicians assisted with the study of upper extremity cumulative trauma disorders at a maquiladora plant in Nogales, Mexico. As mentioned above, SCERP funding was awarded in Spring 1995 for a study of airborne lead pollution in the El Paso/Ciudad Juarez area.

#### CONCLUSION:

All five goals specified for the OM program were accomplished. Of the 15 objectives specified in support of these goals, 12 were accomplished, 2 were partially accomplished, and 1 was not accomplished. The OM program continues to expand, with a record number of residents; commitment from a new faculty member to join the program in November, 1995; new research initiatives, new academic and CE courses, and increased stipend funding. These achievements provide a strong base for future efforts.

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## OCCUPATIONAL HEALTH NURSING PROGRAM

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### ABSTRACT

The Occupational Health Nursing (OHN) program was established in 1978 as part of the original ERC grant. It has been partially funded continuously since that time. During the 1992-1995 grant period, there were eleven MPH, one Community Health Nursing (CHN), and two PhD students enrolled in the OHN academic program, and there were six graduates. Two additional students will complete the program Autumn Quarter 1995. (Please see Appendix OHN-1 for list of students.)

Graduates have been successful in obtaining responsible positions which reflect their advanced level training.

The academic curriculum has been regularly revised, utilizing results of evaluations by students and graduates, inputs from the RMCOEH and OHN Advisory Committees, and information gained from interactions with other RMCOEH faculty and national leaders. These efforts have helped assure currency and relevance of the OHN program, and graduates are well prepared to meet current and projected OHN challenges.

Faculty has grown from 1.0 FTE to 1.5 FTE during the grant period. There were two new OHN courses added to the academic curriculum and the program sponsored twelve continuing education courses. Major research efforts included a multidisciplinary upper extremity cumulative trauma study in Nogales, Mexico. Dr. Meservy was the lead investigator. Four professional articles and one book chapter were submitted or published (see Appendix OHN-2).

## SIGNIFICANT FINDINGS

The following is a summary of progress in accomplishing the overall goals for the Occupational Health Nursing program for the 1992-1995 grant period:

Goal 1: To maintain and expand a nationally-recognized occupational health nursing education program.

Results: Accomplished. Eight of the nine objectives identified for accomplishing this goal were accomplished and one was partially accomplished. During the 1992-95 funding period seventeen students enrolled in the OHN options; eleven MPH, one MSPH, one CHN, two OHNP, and two PhD. Six students have graduated and three additional students will complete the program the end of December 1995. OHN faculty increased from 1.0 FTE to 1.5 FTE with the appointment of Ms. Jean Bass as a 50 percent FTE Teaching Assist. Overall the program was substantially improved.

Goal 2: To develop an international OEHS training program in OHN.

Results: Accomplished. Both objectives identified for meeting this goal were accomplished. A three-day course, "Emergency Response at the Worksite", was presented for all OHNs, OMs, EMTs employed by the Panama Canal Commission in August 1994. Dr Meservy continues to consult with Nursing Faculty in Japan in the area of OHN. A cumulative trauma research study was completed in Nogales, Mexico and an article has been submitted.

Goal 3: To expand Occupational Health Nursing outreach and CE activities.

Results: Accomplished. Four of the five objectives established for meeting this goal were accomplished. A two-credit-hour course was developed ("Introduction to Occupational and Environmental Health and Safety"). It is taught each Autumn Quarter and is open to any student on campus and it was selected as one of the courses for the new University BS in Environmental Sciences. Twelve CE courses were presented to a total of 394 OHNs. A significant increase in number of courses and number of OHN attendees occurred.

Goal 4: To expand research training programs in OHN that support the interdisciplinary research objectives of the RMCOEH and provide student research opportunities.

Results: Accomplished. All four objectives identified to meet this goal were accomplished. All OHN students in the OHN options complete a 4-credit hour research course taught through the College of Nursing. Students in the MSPH and MS options complete a research/masters project. Two new sites for preceptorships have been established and research opportunities in each are available. Two PhD students are currently enrolled with one developing her dissertation proposal. A cumulative trauma study partially funded by the EPA was completed in Nogales, Mexico and paper has been submitted.

Goal 5: Collaborate with other core faculty and students to expand the RMCOEH Center's research activities.

Results: Accomplished. Of the five objectives established to accomplish this goal, three were accomplished, and one was partially accomplished. Dr. Meservy continues to work with a group of College of Nursing faculty and PhD and MS students to develop research proposals that relate to OEHS. She serves on many research project committees for students from other cores, thus promoting interdisciplinary research activities. As noted above, the interdisciplinary cumulative trauma study in Nogales, Mexico was completed and an article submitted for publication. Research efforts have been expanded.

## BODY OF REPORT WITH CONCLUSION

As indicated in the Summary of Significant Findings section, five goals were established for the OHN program. Specific objectives were established for each goal. The following details the progress in accomplishing these objectives:

Goal 1: To maintain and expand a nationally-recognized occupational health nursing education program.

Objective 1a: Expand course offerings in occupational health nursing as identified through needs assessments and national trends in the field of occupational and environmental health.

Results: Accomplished. Changes in curriculum were made as dictated by on-going needs assessments and local, regional and national trends in OEHS and nursing. Ms. Ann Cox, Executive Director of the AAOHN, met with OHN students and students from other cores to discuss national trends in OEHS. An OHN Advisory Committee was very active during this funding period, especially during the 1993-95 academic years. As a result of these activities, an Occupational Health Nurse Practitioner Program was designed and the first students were admitted for Autumn Quarter 1995. To comply with changes in the 1993 Utah Nurse Practice Act, an advanced health assessment course and an advanced pharmacology course were added to the OHN MPH, and MSPH curricula. (Please see Appendix OHN-4 for normal plan of study.) The addition of these courses, currently taught at the College of Nursing, will facilitate licensing of our graduates at the Advanced Practice level.

Objective 1b: Expand recruiting efforts to increase the number of occupational health nursing students to five full time first year students, five full-time second year students, one to two PhD students, and part-time students as resources permit.

Results: Accomplished. During the 1992-95 funding period eleven MPH, one MSPH, one CHN, two OHNP, and two PhD students entered the program. Six students graduated and three additional students will complete the program the end of December 1995. Students are electing the MPH degree rather than the MSPH degree. It appears the MPH option is encouraging a greater number of new students to enter the OHN program. We are receiving an impressive number of inquiries regarding the OHNP program.

Information about the OHN Program is included in the College of Nursing brochures, catalogs, and other College of Nursing and University of Utah advertising and mailing materials. The OHN Program recruits at appropriate national and regional OEHS meetings when these meetings are in the Intermountain Region. In addition information about the RMCOEH programs is distributed to universities across the country.

One to two senior nursing students per quarter are completing their synthesis quarter in an OEHS setting. One student completed his MPH/OHN June 1995. Two other students are exploring entering the program Autumn Quarter 1996. This activity and the OEHS lectures in community health nursing classes continue to serve as excellent recruitment tools.

Objective 1c: Seek external funding for stipends and other educational activities within the OHN Program.

Results: Accomplished. OHN has two fully funded preceptorships, one with Becton Dickinson, one with O.C. Tanner, and a partially funded one with Mervyn's Distribution Center.

An interdisciplinary research grant was funded to study cumulative trauma disorders in Mexican workers along the US/Mexico border. OHN took the lead for this research study that was a part of the Southwest Center for Environmental Research and Policy (SCERP) effort, a consortium of U.S. and Mexico universities supported by the EPA. The study was completed and an article submitted.

Objective 1d: Explore the feasibility of National League of Nursing (NLN) accreditation of the MSPH/MPH programs in occupational health nursing.

Results: Accomplished. The College of Nursing had its regular NLN review during spring quarter 1993 and it was awarded full accreditation for eight years. All OHN courses taught through the College of Nursing were reviewed as a part of the process. College of Nursing administration and Dr. Meservy determined that it was not feasible to seek NLN accreditation for OHN MPH/MSPH options at this time.

Objective 1e: Admit one nurse with research interests in OEHS to the College of Nursing PhD program in 1992, one in 1994, and one in 1996, pending stipend, tuition and research funding from NIOSH.

Results: Accomplished. A doctoral student with OEHS research interests was admitted to the College of Nursing PhD Program in the Autumn of 1993 and a second one was admitted Autumn Quarter 1994. Both are being partially funded through the ERC Grant. Delay of admission was in response to the recommendation of the 1991 site visitors, who recommended delay pending development of a stronger OEHS research base. The OEHS research base is in the area of application of Nursing Informatics methods to the industrial setting. See Goal 4 for additional information about OHN research emphasis

Objective 1f: Admit one nurse to the PhD/Dr.P.H. program in OEHS in 1993, one in 1995, and one in 1997, pending stipend, tuition and research funding from NIOSH.

Results: Partially accomplished. A proposal for a doctoral program in the Department of Family and Preventive Medicine focusing in OEHS is still under review by the University of Utah Graduate Council.

Objective 1g: Continue to work with College of Nursing faculty to further develop and implement a community health nursing program, at the masters level, which will include an option in OHN.

Results: Accomplished. The College of Nursing grant to develop a CHN program at the Master's level was approved and funded in September 1993. Dr. Angeline Bushy, Associate Professor in the College of Nursing, is the Principal Investigator and Project Director. The first fifteen CHN students were admitted Autumn quarter 1994. Students in the CHN Program

may elect to take the OHN courses taught through the College of Nursing for nurses in the MPH/MSPH program. The Community Health Nursing Curriculum also includes several public health courses taught through the Department of Family and Preventive Medicine.

Objective 1h: Explore the feasibility of a double masters for OHNs to include an MS from the College of Nursing and an MPH from the School of Medicine.

Results: Accomplished. As of Autumn Quarter, 1995, students have this option. They will complete the OHN MPH and either the CHN or OHNP MS option.

Objective 1i: A three to five-year objective is to recruit an additional doctoral-prepared OHN faculty member.

Results: Accomplished. The Rocky Mountain Center for Occupational and Environmental Health Core Directors set as a top priority, the recruitment of a second OHN faculty member. Funding for this position is a joint commitment of the College of Nursing and the RMCOEH. Jean Bass joined the College of Nursing faculty as a 50% FTE Teaching Assistant Autumn Quarter 1994. Funding of the CHN grant that provides for a CHN/OHN emphasis in the College of Nursing increases College of Nursing faculty effort in our OHN program.

Goal 2: To develop an international OEHS training program in OHN.

Objective 2a: Develop short courses in OHN designed to enable nurses from developing countries to implement OEHS programs that will protect human resources of their country.

Results: Accomplished. The Center developed and presented an OEHS short course in Mexico as part of the SCERP effort. Funding for follow-on course development was requested but was not funded.

Dr. Meservy presented a three-day course for all OHNs, OMs, and EMTs employed by the Panama Canal Commission. The course, Emergency Response at the Worksite was taught in Ancon, Panama for two different groups of students, during August of 1994.

Plans are currently under way for Dr. Meservy to provide OEHS consultation for Japanese Nursing Faculty in Japan, Autumn Quarter 1996.

Objective 2b: Participate in OEHS activities proposed for the Southwest Center for Environmental Research and Policy as funding is obtained.

Results: Accomplished. An interdisciplinary article was written as a part of the preliminary research effort and was submitted for publication but was not accepted. A second study, in which OHN took the lead, and involving RMCOEH faculty and students, has been accomplished. An article has been submitted to the *Journal of Occupational Medicine*.

Goal 3: To expand Occupational Health Nursing outreach and CE activities.

Objective 3a: Continue to work with Weber State University (WSU), Brigham Young University (BYU), and Westminster College to implement additional occupational and environmental health content into the undergraduate curriculum.

Results: Accomplished. This objective has been accomplished. The *Integrating OEHS into the Undergraduate Curricula* Summer Institute has had a continuing and far-reaching impact in nursing education in Utah. Faculty from these programs continue to integrate OEHS content into their courses and offer rotations in industrial settings to undergraduate student nurses. Students in the BYU program have the option of doing an eight-week clinical experience in an industrial setting. Most students in the WSU programs complete a two- to three-day rotation in an industrial setting.

Objective 3b: Continue to work with Weber State College to develop and implement a joint COHN Certification Exam Review Course.

Results: Not accomplished. Efforts on this objective have been terminated due to lack of support for this type of course.

Objective 3c: Implement a two-credit hour course providing an overview of OEHS in the College of Nursing as the College's new curriculum is implemented in the fall of 1992.

Results: Accomplished. A two-credit hour course entitled *Introduction to Occupational and Environmental Health and Safety* was taught for the first time Autumn quarter 1993 and continues to be taught each Autumn Quarter. Dr. Meservy and Ms Jean Bass are lead instructors with other RMCOEH faculty presenting guest lectures. The course is cross listed as undergraduate (NURS 380) and graduate (NURS 547). Students have enrolled in both level courses. The University of Utah has approved and implemented a new BS degree, Studies in Environmental Sciences. This course has been selected as one of the courses to be included in the degree requirements.

Objective 3d: Work with the University of California at San Francisco (UCSF) to further explore strategies for implementing occupational and environmental health and safety content in undergraduate programs.

Results: Accomplished. Dr. Meservy collaborated with Dr. Jane Lipscomb, Director of the Occupational Health Nursing Program, UCSF, to evaluate ways of working with nursing faculty in implementing OEHS content into undergraduate nursing curricula across the state of California. Course overview, objectives, presentation outlines, and other materials from our earlier Summer Institute on Integrating OEHS content into Undergraduate Nursing Programs were shared with Dr. Lipscomb. They did use the materials in developing and implementing their CE course.

Objective 3e: Develop two additional CE courses in the area of epidemiology and OHN.

Results: Accomplished. Twelve CE courses were presented by OHN. They included: *Health Promotion at the Worksites*, April 29-30, 1993; *Environmental Contamination: Risk Analysis*

*and Management*, September 9-10, 1993 and September 15-16, 1994; *Audiometric Technician Certification Training* taught once each year (four times). *Emergency Response at the Worksite*, August 1994 (two times); *Governors Conference on Worksite Health Promotion*, 1993. In addition the OHN Program co-sponsored, with the UAOHN, three short CE courses, *Pain and Stress Management*, *Overview of Ergonomics*, and *TB in the 90s: Gaining Insight for Today*. We continue to co-sponsor with UAOHN.

**Goal 4:** To expand research training programs in OHN that support the interdisciplinary research objectives of the RMCOEH and provide student research opportunities.

**Objective 4a:** Maintain an MSPH option in OHN that provides an opportunity for masters level students to develop research capabilities, to critique research, and to accomplish their own research.

**Results:** Accomplished. The MSPH option is available to OHN students who desire to complete a research project or thesis. All students in the OHN MS options are required to complete a Masters Project or Thesis. Students in all OHN options are required to take a four credit hour research course taught through the College of Nursing. This master level course teaches advanced content in the research process and basic content in research utilization.

**Objective 4b:** Select preceptor opportunities that will facilitate research experiences for students in the MSPH program.

**Results:** Accomplished. New preceptorship opportunities continue to be evaluated and utilized. Preceptorships with Becton Dickinson, E Systems, Mervyn's Distribution Center, Abbott Critical Care, the Veterans Administration Medical Center, Geneva Steel, and Workcare, a free-standing Occupational Health Clinic, serve as primary providers of research opportunities. Other Primary care clinics and occupational health clinics are also available.

**Objective 4c:** Collaborate with faculty of the College of Nursing doctoral program to assist doctoral students with research interests in the area of OEHS health.

**Results:** Accomplished. One doctoral student was admitted to the PhD OEHS research area autumn quarter 1993, and a second student was admitted Autumn Quarter 1994. Dr. Meservy continues to work with Dr. Lillian Nail, Associate Dean for Research; Dr. Sue Huether, Associate Dean for Academic Affairs; Dr. Linda Lange, Director of the Nursing Informatics Program (area of research emphasis for OHN Doctoral students); and Dr. Cheryl Thompson, faculty member, Nursing Informatics Program; College of Nursing. The 1993 student is currently developing her dissertation proposal.

**Objective 4d:** Seek external funding to facilitate the research training program for master-level and doctor-level occupational health nursing students.

**Results:** Accomplished. Faculty and students of the OHN program have participated in a multidisciplinary research study investigating prevalence of cumulative trauma among workers in maquiladora industries in the U.S./Mexico boarder region. This research was funded by the EPA as a part of the SCERP effort.

**Goal 5:** Collaborate with other core faculty and students to expand the RMCOEH Center's research activities.

**Objective 5a:** Collaborate with OM faculty to develop and implement research studies in the area of lead and health effects associated with hazardous waste sites.

Results: Partially accomplished. This objective was deferred while Center faculty and students focused on the interdisciplinary research of cumulative trauma disorders among workers in maquiladora industries along the U.S./Mexico border.

Dr. Meservy continues to serve on many of the IH students' Research Committees. Several of the student projects have related to lead and hazardous waste sites. This promotes the interdisciplinary research activities with Core Faculty and students.

**Objective 5b:** Collaborate with OM faculty to develop and implement a research project related to industrial toxicology and occupational lung diseases.

Results: Not accomplished. This objective has also been deferred. See 5a above.

**New Objective 5c:** Conduct descriptive research studies which define the OEHS problems associated with industry along the U.S./Mexico border region.

Results: Accomplished. An interdisciplinary team of faculty visited a medical equipment manufacturing plant in Nogales, Mexico on November 17-19, 1992. An upper extremity cumulative trauma study was designed and completed. Dr. Meservy took the lead in designing the study. Data were collected during August 1993 by a multidisciplinary team of faculty and students from the RMCOEH. Data were analyzed and an article has been submitted to the *Journal of Occupational Medicine*.

**Objective 5d:** Work with College of Nursing faculty and doctoral students to develop and implement research studies related to OEHS that will serve as doctoral students' dissertation studies.

Results: Accomplished. Dr. Meservy continues to work with a group of College of Nursing faculty and PhD and MS students to develop research proposals that relate to OEHS. Several students have been identified with interests that have and are developing into research in an OEHS area.

**Objective 5e:** Seek external funding from a variety of sources to support and facilitate faculty and student research activities.

Results: Accomplished. Work on this objective is on-going. RMCOEH has committed 50 percent salary and the College of Nursing has committed a 50 percent salary for a full time faculty position, and RMCOEH has committed 25 percent and the College of Nursing has committed 25 percent time for a Teaching Assistant. This commitment will facilitate grant writing.

## CONCLUSION:

All five goals specified for the OHN program were accomplished. Of the twenty five objectives specified in support of these goals, twenty one were accomplished, two were partially accomplished, and two were not accomplished. The OHN program continues to grow and become stronger in terms of overall quality, number and qualifications of faculty, number of enrolled students, number of graduates, number of continuing education courses, and extent of research efforts.

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## ERGONOMICS AND SAFETY PROGRAM

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### ABSTRACT

The Ergonomics and Safety Program at the RMCOEH was initiated in 1982 at which time the academic degree programs were located in the Industrial Engineering Program in the Department of Mechanical and Industrial Engineering. During the first five years of the program there was not a full-time Program Director and four students were graduated. In 1986, a full-time Program Director, Dr. Bloswick, was hired. In 1986 the Industrial Engineering Program was also phased out, but the E&S Program remained in the Department of Mechanical Engineering. The program survived, and during the 1992-1995 period there were 32 students enrolled in the program with 13 graduates (5 MS, 3 ME, 1 MPhil, 2PhD, 2 MSPH/MPH). An active research program, housed in a well-equipped Ergonomics & Safety research lab was established. One-day and one-week ergonomics short courses and contract courses were regularly offered through RMCOEH. Ergonomic short courses were also offered throughout the U.S. on a consulting basis. In addition, Dr. Bloswick is frequently used as an ergonomics resource within the Intermountain Region. An internship effort was initiated in 1994 and since then seven E&S students have completed paid internships in local and regional industries.

## SIGNIFICANT FINDINGS

The following is a summary of progress in accomplishing the overall goals for the Ergonomics and Safety program for the 1992-1995 grant period:

Goal 1: Maintain and expand a nationally recognized E&S education program.

Results: Accomplished. During the 1992-1995 period there were 32 students enrolled in the program with 13 graduates. It is projected that Dr. Peter Budnick, a recent program Ph.D. graduate, will be appointed as a Research Assistant Professor and assume an increasing role in advising students, research, and course development. Please see listing of students in Appendix E&S-1.

Goal 2: Establish the Rocky Mountain Center as an International Ergonomics Education Resource Center.

Results: Accomplished. A preliminary study of the ergonomic hazards on the U.S./Mexico border maquiladora industries was completed in 1992 as a part of a general health study performed by RMCOEH personnel. Dr. Bloswick was one member of the RMCOEH interdisciplinary team which visited a facility in Nogales, Mexico in November, 1992 and August, 1993 to accomplish an in-depth study of ergonomic hazards in a specific maquiladora facility. Support was provided for one student in 1992-1993 and one student in 1993-1994 through this project. A report of the study has been submitted for consideration for publication.

Goal 3: Expand the E&S outreach program.

Results: Accomplished. Collaboration has been effected with the Utah Safety Council and a format change has been implemented to increase the enrollment in the annual 1-week ergonomics course. A two-day hands-on workshop has been developed and will be included. Seven E&S students have had paid internships since 1994. Dr. Bloswick made 6 presentation in 1993-1993, 10 presentations in 1993-1994 and 10 presentations in 1994-1995 at area and regional professional conferences and meetings.

Goal 4: Expand the E&S research training program.

Results: Accomplished. Dr. Peter Budnick will be partially supported by NIOSH as a research faculty. There are presently 4 Ph.D. students (3 NIOSH supported) in the E&S program, and approximately \$300,000 annually in non-NIOSH research support.

Goal 5: Expand the E&S research program.

Results: Accomplished. Since July, 1992 Dr. Bloswick has been PI or Co-PI, on research projects funded in the amount of \$854,490. These efforts provide a significant supplement to the NOSH grant funding.

## BODY OF REPORT WITH CONCLUSION

As indicated in the Summary of Significant Findings section, five goals were established for the E&S program. Specific objectives were established for each goal. The following details the progress in accomplishing these objectives:

Goal 1: Maintain and expand a nationally recognized E&S education program.

Objective 1a: Secure funding for one additional full-time faculty member with ergonomics and safety emphasis in the Department of Mechanical Engineering.

Results: Not Accomplished. This effort was not successful. However, Dr. Budnick, a recent Ph.D. graduate is assuming an increasing role in teaching E&S lectures and advising E&S students. Dr. Budnick's support will come from external Non-NIOSH grant support and NIOSH funds requested for 1996-1997.

Objective 1b: Increase enrollment in Ergonomics and Safety Program and maintain steady enrollment of 13 full-time students including three PhD and seven M.S./M.E. students in Mechanical Engineering Program and three in MPH/MSPH program (Ergonomics and Safety emphasis).

Results: Accomplished. This goal was met in 1992-1993, 1993-1994, and 1994-1995. (Please see Appendix E&S-1 for listing of students.)

Goal 2: Establish the Rocky Mountain Center as an International Ergonomics Education Resource Center.

Objective 2a: Develop an international program to investigate the ergonomic issues in less developed countries.

Results: Accomplished. A preliminary study of the ergonomic hazards in U.S./Mexico border maquiladora industries was completed in 1992 as a part of a general health study performed by RMCOEH personnel. An initial site visit to a Mexican medical products manufacturing facility was performed in November, 1992 by Dr. Blosswick, E&S Program Director, Dr. Meservy, OHN Program Director, and Dr. Lee, IH Program Director, and a comprehensive ergonomics review of that facility was performed in August, 1993 by an interdisciplinary team comprised of the E&S, IH, OM, and OHN Program Directors and students. A report of the study has been submitted to a professional journal for consideration for publication. These efforts were funded by the Southwest Center for Environmental Research and Policy (SCERP).

Objective 2b: Train specialists to deal with ergonomic issues relating to the hand-intensive and non-automated work often found in less developed countries.

Results: Not Accomplished. This objective was not accomplished. Proposals to accomplish such work were submitted to SCERP, but they were not funded.

Objective 2c: Provide international training exposure for RMCOEH scientists.

Results: Accomplished. Dr. Bloswick was one member of the interdisciplinary team which visited a facility in Nogales, Mexico in November, 1992 and August, 1993.

Objective 2d: Support two E&S students in this program.

Results: Accomplished. SCERP support was provided for one student in 1992-1993 and one student in 1993-1994.

Goal 3: Expand the E&S outreach program.

Objective 3a: Increase enrollment in the September one-week Ergonomics short course to steady attendance of 50 students.

Results: Partially Accomplished. While course evaluations have been very positive, course enrollment has declined from 35-40 in 1988 to 21 in 1993. Collaboration has been effected with the Utah Safety Council and a format change has been implemented. The course was structured to be four separate programs of one, two, two, and one day duration, with each program focusing on specific ergonomic topics. An average of 20 students attended each of the 4 courses in 1994.

Objective 3b: Establish a three-day Advanced Ergonomics short course directed towards engineers or other professionals who have a basic ergonomics understanding.

Results: Accomplished. A two-day hands-on workshop has been developed. The inclusion of this two-day workshop is part of the course modification noted in 3a above.

Objective 3c: Provide one Ergonomics contract course per year through RMCOEH.

Results: Accomplished. At least one contract course was presented in 1992, 1993, 1994 and 1995. In addition, the course notes were "rented" to Industrial Indemnity Insurance Company in 1992-1993 for a two-day course.

Objective 3d: Expand E&S Industrial Affiliates program as discussed in Academic Training-Unique or Special Programs.

Results: Accomplished. An internship effort was initiated in 1994 and seven E&S students have had paid internships since then.

Objective 3e: Enhance the E&S program as a resource/focus for ergonomics and safety in the Intermountain Region.

Results: Accomplished. Dr. Bloswick made six presentations in 1992-1993 and approximately ten presentations at area and regional professional conferences and meetings in each of the grant years 1993-1994 and 1994-1995. The ergonomics and safety library is used frequently by area and regional safety and health personnel and Dr. Bloswick is frequently contacted for formal and informal advice by local and regional industries.

Goal 4: Expand the E&S research training program.

Objective 4a: Secure NIOSH supported funding for one post-doctoral fellow and partial NIOSH funding for one FTE faculty in Mechanical Engineering.

Results: Accomplished. After graduation, Peter Budnick (presently completing his PhD at the University of Utah) will be partially supported as a research faculty. He will also receive support from Non-NIOSH grant support.

Objective 4b: Increase purchases of books and journals. (Increase journal availability to eight recognized ergonomics-related journals.)

Results: Accomplished. The ergonomics and safety library now subscribes to eight ergonomics and safety related journals. The ergonomics and safety library also contains a variety of ergonomic and safety related books.

Objective 4c: Initiate collaborative efforts with other regional universities.

Results: Accomplished. In 1992-1993 Dr. Bloswick made the presentation, *Safety and Ergonomics Courses in a Traditional Engineering Curricula: Process and Content*, at the Workshop on Integration of Safety and Health into the Engineering Curricula, at Oregon State University. Dr. Bloswick regularly lectures in the University of Utah/Utah State University Agriculture Safety class organized by Dr. Jeff Lee. During the grant period he also collaborated with faculty at UCLA, UC Irvine, University of Washington, Mayo Clinic, and the University of Pittsburgh in ergonomics research and publication.

Goal 5: Expand the E&S research program.

Objective 5a: Secure additional outside funding for research activities.

Results: Accomplished. Since July, 1992 Dr. Bloswick has been PI or Co-PI, on the research projects noted below. These efforts provide a significant supplement to the NIOSH grant funding:

Funded:

Don Bloswick PI, Don Brown, Co-PI, American Automobile Manufacturers Association (AAMA), *Internet Testing and development of ErgoWeb*, January 16, 1995-January 15, 1996, \$270,000.

Don Brown PI, Don Bloswick Co-PI, Motor Vehicle Manufacturers Association, *Integration of Ergonomic Design Criteria into Existing Process Engineering Methodologies-Phase 3*, October 15, 1993 - December 31, 1994 \$222,895.

Don Bloswick, PI, Armen Jalalian, Co-PI, *Ergonomics Assessment of Gas Industry Work, Phase I*, Gas Research Institute, October 1, 1992 - September 30, 1994, \$292,597.

Don Bloswick, Borchard-Bennion Fellowship. Received for 1991-1994 to facilitate inclusion of community service in ME 515 "Ergonomics", \$9,000.

Don Brown PI, Don Bloswick Co-PI, Motor Vehicle Manufacturers Association, *Integration of Ergonomic Design Criteria into Existing Process Engineering Methodologies-Phase 2*, April 1 - August 15, 1992, \$59,998.

#### CONCLUSION:

Effectively, there was no functioning E&S program in place when Dr. Bloswick arrived in 1986. By the end of the 1987-1992 grant period, he had established a nationally-recognized, dynamic, high-quality program. Students included both Master and PhD candidates. Thirty-four students were enrolled in the program during the grant period with 13 graduates. Dr. Bloswick obtained College of Engineering support for a state-of-the-art Ergonomics and Safety Laboratory, and significant research studies were accomplished. Significant external support (\$854,490) was secured from external sources to support the E&S research effort. In addition to providing E&S assistance to numerous groups, the extensive outreach efforts increased the visibility of the program. The E&S program has developed the capabilities that will enable it to continue to provide quality education programs while also developing and providing, through its research and service activities, solutions to the increasing numbers of ergonomic problems. (A listing of publications is provided in Appendix E&S-2.)

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## CONTINUING EDUCATION PROGRAM

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### ABSTRACT

The Continuing Education (CE) program was established in 1978 as part of the original ERC grant. It has been funded continuously since that time. The program is committed to reducing human and financial costs by providing excellent short-course training in occupational and environmental health and safety that is marked by continuous improvement and response to needs. The CE program maintains the highest quality standards in providing support and service internally to RMCOEH faculty and staff and externally to relevant organizations, presenters, and students. During the 1992-1995 grant period, there were 5,686 students enrolled in 161 CE courses.

Course curricula have been regularly revised, utilizing results of evaluations by students, inputs from the RMCOEH and CE Advisory Committees, and information gained from interactions with other RMCOEH faculty. Formal needs assessments are also routinely conducted to identify course topics that are either required or of interest. These efforts have helped assure currency and relevance of the CE program, and attenders are well prepared to meet current and projected challenges.

## SIGNIFICANT FINDINGS

The following is a summary of progress in accomplishing the overall goals for the Continuing Education (CE) program for the 1992-1995 grant period:

Goal 1: Maintain and expand nationally-recognized occupational and environmental health and safety continuing education programs.

Results: Accomplished. This goal was accomplished under three major objectives. First, a minimum of two short-term occupational safety and health post-graduate training courses on current issues and topics were scheduled by each core discipline. Second, the CE program sponsored several multidisciplinary conferences to promote interaction among professionals in all field of occupational safety and health. These conferences included the Annual Utah Conference on Safety and Industrial Hygiene and the Annual Managing Compensable Disability seminar. Third, several contract courses were presented to Western Zirconium, Hill Air Force Base and United States Postal Service.

One hundred sixty one courses, including nineteen new courses, were presented to 5,686 registrants during the grant period.

Goal 2: Establish the RMCOEH as an international continuing education resource center.

Results: Accomplished. The CE program has made a concerted effort to expand the Center customer base to include increasing numbers of international attendees at RMCOEH courses and conferences. Already, there are many foreign attenders at RMCOEH courses. Names of potential attenders are drawn from publications and conferences that have increasing global representation. In addition, the Internet has become a source of contact for many foreign professionals. Postings of relevant lists on the Internet have resulted in numerous inquiries from foreign countries. The RMCOEH also conducted a continuing education course for the Mexican government officials in Mexico.

Goal 3: Expand CE research training programs.

Results: Not Accomplished. The Center had planned to offer a research-based conference focusing on a timely topic of interest to occupational safety and health professionals. Due to funding limitations and increased demands on Center faculty, this goal was not accomplished during this grant period. However, a major PM-10 conference has been scheduled for 1996, and funding support has been obtained from state agencies and industries.

Goal 4: Expand CE outreach activities.

Results: Accomplished. The Center was able to expand its outreach activities in a number of ways. First, regional needs assessments were routinely conducted during the grant period. A needs assessment is now a standard item placed in each course participant's packet. These surveys, along with standard course evaluation forms collected at the end of each course, provide continuous needs information. Another objective toward expanding outreach activities was accomplished through interaction with other occupational safety and health programs at other universities within and outside Utah. This collaboration is evident in the number of

consortia in which the Center participates, including the Universities Network for Environmental Training and the Mid-States/Rocky Mountain Regional Lead Training Center. Public outreach was accomplished through exhibiting at national conferences and through the *Giants in Occupational Health Lecture Series*.

## BODY OF REPORT WITH CONCLUSION

As indicated in the Summary of Significant Findings section, four goals were established for the Continuing Education (CE) program. Specific objectives were established for each goal. The following details the progress in accomplishing these objectives:

Goal 1: Maintain and expand nationally-recognized occupational and environmental health and safety continuing education programs.

Objective 1a: To provide short-term occupational safety and health post-graduate training (two per discipline) on current issues and topics to 900 participants/year.

Results: Accomplished. By the end of the three-year grant period, 161 courses were presented to 5,686 participants.

1. Total number of Continuing Education courses presented during the grant period:

1992-1993:	56
1993-1994:	45
1994-1995:	<u>60</u>
Total	161

2. Total number enrolled in Continuing Education courses during the grant period:

1992-1993:	2206
1993-1994:	1503
1994-1995:	<u>1977</u>
Total	5686

3. Number of courses presented by Core Disciplines:

a. Industrial Hygiene

1992-1993:	12
1993-1994:	6
1994-1995:	<u>11</u>
Total	29

b. Occupational Medicine

1992-1993:	4
1993-1994:	6
1994-1995:	<u>6</u>
Total	16

c. Occupational Health Nursing

1992-1993:	6
1993-1994:	3
1994-1995:	<u>3</u>
Total	12

d.	<u>Safety</u>	
	1992-1993:	9
	1993-1994:	3
	1994-1995:	<u>12</u>
	Total	24
e.	<u>Hazardous Substances</u>	
	1992-1993:	4
	1993-1994:	5
	1994-1995:	<u>5</u>
	Total	14
e.	<u>Asbestos</u>	
	1992-1993:	15
	1993-1994:	16
	1994-1995:	<u>18</u>
	Total	49
f.	<u>Lead</u>	
	1992-1993:	6
	1993-1994:	6
	1994-1995:	<u>5</u>
	Total	17

4. Number of new Continuing Education courses presented during the grant period:

Nineteen new courses were developed and offered during the 1992-1995 grant period:

"Indoor Air Quality & HVAC Fundamentals"\*

"Confined Spaces: Training the Team

*Ergonomic Certification Series\**

"Introduction to Industrial Ergonomics"

"Manual Material Handling Task Analysis and Design"

"Upper Extremity Cumulative Trauma Disorders, Seated and  
VDT Workstation Design"

"Computer Methods of Manual Material Handling Task  
Analysis & Design"

"Sling Safety"

"Total Quality--Safety and Health: A Joint Venture"

"Assessment of the Worksite"

"Ergonomics Workshop"

"Environmental Contamination: Risk Analysis & Management"

"Health Promotion Programs at the Worksite"

"Pain & Stress Workshop"

"TB in the '90s: Gaining Insight for Today"

"Correspondence Course in Managing Occupational and  
Environmental Health & Safety Programs"\*

"Occupational Illness and Injury: Tools for the Front-Line Provider"

"Reproductive Hazards in the Workplace/Environment"  
"Lead Inspector Training"\*  
"Lead Abatement for Supervisors and Contractors" \*

\* courses which will also be offered in the next grant period

The CE program meets the requirement that two short-term post-graduate courses be conducted in each of the core disciplines.

Objective 1b: To provide multi-disciplinary conferences to promote interaction among professionals in all fields of occupational safety and health.

Results: Accomplished. The RMCOEH continues to actively participate in the annual Utah Conference on Safety and Industrial Hygiene as well as the Managing Compensable Disability forum.

Goal 2: Establish the RMCOEH as an international continuing education resource center.

Results: Accomplished. The CE program made a concerted effort to expand the Center customer base to include increasing numbers of international attenders at RMCOEH courses and conferences. This was accomplished through announcements and publicity in journals and national conferences that have international audiences. A course for occupational and environmental health inspectors was presented at the National Institute of Public Health, Cuernavaca, Mexico in 1993. Proceedings, with English and Spanish translations, were provided to the Institute for dissemination. This goal was eliminated in 1994.

Goal 3: Expand CE research training programs.

Objective 3a: To offer an annual research-based conference focusing on timely topics of interest in occupational safety and health.

Results: Not Accomplished. Due to funding limitations that precluded attendance by potential attenders and competing faculty priorities, the annual Park City Conference was not held in the grant period. A major PM-10 conference was planned during the grant period and is scheduled for 1996. Funding support has been obtained from state agencies and industry.

Goal 4: Expand CE outreach activities.

Objective 4a: To estimate the needs of each state within the Center's designated region by extensive questionnaires and needs assessment surveys.

Results: Accomplished. Formal regional needs assessment are scheduled to be conducted on an every-other-year basis. In the grant period, assessments were sent to Safety Professionals and Occupational Physicians.

Needs assessment surveys are routinely distributed at each training courses along with post-course evaluations.

Finally, the Center CE Program drew upon the networking system established between all ERC Continuing Education Directors. National needs are identified through a survey that is distributed through the NIOSH ERC exhibit at several major national occupational safety and health association meetings.

Objective 4b: To increase interaction between Continuing Education and other occupational safety and health programs that are in place at other universities within and outside Utah.

Results: Accomplished. Co-sponsorship of courses with other Center's has occurred. During the grant period, we co-sponsored a course that we developed, "Total Quality---Safety and Health: A Joint Venture", with the Deep South Center for Occupational Health and Safety.

The University of Utah currently supports the efforts of a consortium offering an Environmental Coordination Certificate Program. The consortium is called the University Network for Environmental Training (UNET). Curriculum modules have been developed and are being offered by the seven member institutions of the consortium. These members include the University of Kansas, the University of Florida, the University of California - Davis, the University of Cincinnati, the EOHSI Centers for Education and Training, and the University of Utah.

The RMCOEH is also a member of the Mid-States/Rocky Mountain Regional Lead Training Center. As a consortia partner to the University of Kansas, the RMCOEH CE Program offers training in lead abatement for both inspectors and supervisors.

The correspondence course on management of occupational and environmental health and safety programs is co-sponsored by the American College of Occupational and Environmental Medicine (ACOEM). RMCOEH faculty were also selected by ACOEM to present Segment I of its Basic Curriculum in Occupational and Environmental Medicine. The initial presentation, to over 50 physician registrants, occurred at Las Vegas, NV in May 1995.

Objective 4c: To maintain the continuing education program as a reference and information center on available resources.

Results: Accomplished. To meet this objective, the RMCOEH continuously supplies its library with up-to-date selected major journals and publications covering issues in the occupational safety and health field. In addition, new audiovisual resources are routinely added to the Center's audiovisual resource library to keep it as up-to-date as possible. Capabilities were enhanced during the grant period to include Internet Access and CD-ROM functions.

Objective 4d: To expand the number of outreach activities directed toward the public.

Results: Accomplished. The *Giants in Occupational Health Lecture Series* has been a significant outreach activity at the RMCOEH since 1981. Potential lecturers continue to be identified and invited. During the 1992-1995 period, the following lectures presented *Giants* sessions:

<u>Name:</u>	<u>Current Job Title:</u>
Ann R. Cox, MN, RN, CAE	Executive Director, AAOHN
Bernice Goelzer	Occupational Hygienist, WHO
Susan P. Baker, MPH	Professor, Johns Hopkins
Ralph R. Cook, MD, MPH	Corp. Director of Occupational Health & Epidemiology, Dow Corning
Jeffrey S. Harris, MD, MPH, MBA	Chief Prevention Health & Disability Officer, Industrial Indemnity
Barbara A. Silverstein, PhD, MPH	Special Assistant for Ergonomic Programs, OSHA

#### CONCLUSION:

Three of the four goals specified for the CE program were accomplished. Plans were made to accomplish the fourth goal, and a major conference has been scheduled, with funding support obtained. Of the 7 objectives specified in support of these goals, 6 were accomplished, and 1 was not accomplished. The CE program continues to grow and become stronger in terms of overall quality, number and qualifications of faculty, and numbers and quality of courses. All aspects of the program are continuously evaluated to ensure timeliness and relevance. Programs are also carefully structured to meet the program's mission: to reduce human and financial costs by providing excellent short-course training in occupational and environmental health and safety that is marked by continuous improvement and response to needs. The program accomplished its mission while setting the highest standards for both internal and external service.

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## **AGRICULTURAL SAFETY AND HEALTH PROGRAM**

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### **ABSTRACT**

The Rocky Mountain Center for Occupational and Environmental Health (RMCOEH), University of Utah Department of Family and Preventive Medicine (DFPM), in collaboration with Utah State University, began an agricultural safety and health training and research program with NIOSH funding in July 1990. NIOSH has continued funding this program since that time. Approval has specifically been to continue the academic course in agricultural safety and health. Approval has not been given to date for an agricultural research program.

There were 1 (Helwig), 1 (Helwig), and 2 (Lidell and McArthur), students enrolled in the program for 1992-1993, 1993-1994 and 1994-1995 years respectively. There were a total of 3 different students enrolled in the program during this period (see Appendix IH-1).

## SIGNIFICANT FINDINGS

The following is a summary of progress in accomplishing the overall goal for the Agricultural Safety and Health program for the 1992-1995 grant period:

Goal 1: Maintain and expand agricultural safety and health academic programs.

Results: Accomplished. All three of the objectives identified in support of this goal (see Body of Report below) were accomplished. All IH students continue to be formally exposed to agricultural safety and health through a well-developed required course. In addition, a modest number of students sub-specialize in this area.

## BODY OF REPORT WITH CONCLUSION

As indicated in the Summary of Significant Findings section, there was only one goal which was established for the Agriculture program. Specific objectives were established for this goal. The following details the progress in accomplishing these objectives:

Goal 1: Maintain and expand agricultural safety and health academic programs.

Objective 1a: Continue the developed academic course Agriculture Safety and Health.

Results: Accomplished. The three credit hour academic course in agricultural safety and health was presented every spring quarter of the three year grant period (see Appendix AG-1 for the course outline). Beginning in the 1995-1996 year, the course will be opened as an elective for students enrolled in the Utah State undergraduate program in industrial hygiene as well as for students enrolled in USU's College of Agriculture. Similarly, at the University of Utah the course will be advertised campus wide as a senior elective. Hopefully this will offer an opportunity to impact on a larger number of students who may practice in an agricultural related area and also will introduce undergraduates to the field in an attempt to entice them to pursue further studies at the graduate level. The course will remain a requirement for graduate students enrolled in the IH program at the University of Utah.

The course covers current issues in agricultural safety and health, the organization and infrastructure in government, corresponding regulations, ergonomics and agricultural safety practices, research related to health problems in agricultural safety hazards (including livestock handling and machine and electrical hazards), migrant worker issues, pesticides, emergency response and program design, and implementation problems.

The agricultural course was the first graduate course to be offered for joint credit at the University of Utah and our sister land grant University, Utah State. The majority of the course is presented via live, interactive television (EDNET), with lectures broadcast from one or the other campus where the lecturer is located, to the other campus. Students at either location are able to ask questions of the lecturer and to make comments at any point. This has proven to be a highly effective and efficient distance learning technique with potential for expansion or adaptation in other settings. The remaining part of the course requires travel on the part of students from one of the participating Universities to the other or to local area sites used for field studies.

Dr. Lee met with Colorado State faculty and staff from the NIOSH-supported High Plains Agricultural Center in 1995 to discuss areas of mutual interest. Beginning in the 1995-1996 year it is anticipated that Colorado State will become actively involved in the academic course via distance learning facilities.

Objective 1b: Provide financial support for graduate students specializing in agricultural safety and health.

Results: Accomplished. One student (Jennifer Helwig), specializing in agricultural safety and health, was supported in 1992-1993 and 1993-1994 and two students (Brian Liddell and Heather McArthur) were supported during the 1994-1995 year. Specialization in agricultural

safety and health has three requirements in addition to the regular curriculum in industrial hygiene: (1) completion of the Agricultural Safety and Health course, (2) a preceptorship involving experience in agriculture, and (3) a research project involving an agricultural health problem. Ms. Helwig has completed the first two of these requirements and will complete her research project during the 1995-1996 year. Her preceptorship enabled her to conduct a noise survey in a dairy operation. She also planned a survey of a poultry processing plant during her preceptorship.

Objective 1c: Continue the compilation of agricultural safety and health curriculum materials.

Results: Accomplished. Curriculum materials in agricultural safety and health have been substantially increased during the grant period at both the University of Utah and at Utah State University.

The evaluation, collection, and dissemination of agricultural safety and health information is an important responsibility of any training center. To accomplish this task, the Utah State University agricultural safety and health trainers continued to review and collect these important materials. Currently, the Agricultural Systems Technology Department at Utah State University has a large and diverse collection of materials. These include extensive publications, research reports, training guides, and materials provided by supporting agricultural safety and health agencies (Farm Bureau, OSHA, Department of Labor, EPA, and USDA). In addition, USU faculty have reviewed and ordered numerous video tapes for placement with the University of Utah's audio-visual collection in Merrill Library.

A major responsibility of a curriculum materials depository is dissemination. The current materials have had much dissemination. For example, USU extension specialists, teachers of high school agriculture, and the general public have used these resources in the past. In fact, the materials related to injury surveillance have enjoyed a wide distribution throughout the US. This project will continue with the current level of activities. The USU training and research component of this proposal will be responsible for this dissemination process.

Utah State faculty presented two additional workshops for Utah agricultural science and technology teachers and Utah Young Farmers Association in 1993. In 1994 Dr. Straquadine also conducted an additional in-service program for the Bear River Young Farmers Chapter and made a presentation on Agricultural Safety and Health at the Utah Young Farmers State Convention. In 1995, Dr. Joerger assumed the responsibility of managing the effort at USU.

#### CONCLUSION:

The one goal specified for the Agriculture program was accomplished. In addition, all three of the supporting objectives were accomplished. Overall the academic course in Agricultural Safety and Health continues to be strengthened. The program is poised to begin a modest research effort in agricultural safety and health.

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## CENTER ADMINISTRATION APPENDICES

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**APPENDIX  
ADM-1**

10 January 1995

**SURVEY OF GRADUATES OF RMCOEH EDUCATION PROGRAMS**

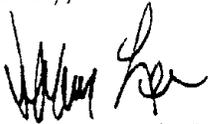
Dear Colleague:

All of us at the Rocky Mountain Center for Occupational and Environmental Health hope that the educational program you accomplished during your association with us was professionally satisfying and rewarding. We are continually looking for ways to improve the effectiveness and relevance of our programs, and, consequently, we would very much appreciate your taking a few minutes to complete the attached brief survey. We have included a self-addressed, stamped envelope for your use in returning the survey.

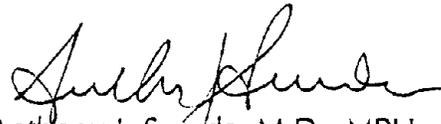
Please note that we would be particularly glad to get your comments in items 12 and 13 regarding specific actions we can take to help meet current and future occupational and environmental health and safety challenges.

Thank you for helping us to improve our programs!

Sincerely,



Jeffrey S. Lee, Ph.D., MPH, CIH  
Director, IH Program



Anthony J. Suruda, M.D., MPH  
Director, OM Program



Darlene Meservy, Dr.P.H., MPH  
Director, OHN Program



Don Bloswick, Ph.D., P.E., CPE  
Director, E&S Program



Royce Moser, Jr., M.D., MPH  
Director, RMCOEH

### SURVEY OF GRADUATES OF RMCOEH EDUCATION PROGRAMS

Date: \_\_\_\_\_

1. The mailing address used to send the survey to me is:
  - a. Correct \_\_\_\_\_
  - b. Needs to be corrected as follows:
  
2. I graduated from the University's program conducted through the Rocky Mountain Center in \_\_\_\_\_ (Year) with a degree of \_\_\_\_\_.
  
3. My area of emphasis was \_\_\_\_\_ (IH, OM, OHN, E&S).
  
4. My primary employer is: \_\_\_\_\_ (Please specify, e.g. industry, state/federal/or local government, university, own business, etc.)
  
5. My current title is \_\_\_\_\_.
  
6. I am involved full-time \_\_\_ or part-time \_\_\_ in the following occupational and environmental health and safety (OEHS) area(s):
  
  
7. Overall, I would rate my educational experience at the RMCOEH as:
  - a. Excellent \_\_\_\_\_
  - b. Very Good \_\_\_\_\_
  - c. Adequate \_\_\_\_\_
  - d. Marginal \_\_\_\_\_
  - e. Poor \_\_\_\_\_

(Feel free to provide any comments on the reverse of this sheet)

(Feel free to provide additional or expanded comments on any question on the reverse)

8. The following courses/activities were most useful to me:
  
  
  
  
  
  
  
  
  
  
9. The following courses/activities were least useful to me:
  
  
  
  
  
  
  
  
  
  
9. For an individual entering an OEHS position similar to mine, either today or in the next 3 to 5 years, I would recommend additional or increased training in:
  
  
  
  
  
  
  
  
  
  
10. For the individual described in number 9, I would recommend deletion of training in:
  
  
  
  
  
  
  
  
  
  
11. I believe the major challenge(s) facing an individual in my OEHS area in the next 3 to 5 years will be:
  
  
  
  
  
  
  
  
  
  
12. I believe the following would improve the effectiveness of the Center's and University's programs for those in my OEHS field:
  
  
  
  
  
  
  
  
  
  
- 13: Other comments regarding the RMCOEH or its activities:

END OF SURVEY. THANK YOU FOR YOUR ASSISTANCE!

**APPENDIX  
ADM-2**

**SUMMARY OF NUMBERS OF STUDENTS**

INDUSTRIAL HYGIENE:	54
OCCUPATIONAL MEDICINE:	10
OCCUPATIONAL HEALTH NURSING:	17
ERGONOMICS AND SAFETY:	34
CONTINUING EDUCATION:	5,686

**APPENDIX  
ADM-3**

**LISTING OF NEW COURSES  
FOR THE 1992-1995 GRANT PERIOD**

**INDUSTRIAL HYGIENE:**

- "International Aspects of Occupational and Environmental Health" (FPMD 580)
- "Advanced Hazardous Substances" (FPMD 580)

**OCCUPATIONAL MEDICINE:**

- "Issues in Injury Control" (FPMD 668)

**OCCUPATIONAL HEALTH NURSING:**

- "Introduction to Occupational and Environmental Health and Safety" (NURS 380)
- "Introduction to Occupational and Environmental Health and Safety" (NURS 547)

**CONTINUING EDUCATION:**

- "Indoor Air Quality & HVAC Fundamentals"
- "Confined Spaces: Training the Team"
- Ergonomic Certification Series*
  - "Introduction to Industrial Ergonomics"
  - "Manual Material Handling Task Analysis and Design"
  - "Upper Extremity Cumulative Trauma Disorders, Seated and VDT Workstation Design"
  - "Computer Methods of Manual Material Handling Task Analysis & Design"
- "Sling Safety"
- "Total Quality--Safety and Health: A Joint Venture"
- "Assessment of the Worksite"
- "Ergonomics Workshop"
- "Environmental Contamination: Risk Analysis & Management"
- "Health Promotion Programs at the Worksite"
- "Pain & Stress Workshop"
- "TB in the '90s: Gaining Insight for Today"
- "Correspondence Course in Managing Occupational and Environmental Health & Safety Programs"
- "Occupational Illness and Injury: Tools for the Front-Line Provider"
- "Reproductive Hazards in the Workplace/Environment"
- "Lead Inspector Training"
- "Lead Abatement for Supervisors and Contractors"

**APPENDIX  
ADM-4****CENTER ADVISORY COMMITTEE MEMBERS**

**Mark Anderson, M.D.**  
Work Care Industrial Clinic  
2390 South Redwood Road  
Salt Lake City, Utah 84119  
Office: (801) 975-1600

**Don Marano, CIH, PE**  
President  
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Salt Lake City, Utah 84106  
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**Jay Bagley, MS**  
UOSHA Administrator  
Industrial Commission of Utah  
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Office: (801) 530-6901

**Ed Mayne**  
President  
Utah State AFL/CIO  
2261 So. Redwood Rd.  
Salt Lake City, UT 84119  
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**Annette Burst, M.D.**  
S.G.P.F.O.  
Hill Air Force Base, Utah 84056-5306  
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**Mary E. Nickolaus, Dr.PH, RN**  
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Pueblo, Colorado 81005  
Home: (719) 564-8218

**Bob Curtis, MSPH**  
Director, OSHA Health Response Team  
P.O. Box 15200  
Salt Lake City, UT 84165-0200  
1781 South 300 West  
Salt Lake City, UT 84115  
Office: (801) 487-0521

**Dianne R. Nielson, Ph.D.**  
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Department of Environmental Quality  
P.O. Box 144810  
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Office: (801) 536-4400

**Mary Jo Jacobs, M.D., MPH**  
7425 E. Kenyan Avenue  
Denver, Colorado 80237  
Home: (303) 694-2878

**Robert Parenti, MA**  
President  
Utah Safety Council  
5263 South 300 West  
Suite 201  
Murray, Utah 84107  
Office: (801) 262-5400

**Linda Leeper, MS, OHNP**  
E Systems  
2268 South 3270 West  
West Valley City, Utah 84119  
Office: (801) 974-7301

**APPENDIX  
ADM-5**

**PROFESSIONAL PUBLICATIONS  
SUBMITTED OR PUBLISHED DURING THE 1992-1995 GRANT PERIOD**

**BOOKS AND BOOK CHAPTERS:**

Moser R Jr: *Effective Management of Occupational and Environmental Health and Safety Programs - A Practical Guide*. OEM Press, Boston, 1992.

**PEER-REVIEWED PUBLICATIONS:**

Hegmann KT, Barrier PA, Moser R Jr: Occupational medicine training program surveys. *Journal of Occupational Medicine* 35:768-775; 1993.

Moser R Jr: Quality management in occupational and environmental health programs: benefit or disaster? *Journal of Occupational Medicine* 35:1103-1105; 1993.

Rayman MW, Moser R Jr: Aviators at risk. *Aviation, Space and Environmental Medicine* 66:35-39; 1995.

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## INDUSTRIAL HYGIENE APPENDICES

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NEW, CONTINUING AND GRADUATED STUDENTS

APPENDIX  
 IH-1

<u>NAME</u>	<u>NIOSH SUPPORT</u>	<u>DEGREE PROGRAM</u>	<u>DATE ENTERED</u>	<u>DATE GRADUATED</u>	<u>CURRENT POSITION</u>
MELANIE BANKSTON	NO	DROPPED	09/88	----	Unknown
JEFF BENNETT	NO	MSPH	09/92	06/96*	Student
MARY BENSON	NO	MSPH	01/94	03/96*	Student
MIKE BOSKO	NO	MSPH	09/92	06/97*	Student
ALAN CARVO	NO	MSPH	09/94	06/97*	Student
PAUL CHAO	YES	MSPH	08/90	12/93	Industrial Hygienist
KAREN CHASE	NO	MSPH	09/87	06/93	Occup. Hlth. Consultant
TOM CLARK	YES	MPH	09/90	08/95	Industrial Hygienist
TOM COLLETT	YES	MSPH	09/91	12/94	Industrial Hygienist
TED CRAWFORD	NO	MSPH	09/94	06/97*	Student
MARK DAVIS	NO	MSPH	09/92	03/96*	Student
CHARLES DIXON	NO	MSPH	09/92	06/96*	Student
MARK DUMAS	NO	MSPH	09/89	08/93	Industrial Hygienist
MIKE FINNEGAN	YES	MSPH	09/92	08/94	Deceased
REBECCA FITZPATRICK	YES	MSPH	09/91	12/93	Industrial Hygienist
JOHN FLORES	NO	MSPH	09/94	06/96*	Student
SHAWN FRASIER	YES	MSPH	09/94	06/96*	Student
KIRK FREEMAN	NO	MSPH	09/92	03/96*	Student
LEE HATHON	NO	MSPH	09/88	03/94	Industrial Hygienist
JENNIFER HELWIG**	NO	MSPH	09/92	06/96*	Student
CHRIS HOEFELMEIER	NO	MSPH	09/89	12/92	Industrial Hygienist
CARLA HOFFMAN	NO	MSPH	09/92	06/96*	Student
ELIZABETH HOLLAND	NO	MSPH	09/87	06/93	Industrial Hygienist
JEAN HOWARD	NO	DROPPED	09/89	----	Unknown
DAVID JOHNSON	NO	MSPH	09/93	03/96*	Student
TODD JORDAN	YES	MSPH	09/94	06/96*	Student
JAMES JUMONVILLE	NO	MSPH	09/93	09/96*	Student
DAVID KLANICA	NO	MPH	09/88	06/93	Safety Analyst
CASPER KNIES	NO	MSPH	09/94	06/97*	Student
BRIAN LIDDELL**	YES	MSPH	09/94	06/96*	Student
JUN-JIE LIN	NO	MSPH	09/91	03/94	Chemist

SARAH LOCKE	YES	MSPH	09/91	12/93	Industrial Hygienist
SHAWN LUDLOW	YES	MSPH	09/92	06/94	Technical Manager - Chemistry Section
APRIL BERNER MADDEN	NO	MSPH	09/94	09/97*	Student
STEVE MANGUM	NO	MSPH	09/91	03/96*	Student
HEATHER MCARTHUR**	YES	MSPH	09/94	06/96*	Student
DAN MITCHELL	NO	MSPH	09/92	06/95*	Student
TAD OGDEN	NO	MSPH	09/88	03/96*	Industrial Hygienist
BRETT PINCOCK	NO	MSPH	09/93	06/97*	Student
TIM PRICE	NO	MSPH	09/93	12/95	Industrial Hygienist
CHARLES PUGH	NO	MSPH	09/89	12/93	Industrial Hygienist
ARTURO RIFFO	NO	DROPPED	09/93	-----	Unknown
SHAHEEN SAFIULLAH	NO	MSPH	09/90	03/93	Industrial Hygienist
TODD SCHMANSKI	NO	MSPH	09/92	03/96*	Student
KURT SCHULL	NO	DROPPED	09/93	-----	Unknown
RANDY STURGELL	NO	MSPH	09/93	06/96*	Student
APRIL SUMMERS	NO	MSPH	09/90	12/92	Envir. & Safety Specialist
DOUG THORNTON	YES	MSPH	09/91	08/93	Industrial Hygienist
ZANDRA WEIS	YES	MSPH	09/91	12/94	Industrial Hygienist
GRACE KIM WOOD	YES	MSPH	09/94	06/96*	Student
DAGAN WRIGHT	NO	MSPH	09/93	03/96*	Student
ZHONG YU	NO	MSPH	09/90	06/93	Chemist
KEVIN ZEIGLE	NO	MSPH	09/89	03/93	Safety & Health Manager
XI ZHANG	NO	MSPH	09/90	03/93	Industrial Hygienist

\*\* Agricultural Safety and Health Student Emphasis

\* Projected date of graduation

**APPENDIX  
IH-2****PROFESSIONAL PUBLICATIONS  
SUBMITTED OR PUBLISHED DURING THE 1992-1995 GRANT PERIOD****PEER-REVIEWED PUBLICATIONS:**

Finnegan M, Wallace D, Lillquist D: Air lead levels resulting from vacuuming carpets imbedded with lead containing dust. Published abstract of *American Industrial Hygiene Conference and Exposition*, Kansas City, MO, May 1995.

Fitzpartrick R, Wallace D: Comparison of the levels of methylene chloride released during a small-scale stripping operation using two different paint stripper formulations. Submitted for publication.

Hathon L, Lee JS, Meservy D, Burton DJ: A tuberculosis wake-up call for the HVAC industry. *Proceedings from Indoor Air Quality 1993*, American Society of Heating Refrigerating and Air Conditioning, pgs. 131-137; 1995.

Lee J: Occupational hygiene around the world. Invited keynote address, *Proceedings of the 2nd International Occupational Hygiene Association meeting, Hong Kong*, November, 1994 and *Proceedings of the Annual Conference of the Australian Institute of Occupational Hygienists*, Queensland, Australia, December 1994.

Lillquist DR: Identifying and Regulating Occupational Chemical Carcinogens in the United States. *Proceeding 2nd International Symposium in Industrial Toxicology* June 1993.

Lillquist D: What industrial hygiene can teach the environmental health community about particulate air sampling. *Proc. 2nd Congress on Research in Occ. Health*. Bogota, Colombia, 7/94.

Locke S, Lee J, Lillquist D: A field evaluation of a personal single stage impactor for estimating ambient PM-10 levels. Submitted for publication 1/95.

Ludlow S, Lee J, Nelson J: A method of separating and quantifying low levels of sulfuric acid from particulate sulfates on filters. Accepted for publication in *American Industrial Hygiene Association Journal*.

Straquadine GS, Williams S: Livestock related agricultural injuries among Utah livestock producers. *Journal of Agricultural Mechanization* 8; Fall 1994.

Suruda A, Wallace D, Moser R Jr: Tuberculosis and the need for respiratory protection for health care workers. *Western Journal of Medicine* 160:566-567; 1994.

Toth D, Lillquist D: Data quality in industrial hygiene. Submitted to *Occupational Hazards*; 4/95.

**NEWSLETTERS:**

Joerger RM: Eds. *Agricultural Safety and Health Newsletter*. Monthly newsletter distributed via E-Mail

to all extension agents and specialists, July 1994-present.

Straquadine GS, Giustino J, Williams S: Eds. *Agricultural Safety and Health Newsletter*. Monthly newsletter distributed via E-Mail to all Utah extension agents and specialists, Jan.-June 1994.

**APPENDIX  
IH-3****FULL-TIME/PART-TIME/VOLUNTEER FACULTY  
AND THEIR ROLES**

<b>FULL-TIME FACULTY:</b>	<b>POSITION</b>
Jeffrey S. Lee, PhD, MPH, CIH	Associate Professor, Program Director
Dean R. Lillquist, PhD, CIH	Assistant Professor, Assistant Program Director
David O. Wallace, MSPH, CIH	Instructor
Zandra L. Weis, MSPH	Instructor
<b>PART-TIME FACULTY:</b>	<b>POSITION/ASSOCIATION</b>
D.J. Burton, MS, CIH, CSP, PE	Clinical Assistant Professor
David Nelson, MS	Clinical Instructor President of Envirosearch - hazardous waste consulting firm
James Nelson, PhD, CIH	Associate Professor President of DataChem - Industrial Hygiene and Environmental Chemistry firm
William Wagner, MS, MSPH, CIH, CSP	Clinical Instructor Senior Partner of IHI, Industrial Hygiene Consult Firm
<b>VOLUNTEER (CLINICAL) FACULTY:</b>	<b>POSITION/ASSOCIATION</b>
Vaughn Baird, CIH	Clinical Instructor Kennecott Copper Corp.
Bobby F. Craft, MSPH, PhD, CIH, CSP	Clinical Professor IHI - Industrial Hygiene Consulting firm
Kevin Cummins, MS, MSPH, CIH	Clinical Instructor Industrial Hygienist - OSHA National Laboratory
Robert Curtis, MS	Clinical Instructor Area Director - Salt Lake OSHA
Howard Deere, PhD	Clinical Instructor Utah State University
David Drown, PhD, CIH	Clinical Instructor Utah State University

VOLUNTEER FACULTY con't	POSITION/ASSOCIATION
Alan Heins, PhD, CIH	Clinical Instructor Industrial Hygienist - OSHA Health Response Team
Floyd Madsen, CIH	Clinical Instructor Director - OSHA National Laboratory
Don Marano, CIH, CE	Clinical Instructor President - IHI, Industrial Hygiene Consulting firm
Michael Shulsky, MS	Clinical Instructor
Gary Straquadine, PhD	Clinical Instructor Utah State
Mike Taylor, MSPH, CIH	Clinical Instructor Manager of Environmental Affairs - LDS Church
Miriam Vaughn, MS, CIH	Clinical Instructor Vice President - IHI, Industrial Hygiene Consulting firm
Kenneth White, MS, MSPH, CIH	Clinical Instructor Vice President - IHI, Industrial Hygiene Consulting firm
Lowell White, PhD, CIH	Clinical Instructor Geneva Steel

APPENDIX  
IH-4TYPICAL PLAN OF STUDY  
ACADEMIC PROGRAMYEAR 01

Fall	Course No.	Title (Instructor)	Core	HRS			
				Req'd	Elect.		
	FPMD 710-1	Biostatistics (Reading)	3				
	FPMD 650-1	Epidemiology (Lyon)	3				
	FPMD 651-1	Epidemiology Lab (Lyon)			1		
	FPMD 686-1	Interdisc. Seminar (Meservy)		1			
	FPMD 664-1	Fundamentals of IH (Lillquist)		3			
	FPMD 580-4	S.T.-Computer Applications (Lee)		1			
	FPMD 660-1	Environmental Health (Suruda)	3				
		totals =	9	5	0-1	14	
Winter							
	FPMD 640-1	Health Care Organization (Hammer)	3				
	FPMD 761-1	Advanced IH (Lee)		3			
	FPMD 687-1	Interdisc. Seminar (Meservy)		1			
	FPMD 751-1	Prin. of Public Health (Lyon)	3				
	ME 516	Industrial Safety (winter of even yrs)			3		
		Other Electives			2+		
	FPMD 765-1	IH Chemistry (J. Nelson)*		3			
		totals =	6	7	0-5	13	
Spring							
	FPMD 665-1	Environ. Physiology (Suruda)		2			
	FPMD 645	HC Admin.: OEHS (management)(Moser)	3				
	FPMD 667	Industrial Toxicology (Lillquist)		3			
	FPMD 688	Interdisc. Seminar (Meservy)		1			
	FPMD 770	Social Context (Hughes)	3				
	FPMD 749	Study Design (Lyon)				2	
		Other Electives					
	FPMD 694-1	FUNDED (\$750) Research Project or		1			
	FPMD 696-1	FUNDED(\$750) Thesis Research-Res Design					
		totals =	7	6	0-2	13	
COMPREHENSIVE EXAM- June							

Summer

	Core	Reg'd	Elect.	
FPMD 580-1 Preceptorship (Lee/Lillquist/Wallace)	0*			
FPMD 656 Environ. Epid. & Risk Assessment or				
FPMD 655 Occupational Epidemiology (Meservy)			<u>3</u>	
totals =	<u>0</u>	<u>0</u>	<u>0-3</u>	

\*Register for this course in Fall of yr. 02.

Year 02

Fall

FPMD 580-1 Preceptorship (Lee/Lillquist/Wallace)	3			
ME 515 Ergonomics (Bloswick)		3		
FPMD 766-1 Noise and Other Physical Agents (Wagner)*		3		
FPMD 680-2 OM Clinic (Suruda)(can be taken F,W or S)		1		
FPMD 580-3 International Aspects of OEH (Lee)		1		
FPMD 695-1 Research Project or	1			
FPMD 697-1 Thesis Research				
N600R1 Research Design			4	
CE 463 Intro. to Envir. Engineering			4	
CE 563 Air Pollution Ecology			4	
FPMD 661 Readings in Environ. Health			1-3	
FPMD 791 Independent Study			1-4	
FPMD 677 International PH Health Issues			<u>2</u>	
totals =	<u>4</u>	<u>8</u>	<u>0-4</u>	12

Winter

FPMD 666 Hazardous Wastes (D. Nelson)*		3		
FPMD 657-1 OH Field Trips (Meservy)		2		
FPMD 695 Research Project	7			
FPMD 662-1 O. Lung Disease			2	
FPMD 668-1 Issues in Injury Control			2	
FPMD 663-1 Ad. Topics in Occup. Med.			3	
FPMD 661 Readings in Environ. Health			1-3	
FPMD 791 Independent Study			1-6	
FPMD 670 Dev. of Interdisc. Health Teams			3	
FPMD 774 Law and Medicine			<u>2</u>	
totals =	<u>7</u>	<u>5</u>	<u>0-3</u>	12

Spring

	Core	Req'd	Elect.	
FPMD 580-5 Agricultural S & H (Lee)		3		
FPMD 764 Industrial Ventilation (Burton)*		2		
FPMD 695 Research Project	6			
FPMD 580-4 Ad. Hazardous Substances (Lillquist)			2	
ME 615 Advanced Ergonomics (even yrs)(Bloswick)			3	
ME 617 Ad Ego Lab (even yrs)(Bloswick)			1	
BioE570 Functional Anatomy (Bloswick)			3	
ME 616 System Safety (odd years only)(Bloswick)			3	
FPMD 663 Ad. Topics in Occup. Med. (Con't)(Moser)			2	
FPMD 661 Readings in Environ. Health			1-3	
FPMD 791 Independent Study			1-4	
FPMD 760 Ad. Methods Epi. Research			4	
		<u>6</u>	<u>5</u>	<u>0-4</u>
totals =	6	5	0-4	11
Gnd Totals	39	36	0+	75+

EXPECTED GRADUATION DATE:

\* Required unless expertise and/or previous training can be demonstrated.

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## OCCUPATIONAL MEDICINE APPENDICES

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## NEW, CONTINUING AND GRADUATED STUDENTS

<u>NAME</u>	<u>NIOSH SUPPORT</u>	<u>DEGREE PROGRAM</u>	<u>DATE ENTERED</u>	<u>DATE GRADUATED</u>	<u>CURRENT POSITION</u>
ERIC ACKERMAN	YES	MPH	07/94	06/96*	Resident
STEVEN BARNES	NO	MPH	07/92	06/94	Occup. Medicine Physician
SUSAN BAUM	YES	MPH	07/94	06/96*	Resident
WILLIAM BRADY	YES	MPH	07/94	06/96*	Resident
ROBERT KOOGLER	NO	MPH	07/93	06/95	Chief of Health Care Services in Occup. Med.
LOREN LEWIS	YES	MPH	07/94	06/96*	Resident
JOHN OGRODNICK	YES	MPH	07/92	08/94	Occup. Medicine Physician
DEBBIE TEYNOR	YES	MPH	07/91	06/93	Occup. Medicine Physician
PAUL TEYNOR	YES	MPH	07/93	07/95	Occup. Medicine Physician
EMILE VANDERMEER	YES	MPH	07/91	06/93	Occup. Medicine Physician

\* Projected date of graduation

APPENDIX  
OM-1

**APPENDIX  
OM-2****PROFESSIONAL PUBLICATIONS  
SUBMITTED OR PUBLISHED DURING THE 1992-1995 GRANT PERIOD****BOOKS AND BOOK CHAPTERS:**

Archer VE: Radon in Homes -- Health effects, measurement and control. *Encyclopedia of Environmental Control Technology* Vol 8: Work Area Hazards, Chapter 23; 1994.

Suruda AJ, Castillo D, Helmkamp J, Pettit T: Epidemiology of confined-space-related fatalities, a chapter in *Worker Deaths in Confined Spaces*, DHHS (NIOSH) publication, Cinn., 94-103; 1994.

**PEER-REVIEWED PUBLICATIONS:**

Agnew J, Suruda A: Age and fatal work-related falls. *Human Factors* 35:731-736; 1993.

Archer VE: Reversal of the healthy-worker effect. *Int J Occup Environ Health* 1:33-36; 1995.

Egeland GM, Bloom TF, Schnorr TM, Hornung RW, Suruda AJ, Wille KK: *Fluorocarbon 113 Exposure and Cardiac Dysrhythmias Among Aerospace Workers*. American Journal of Industrial Medicine 22:851-858; 1992.

Hegmann K, Barrier P, Moser R: Occupational medicine training program surveys. *Journal of Occupational Medicine* 35:768-775; 1993.

Hudnall JB, Suruda AJ, Campbell DL: Deaths involving air-line respirators connected to inert gas sources. *Am Ind Hyg Assoc J* 54:32-35; 1993.

Moser R Jr: Quality management in occupational and environmental health programs. Benefit or disaster? *Journal of Occupational Medicine* 35:1103-1105; 1993.

Suruda A: Injuries to working children. *Western J Med* 161:62-3; 1994.

Suruda A, Fosbroke D, Braddee, R: Fatal work-related falls from roofs. *Journal of Safety Research* 26:1-8; 1994.

Suruda A, Pettit T, Noonan G, and Ronk R: Deadly rescue: The confined space hazard. *Journal of Hazardous Materials* 36:45-53; 1994.

Suruda A, Schulte P, Boeniger M, Hayes R, Livingston G, Steenland K, Stewart P, Herrick R, Douthit D, and Fingerhut M: Cytogenetic effects of formaldehyde exposure in students of mortuary science. *Cancer Epidemiology, Biomarkers, and Prevention* 2:453-460, 35(4); 731-736; 1993.

Suruda A, Smith LD: *Work-Related Electrocutions Involving Portable Power Tools and Appliances, Journal of Occupational Medicine, 34:887-892, 1992.*

Suruda A, Ward EM, Fingerhut MA: Identification of mortality from soft tissue sarcomas in cohorts exposed to dioxin and to chlorinated naphthalenes. *Epidemiology* 4:14-19; 1993.

Suruda A, Wallace D, Moser R: Tuberculosis and the need for respiratory protection for health care workers. *Western J Med* 160:566-567; 1994.

Ward EM, Suruda A, Smith AB, Halperin W, Fessler CA, Zahm SH: Cancer mortality patterns among female and male workers employed in a cable manufacturing plant during World War II. *Journal of Occupational Medicine* 36:860-866; 1994.

**APPENDIX  
OM-3****FULL-TIME/SUPPORTING/VOLUNTEER FACULTY  
AND THEIR ROLES**

FULL-TIME FACULTY:	POSITION
Anthony J. Suruda, MD, MPH	Associate Professor, Program Director
Royce Moser, Jr., MD, MPH	Professor and Vice-Chairman, DFPM, Director RMCOEH, Associate Director, OM Residency
SUPPORTING & VOLUNTEER (CLINICAL) FACULTY:	POSITION/ASSOCIATION
Vicotr E. Archer, MD	Supporting faculty
Richard Kanner, MD	Preceptor University of Utah Pulmonary Dept.
Mark V. Anderson, MD	Clinical Instructor WorkCare Clinic
Annette G. Burst, MD	Clinical Professor Hill Air Force Base
Jeffrey R. Davis, MD	Clinical Assistant Professor American Airlines
Richard E. Johns, Jr., MD, MSPH	Clinical Assistant Professor Alliant TechSystems (formerly Hercules Aerospace)

**APPENDIX  
OM-4****TYPICAL PLAN OF STUDY  
OCCUPATIONAL MEDICINE PROGRAM****ACADEMIC PHASE - PGY 2**

Required and elective course work to complete the MPH or MSPH degree programs  
Occupational Medicine Clinic (UUMC) - 1 month  
Industrial Preceptorship (Hercules Aerospace) - 1 month\*  
Clinical rotation (UUMC or VAH) - 1 month  
Federal Occupational and Environmental Health Clinic: 4 weeks (concurrent with academic phase), Salt Lake City, UT\*

**PRACTICUM PHASE - PGY 3**

- A. *Clinical rotations - 12 weeks required***  
Rotations determined by resident's level and prior clinical experience  
Available rotations:  
Emergency Department (UUMC)  
Internal Medicine (UUMC)  
Occupational Dermatology (UUMC)  
Occupational Ophthalmology (UUMC or VAH)  
Occupational Orthopedics (UUMC)  
Pulmonary Medicine (VAH)  
Rehabilitation (VAH)
- B. *Occupational Medicine Clinic (UUMC) - 12 weeks***
- C. *Industrial Preceptorships - 12 weeks (Total 16 weeks)\****  
Available rotations:  
Hercules Aerospace - Magna, UT\*  
Abbott Critical Care - Murray, UT\*  
Dow Chemical Company - Midland, MI  
Hanford Environmental Health Foundation - Richland, WA  
Hill AFB Occupational and Environmental Health Clinic - Layton, UT
- D. *State of Utah Industrial Commission - Salt Lake City, UT\****  
Two weeks required (usually done concurrently with OM Clinic rotation)
- E. *Elective preceptorships***  
Utah Department of Health - Salt Lake City, UT  
Salt Lake City/County Health Department - SLC, UT  
Worker Evaluation and Reconditioning Center - Murray, UT  
Safety - VAH  
Industrial Research Project - TBA

**KEY:**

*UUMC* - University of Utah Medical Center

*VAH* - Veteran's Admin. Hospital (U. of UT School of Medicine)

\* *Required off-site rotations*

**APPENDIX  
OM-4 (con't)**

**MSPH/MPH PROGRAM  
OCCUPATIONAL AND ENVIRONMENTAL MEDICINE  
REQUIRED COURSES\***

Course #	Title	Credit Hours
<b>FPMD (Family &amp; Preventive Medicine)</b>		
640	Health Care Organization	3
650	Introduction to Epidemiology	3
660	Environmental Health Problem	3
710	Introduction to Biostatistics	3
751	Principles of Public Health and Preventive Medicine	3
770	Social Context of Medicine and Public Health	3
580	Preceptorship	3
697	Thesis Research	15
695	Project Project Research	15
667	Introduction to Industrial Toxicology	3
657	Occupational Health & Safety Field Trips	2
662	Occupational Lung Disease	3
663	Advanced Topics in Occupational Medicine	3
665	Environmental Physiology	2
689	Occupational Medicine Seminar (for OM Residents only)	3
<b>Choice of <u>one</u>:</b>		
FPMD 645	Health Care Administration (Occupational and Environmental Health and Safety)	3
<b><u>or</u></b>		
<b>HEDU (Health Education)</b>		
579	Health Services Administration	3
<b>(For MSPH Students only)</b>		
<b>FPMD</b>		
697	Thesis Research	15
695	Project Research	15

- NOTE:
1. MSPH/MPH Program Accredited by Council on Education in Public Health
  2. Academic Program Accredited by Accreditation Council on Graduate Medical Education as academic phase of OM Residency.

**APPENDIX  
OM-4 (con't)**

Elective Courses:

FPMD 580	(Special Topics)
580	ST-Advanced Hazardous Substances
580	ST-Agricultural Safety & Health
580	ST-Computer Applications in Occupational Health
580	ST-Current Topics in Epidemiology
580	ST-International Aspects of OEH
651	Epidemiology laboratory Session
654	Reading in Epidemiology
655	Occupational Epidemiology
656	Environmental Epidemiology and Risk Assessment
657	Occupational Health & Safety Field Trips
661	Reading in Public Health
711	Epidemiological Statistical Methods
749	Study Design
764	Industrial Ventilation
774	Law and Medicine
780	Community Analysis

**APPENDIX  
OM-4 (con't)**

**PRECEPTORSHIP LISTING  
(Local and Out-of-State)**

American Airlines (Dallas/Fort Worth Airport)

Boeing Company

FEOH (Federal Employees Occupational Health Clinic,  
Salt Lake City, Utah)

FEOH (Federal Employees Occupational Health Unit,  
Denver, Colorado)

General Mills Corporation

Hanford Environmental Health Foundation (HEHF)

Hercules Occupational Health Clinic (Salt Lake City)

Hill Air Force Base (Utah)

Industrial Commission (Utah)

LDS Hospital (Salt Lake City)

Salt Lake City-County Health Department

Utah Department of Health

University of Utah Hospital

Veterans Administration Hospital (Salt Lake City)

WERC (Worker Evaluation and Reconditioning Center, SLC)

Work Care Clinic (Salt Lake City)

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## OCCUPATIONAL HEALTH NURSING APPENDICES

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## NEW, CONTINUING AND GRADUATED STUDENTS

<u>NAME</u>	<u>NIOSH SUPPORT</u>	<u>DEGREE PROGRAM</u>	<u>DATE ENTERED</u>	<u>DATE GRADUATED</u>	<u>CURRENT POSITION</u>
SARA ADKERSON	YES	MPH	09/92	06/94	Occupational Health Nurse
JEAN BASS	YES	PHD	09/94	08/97 *	Student
JULIA BATTEN	YES	MPH	09/93	06/95	Occupational Health Nurse
JULIA BATTEN	YES	OHNP	06/95	06/97 *	Student
CHRISTINE BURROWS	YES	MPH	09/93	06/95	Occupational Health Nurse
LAURA EPARVIER	YES	MPH	09/92	06/94	Occupational Health Nurse
LARRY GARRETT	YES	MPH	09/93	06/95	Epidemic Intelligence Service Officer
BARBARA GODSEY	YES	MPH	06/94	06/96 *	Student
CHERYL GRENNY	YES	MPH	06/95	06/97 *	Student
NANCY JACOBS	YES	MPH	09/93	12/95	Research Assistant
NANCY JACOBS	YES	OHNP	06/95	06/97 *	Student
RAY JOHNSON	NO	CHN/OHN	03/95	06/97 *	Student
PATRICIA KELLER	YES	MPH	09/92	12/95	Student/Dir. Injury Control
VINCENZO MANCINI	YES	MPH	06/94	12/95	Student/Occup. Hlth. Nurse
PAUL NIXON	YES	MPH	06/94	12/95	Student/Occup. Hlth. Nurse
GINEETE SPEED	YES	MPH	06/95	06/97 *	Student
DONNIE TOTH	YES	PHD	09/93	08/96 *	Student

\* Projected date of graduation

APPENDIX  
OHN-1

**APPENDIX  
OHN-2****PROFESSIONAL PUBLICATIONS  
SUBMITTED OR PUBLISHED DURING THE 1992-1995 GRANT PERIOD****BOOKS AND BOOK CHAPTERS:**

Meservy D, & Meservy JA: Legal aspects of environmental epidemiology. In T. Aldrich, & J. Griffith (Eds), *Environmental epidemiology and risk assessment*; 1993.

**PEER-REVIEWED PUBLICATIONS:**

Meservy D, Blosswick D, Suruda A, Lee J: (in progress). A descriptive study of upper extremity cumulative trauma disorders and chemical exposure among production workers in a maquiladora medical devices manufacturing plant. Submitted to *Journal of Occupational Medicine*.

Rothwell CJ, Hamilton CB, Leaverton PE: Identification of sentinel health events as indicators of environmental contamination. *Environmental Health Perspectives* 94: 261-263. (Guideline statement developed by the Consensus Conference members in Ashville, NC, 11/89, all members are noted at the end of the articles); 1994

Shy C, Greenberg R, Winn D: Sentinel health events of environmental contamination: A consensus statement. *Environmental Health Perspectives* 102: 316-317. (Guideline statement developed by Consensus Conference members in Chapel Hill, NC, 5/92, all members are noted at the end of the article); 1994

Toth D, Lillquist D: Data quality in industrial hygiene. Submitted to *Occupational Hazards*.

**APPENDIX  
OHN-3**

**FULL-TIME/PART-TIME/VOLUNTEER FACULTY  
AND THEIR ROLES**

FULL-TIME FACULTY:	POSITION
Darlene Meservy, DrPH, MPH, RN	Associate Professor, Program Director
PART-TIME FACULTY:	POSITION/ASSOCIATION
Linda K. Amos, RN, EdD	Course director, "Advanced Nursing Trends and Issues", NURS 786, (3 credit hours)
Sherrod Beall, RN, MS	Course director, "Child Health Assessment - Infancy through Adolescence", NURS 604A, (3 credit hours)
Penny Brooke, RN, JD	Course director, "Health Policy, Health Care Systems, and Advanced Practice Nursing", NURS 607, (3 credit hours)
Angeline Bushy, RN, PhD	Course director, "Nursing Theory", NURS 606, (3 credit hours); "Health Policy, Health Care Systems and Advanced Practice Nursing", NURS 607, (3 credit hours) and "Advanced Nursing I", NURS 610, (3 credit hours)
Beth Cole, RN, PhD	Course director, "Advanced Nursing II", NURS 610B, (3 credit hours)
Mary Duffy, RN, PhD	Course director, "Qualitative Analysis in Nursing Research", NURS 701, (4 credit hours)
Sandra Haak, RN, PhD	Course director, "Advanced Adult Health Assessment", NURS 604B, (2 credit hours)
Sue Huether, RN, PhD	Course director, "Advanced Adult Health Assessment", NURS 604B, (2 credit hours); course director, "Pharmacology in Primary Care", NURS 605, (3 credit hours)
Ann Hutton, RN, PhD	Course director, "Advanced Nursing II", NURS 610B, (3 credit hours)
M.A. Johnson, RN, PhD	Course director, "Gerontology Advanced Health Assessment", NURS 604G, (2 credit hours)

PART-TIME FACULTY con't:	POSITION/ASSOCIATION
Karin Kirchhoff, RN, PhD	Course director, "Research Utilization in Nursing Practice", NURS 600, (3 credit hours); course director, "Advanced Research Design", NURS 690, (4 credit hours)
Maeona Kramer, RN, PhD	Course director, "Nursing Theory", NURS 606, (3 credit hours) and "Critical Analysis and Construction of Nursing Theory", NURS 710, (3 credit hours)
Lillian Nail, RN, PhD	Course director, "Research Utilization in Nursing Practice", NURS 600, (3 credit hours) and "Experimental Design in Clinical Research", NURS 700, (4 credit hours)
Marge Pett, RN, PhD	Course director, "Statistics I", NURS 694, (4 credit hours); "Statistics II", NURS 705, (3 credit hours); "Statistics III", NURS 706, (3 credit hours)
Joy Princeton, RN, PhD	Course director, "Advanced Nursing I", NURS 610A, (3 credit hours) and "Qualitative Analysis in Nursing Research", NURS 701, (4 credit hours)
Joanne Rolando, RN, MS	Course director, "Gerontology Advanced Health Assessment", NURS 604G, (2 credit hours)
Sandra Talley, RN, MS	Course director, "Advanced Health Assessment for Psychiatric/Mental Health Nursing", NURS 604C, (2 credit hours)
Suzie Tarmina, RN, PhD	Course director, "Advanced Health Assessment", NURS 603, (4 credit hours)
Cheryl Thompson, RN, PhD	Course director, "Research Utilization in Nursing Practice", NURS 600, (3 credit hours)
Hilary Verson, RN, MS	Course director, "Gerontology Advanced Health Assessment", NURS 604G, (2 credit hours)
Ann Voda, RN, PhD	Course director, "Measurement Theory and Techniques in Nursing Research", NURS 704, (3 credit hours)
Lee Walker, RN, PhD	Course director, "Nursing Theory", NURS 606, (3 credit hours); instructor, "Advanced Nursing II", NURS 610B, (3 credit hours)

PART-TIME FACULTY con't:	POSITION/ASSOCIATION
John Wolfer, PhD	Course director, "Patterns of Nursing Knowledge", NURS 709, (3 credit hours)
VOLUNTEER (CLINICAL) FACULTY:	POSITION/ASSOCIATION
Francine Barber, BSN, MBA, RN	Associate Instructor. OHN, Director, Health Works (5 OEHS clinics, she also supervises contracts for OEHS services to small industries). MS. Barber teaches in NURS 647A (OHN I) and serves as a preceptor for students in NURS 647B (OHN II) and 647C (OHN III, Preceptorship). She has 20 years experience as an OHN at multiple levels of practice.
Chris Burrows, BS, MSPH, RN, IH	Clinical Instructor. Director OHS, Hercules. He teaches in NURS 647B (OHN II) and serves as a preceptor for students in NURS 647B (OHN II) and NURS 647C (OHN III, Preceptorship). HE has extensive experience both as an OHN and an IH.
Jeannette Cunningham, BSN, MPH, COHN	Clinical Instructor. OHN, Abbott Critical Care. She teaches in NURS 647A (OHN I)
Paul Francom, BSN, OHNP	Associate Instructor. OHNP, Mervyn's Distribution Center. Serves as a Preceptor for students in NURS 647B (OHN II) and NURS 647C (OHN III, Preceptorship). He has many years experience as an OHNP and is excellent in teaching students screening skills and health surveillance program development.
Connie Kirkpatrick, BS, MSPH, COHN	Clinical Instructor. OHN, O C Tanner's. Teaches in NURS 647A (OHN I). She has strong research expertise in cumulative trauma disorders.
Linda Leeper, BS, MS, OHNP	Clinical Instructor. OHNP, E Systems. Teaches in NURS 647A (OHN I) and serves as a preceptor for students in NURS 647B (OHN II) and NURS 647C (OHN III, Preceptorship).

VOLUNTEER (CLINICAL) FACULTY con't:	POSITION/ASSOCIATION
LaDonne Loveday, BS, COHN	Associate Instructor. OHN, Becton Dickinson. Teaches in NURS 647A (OHN I) and serves as a preceptor for students in NURS 647B (OHN II) and NURS 647C (OHN III, Preceptorship). MS. Loveday is currently Chair of the OHN Advisory Committee.
Linda Morris, BS, MS, COHN	Clinical Instructor. Infection Control Practitioner, LDS Hospital. Teaches in NURS 647A.
Roberta Popp Rose, BSN, MSPH, COHN	Clinical Instructor. OHN, Veteran Administration Medical Center. Teaches in NURS 647A (OHN I) and serves as a preceptor for students in NURS 647B (OHN II) and NURS 647C (OHN III, Preceptorship). She has several years experience in case management.

**APPENDIX  
OHN-4**

**TYPICAL PLAN OF STUDY  
MASTER OF PUBLIC HEALTH (MPH)**

COURSE #	COURSE TITLE	HOURS
<u>YEAR ONE</u>		
AUTUMN		
FPMD 664	FUNDAMENTALS OF INDUSTRIAL HYGIENE	3
FPMD 660	ENVIRONMENTAL HEALTH PROBLEMS	3
FPMD 686	INTERDISCIPLINARY SEMINAR	1
FPMD 580	COMPUTER APPLICATIONS	1
FPMD 710	BIostatISTICS	3
FPMD 650	EPIDEMIOLOGY	3
FPMD 651	EPIDEMIOLOGY LAB	<u>1</u>
	SUB TOTAL	15
WINTER		
MEEN 515	ERGONOMICS	3
NURS 647A	OHN I	4
FPMD 687	INTERDISCIPLINARY SEMINAR	1
FPMD 751	PRINCIPLES OF PUBLIC HEALTH	3
FPMD 640	HEALTH CARE ORGANIZATION	<u>3</u>
	SUB TOTAL	14
SPRING		
NURS 647B	OHN II	3
FPMD 688	INTERDISCIPLINARY SEMINAR	1
FPMD 667	INDUSTRIAL TOXICOLOGY	3
FPMD 645	HEALTH CARE ADMINISTRATION: OEHS	3
FPMD 770	SOCIAL CONTEXT OF MEDICINE AND PH	<u>3</u>
	SUB TOTAL	13
SUMMER		
NURS 600	RESEARCH UTILIZATION IN NURSING	4
NURS 647C	OHN III (PRECEPTORSHIP)	8
NURS 647G	OHN CLINICAL	<u>3</u>
	SUB TOTAL	15
	<b>TOTAL</b>	<b>57</b>

**APPENDIX  
OHN-4 (con't)**

**TYPICAL PLAN OF STUDY  
MASTER OF SCIENCE IN PUBLIC HEALTH (MSPH)**

COURSE #	COURSE TITLE	HOURS
<u>YEAR ONE</u>		
AUTUMN		
FPMD 650	EPIDEMIOLOGY	3
FPMD 651	EPIDEMIOLOGY LAB	1
FPMD 664	FUNDAMENTALS OF INDUSTRIAL HYGIENE	3
FPMD 660	ENVIRONMENTAL HEALTH PROBLEMS	3
FPMD 686	INTERDISCIPLINARY SEMINAR	1
FPMD 580	COMPUTER APPLICATIONS in OEHS	<u>1</u>
	SUB TOTAL	12
WINTER		
MEEN 515	ERGONOMICS	3
NURS 647A	OHN I	4
FPMD 687	INTERDISCIPLINARY SEMINAR	1
FPMD 751	PRINCIPLES OF PUBLIC HEALTH	<u>3</u>
	SUB TOTAL	11
SPRING		
NURS 647B	OHN II	3
FPMD 688	INTERDISCIPLINARY SEMINAR	1
FPMD 667	INDUSTRIAL TOXICOLOGY	3
FPMD 770	SOCIAL CONTEXT OF MEDICINE & PH	<u>3</u>
	SUB TOTAL	10
SUMMER		
NURS 647C	OHN III (PRECEPTORSHIP)	<u>8</u>
	SUB TOTAL	8
<u>YEAR TWO</u>		
AUTUMN		
NURS 600	RESEARCH UTILIZATION IN NURSING	4
FPMD 710	BIostatISTICS	3
NURS 647G	OHN CLINICAL	<u>3</u>
	SUB TOTAL	10

WINTER

FPMD 640	HEALTH CARE ORGANIZATION	3
FPMD 695/697	RESEARCH PROJECT	<u>8</u>
	SUB TOTAL	11

SPRING

FPMD 645	HEALTH CARE ADMINISTRATION: OEH & S	3
FPMD 695/697	RESEARCH PROJECT	<u>7</u>
	SUB TOTAL	10

**TOTAL** **72**

**APPENDIX  
OHN-4 (con't)**

**TYPICAL PLAN OF STUDY  
CLINICAL SPECIALIST IN COMMUNITY HEALTH/OCCUPATIONAL HEALTH NURSING**

COURSE #	COURSE TITLE	HOURS
<u>YEAR ONE</u>		
AUTUMN		
NURS 600	RESEARCH UTILIZATION IN NURSING	3
NURS 672	HEALTH PROMOTION/ILLNESS PREVENTION	3
FPMD 664	FUNDAMENTALS OF INDUSTRIAL HYGIENE	3
MEEN 515	ERGONOMICS	<u>3</u>
	SUB TOTAL	12
WINTER		
NURS 606	NURSING THEORY	3
NURS 674A	COMMUNITY HEALTH NURSING ASSESSMENT/PLANNING	3
NURS 659	RURAL PRIMARY CARE SEMINAR	3
NURS 647A	OCCUPATIONAL HEALTH NURSING I	<u>4</u>
	SUB TOTAL	13
SPRING		
NURS 606	HEALTH POLICY, HEALTH CARE SYSTEMS & ADVANCE PRACTICE	3
NURS 674B	IMPLEMENTATION & EVALUATION	3
NURS 647B	OCCUPATIONAL HEALTH NURSING II	<u>3</u>
	SUB TOTAL	9
<u>YEAR TWO</u>		
AUTUMN		
NURS 695	MASTER'S PROJECT	
or		
NURS 697	THESIS RESEARCH, MASTERS'S	3
NURS 647C	OCCUPATIONAL HEALTH NURSING PRACTICUM/RESIDENCY	3
FPMD 650	INTRODUCTION TO EPIDEMIOLOGY	3
FPMD 651	EPIDEMIOLOGY LAB	<u>1</u>
	SUB TOTAL	10

## WINTER

NURS 695	MASTER'S PROJECT	
or		
NURS 697	THESIS RESEARCH, MASTER'S	3
NURS 647C	OCCUPATIONAL HEALTH NURSING PRACTICUM/RESIDENCY	4
FPMD 751	PRINCIPLES OF PUBLIC HEALTH/ PREVENTIVE MEDICINE	<u>3</u>
	SUB TOTAL	10
	<b>TOTAL</b>	<b>54</b>

**APPENDIX  
OHN-4 (con't)**

**TYPICAL PLAN OF STUDY  
NURSE PRACTITIONER PROGRAM (OHNP), MASTERS PROGRAM**

COURSE #	COURSE TITLE	HOURS
<u>YEAR ONE</u>		
SUMMER		
NURS 603	Advanced Health Assessment	5
NURS 600	Research Utilization	<u>4</u>
	SUB TOTAL	9
AUTUMN		
NURS 606	NURSING THEORY	3
NURS 607	HEALTH CARE SYSTEMS/POLICY	3
FPMD 667	INDUSTRIAL HYGIENE	3
FPMD 650	EPIDEMIOLOGY	<u>3</u>
	SUB TOTAL	12
WINTER		
NURS 605	PHARMACOLOGY IN PRIMARY CARE	3
NURS 634	NP SEMINAR AND PRACTICUM I	3
NURS 662	ADULT PRIMARY CARE I	3
NURS 647A	OHN I	<u>4</u>
	SUB TOTAL	13
SPRING		
NURS 666	NP SEMINAR AND PRACTICUM II	3
NURS 663	ADULT PRIMARY CARE II	3
NURS 647B	OHN II	<u>3</u>
	SUB TOTAL	9

SECOND YEAR  
SUMMER

NURS 644	EMERGENCY MANAGEMENT FOR NPS	3
NURS 695	MASTER'S PROJECT	<u>6</u>
	SUB TOTAL	9

## AUTUMN

NURS 665	NP SEMINAR AND PRACTICUM III	3
NURS 664	ADULT PRIMARY CARE III	3
MEEN 516	ERGONOMICS	<u>3</u>
	SUB TOTAL	9

## WINTER

NURS 660	OHNP RESIDENCY	7
NURS 695	MASTER'S PROJECT	<u>3</u>
	SUB TOTAL HOURS	10

	TOTAL	71
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**APPENDIX  
OHN-4 (con't)**

**TYPICAL PLAN OF STUDY  
NURSING INFORMATICS - OHN (DOCTORAL)**

**DOCTORAL CORE** (42-52 credits), Completed by all doctoral students.

Advanced Statistics (10 credits).

NURS 694 Statistics I (4)  
NURS 705 Statistics II (3)  
NURS 706 Statistics III (3)

Nursing Theory (6 credits)

NURS 709 Patterns of Nursing Knowledge (3)  
NURS 710 Critical Analysis and Construction of Nursing Theory (3)  
Nursing Research (26-36 credits)

NURS 690 Advanced Research Design (4)  
NURS 700 Experimental Design in Clinical Research (4)  
NURS 701 Qualitative Methods in Nursing Research (4)  
NURS 704 Measurement Theory and Techniques in Nursing Research (3)  
NURS 720 Practicum in Nursing Research (2-6)  
NURS 786 Advanced Nursing Trends and Issues (3)  
NURS 777 Doctoral Synthesis Seminar (3) (new course not yet in  
course catalog)  
NURS 797 Thesis Research: Doctoral (3-9)

Other course work is completed according to student interest in preparation for their dissertation research. In the Informatics-OHN Program students complete a core of 6 informatics courses if not completed at the masters level.

**INFORMATICS CORE** (23 credits)

NURS 658 Introduction to Nursing Informatics (3)  
NURS 681 Systems Analysis and Design (5)  
NURS 680 Database Design for Clinical Nursing (5)  
NURS 683 Nursing Information System Support/Clinical Decision  
Making (5)  
NURS 684 Implementation, Management and Evaluation of A  
Clinical Nursing Informatics System (5)  
CP SC 104 Programming in Pascal (3)

**OHN/OEHS COURSES** (18-19 credits) The Informatics-OHN doctoral students will complete the following OEHS courses if have not been completed at the masters level. In addition they will complete NURS 796 OR NURS 647A and NURS 647B.

FPMD 664 Fundamentals of Industrial Hygiene (3 credits)

ME EN 515 Ergonomics (3 credits)

or

ME EN 516 Safety (3 credits)

FPMD 667 Industrial Toxicology (3 credits)

FPMD 650 Introduction to Epidemiology (3 credits)

NURS 796 Independent Study in OHN (6, 3 credits X 2 quarters)

or

NURS 647A OHN I (4)

NURS 647B OHN II (3)

The Research Practicum provides further opportunity for the student to develop their OEHS knowledge and skills. With the College of Nursing's expansion in the area of Faculty Practice, other informatics projects with faculty will be available to assist students in preparation for their dissertation research.

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## **ERGONOMICS AND SAFETY APPENDICES**

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APPENDIX  
E&S-1

NEW, CONTINUING AND GRADUATED STUDENTS

<u>NAME</u>	<u>NIOSH SUPPORT</u>	<u>DEGREE PROGRAM</u>	<u>DATE ENTERED</u>	<u>DATE GRADUATED</u>	<u>CURRENT POSITION</u>
DAN BAKER	YES	PhD	09/87	09/93	Research Scientist
JAMES BLAUFUS	NO	MS	01/92	06/96*	Student
KYLE BOWEN	YES	MS	01/91	06/93	Safety Consultant
BRENT BOWERS	YES	MS	09/93	12/95*	Student
PAUL BROWN	YES	MS	06/91	06/94	Process Engineer
PETER BUDNICK	YES	PhD	09/88	06/95	Research Associate
CHRIS DANSIE	YES	MS	01/94	12/95*	Student
MARK DUMAS	YES	MSPH	09/91	09/93	Loss Control Officer
JON ERICKSON	YES	MS	09/91	06/93	Manufacturing Engineer
STEVE ERICKSON	NO	MPH	06/91	06/94	Head of Loss Control
FRANK FALVO	YES	ME	03/90	03/94	Safety Engineer
KEVIN FARNSWORTH	YES	MEA	09/94	06/97*	Student
BEN GERLACH	NO	MPH	09/95	06/97*	Student
BRET HARPER	YES	MS	09/93	12/95*	Student
ARMEN JALALIAN	YES	PhD	09/92	09/96*	Student
MEHDI KHALIGHI	NO	PhD	09/94	06/97*	Student
ERIC KING	YES	MS	01/92	03/93	Rehabilitation Engineer
BRIAN McQUIVEY	NO	ME	03/94	09/97*	Student
TIMOTHY MAZUR	YES	ME	09/94	09/96*	Student
BILL MECHAM	YES	ME	06/91	09/93	Rehabilitation Engineer
SAIED MORTEZAVI	YES	MS	09/90	06/96*	Student
TOM NIEDEREE	YES	MS	09/92	06/93	High School Teacher
JON PAULSON	YES	MS	09/94	06/96*	Student
RICHARD SESEK	YES	PhD	09/94	06/97*	Student
KIRT SASSER	YES	MS	09/94	06/96*	Student
HOSSEIN SHAREBANI	YES	MS	06/93	06/96*	Student
GUOHUA SHEN	NO	MS	03/92	06/96*	Student
BEN SHIRLEY	YES	MS	09/92	06/93	Process Engineer
BRUCE SIMON	NO	PhD	03/95	12/95*	Student
TIMOTHY VILLNAVE	NO	MSPH	09/93	06/96*	Student
SCOTT VINCENT	YES	MPhil	03/91	09/93	Process Engineer

ROGER WARRENS	NO	ME	01/92	06/96*	Student
KEN WENGERT	NO	MPH	09/94	06/97*	Student
HOLLY WICK	YES	MS	10/93	09/95	Acceptance of job offer pending

\* Projected date of graduation

**APPENDIX  
E&S-2****PROFESSIONAL PUBLICATIONS  
SUBMITTED OR PUBLISHED DURING THE 1992-1995 GRANT PERIOD****BOOKS AND BOOK CHAPTERS:**

Bloswick DS: Usability testing of modified wheelchairs. Accepted as a chapter in *Ergonomics in Clinical Practice*, edited by Valerie Rice, Butterworth-Heinemann, Newton, MA, 1996.

Bloswick DS, Alverson N: Clinical ergonomics and the Americans with Disabilities Act. Accepted as a chapter in *Ergonomics in Clinical Practice*, edited by Valerie Rice, Butterworth-Heinemann, Newton, MA, 1996.

Bloswick DS, Burton DJ: Ergonomics and human factors. Chapter in *Industrial Hygiene Workbook*, IVE, Inc., Salt Lake City, UT; 1992

Bloswick DS, Golias E: An ergonomic analysis and abatement recommendations to reduce musculoskeletal stress in warehousing operations: Case Study. Accepted as a chapter in *Occupational Ergonomics*, Marcel Dekker, 1995.

Bloswick DS, Jeffries D: The Americans with Disabilities Act and ergonomics in a lumber mill. Accepted as a chapter in *Ergonomics in Clinical Practice*, edited by Valerie Rice, Butterworth-Heinemann, Newton, MA, 1996.

Budnick PM, Bloswick DS: Electric engineering safety. 8-hour course module for undergraduate engineering education prepared for NIOSH; 1992

Budnick PM, Bloswick DS, Brown DR: Ergonomics and concurrent design. Accepted as a chapter in *Occupational Ergonomics*, Marcel Dekker, 1995.

Johns R, Elegante J, Teynor P, Swinyer L, Bloswick DS: *Chronic, Recurrent Low Back Pain*. edited by Steve L Demeter, Mosby-Yearbook, Inc., St. Louis, 1996.

Redfem MS, Bloswick DS: Slips, trips, and falls in the work place. Accepted as a chapter in *Work Related Musculoskeletal Disorders*, edited by M. Nordin, Mosby Year Book, Inc., 1995.

**PEER-REVIEWED PUBLICATIONS:**

Baker DR, Meek SG, Wood JE, Bloswick DS: Determining the mass moment of inertia from a suddenly Applied Load. Submitted to *Journal of Biomechanics*.

Baker DR, Wood JE, Meek SG, Bloswick DS: Parameter identification of the torso in the sagittal plane under sudden loading and muscle fatiguing conditions. Accepted pending revisions for *Journal of Biomechanical Engineering*.

Bloswick DS, Brown DR, King E, Howell G, Gooch J: Development and testing of a hip extensor trike for children with cerebral palsy. Accepted for *Disability and Rehabilitation*, 1995.

Brown DR, Budnick PM, Bloswick DS, Zhou J: Design for ergonomics in a concurrent engineering design environment. Submitted to *Journal of Design and Manufacturing*.

Bloswick DS, Gerber AH, Sebesta D, Johnson S, Mecham W: The effect of mailbag design on musculoskeletal and physiological fatigue. *Human Factors* 36(5):210-218; 1994.

Bloswick DS, King E, Brown D, Gooch JL, Peters ML: Evaluation of a device to exercise hip extensor muscles in children with cerebral palsy: A clinical and field study. *RESNA Journal of Assistive Technology* 6(2); 1994.

Harber P, Bloswick DS, Beck J, Pena L, Baker DR, Lee J: Supermarket checker motions and cumulative trauma risk *Journal of Occupational Medicine* 35(8):805-811; 1993.

Harber P, Bloswick DS, Luo J, Beck J, Greer D, Pena L: Work related symptoms and checkstand configuration: An experimental study. *American Industrial Hygiene Association Journal* 54(7); July 1993.

Harber P, Bloswick DS, Pena L, Beck J, Lee J, Baker DR: The ergonomic challenge of non-repetitive cumulative trauma: Characterizing supermarket checking work. *Journal of Occupational Medicine* 34(5):518-528; 1992.

Howell G, Brown DR, Bloswick DS, Gooch J, Bean J: Design and development of a device to exercise hip extensor muscles in children with cerebral palsy. *RESNA Journal of Assistive Technology* 5(2); 1993.

Johns R, Bloswick DS, Elegante J, Colledge A: Chronic, recurrent low back pain: A methodology for analyzing fitness for duty and managing risk under the Americans with Disabilities Act. *Journal of Occupational Medicine* 36(5):537-547; 1994.

King E, Gooch JL, Howell GH, Peters ML, Bloswick DS, Brown DR: Evaluation of the hip extensor tricycle in improving gait in children with cerebral palsy. *Developmental Medicine and Child Neurology* 35:1048-1054; 1993.

Mecham WA, Lantz SA, Bloswick DS, Shultz, BB, Shen Y: The effect of heel height and fatigue on gait and slip tendency in women. Accepted pending revisions to *Human Factors*; August 1994.

Mecham WA, Lantz SA, Bloswick DS, Shultz BB, Shen Y: The prediction of slip tendency in women's gait. Submitted to *Safety Science*.

Meservy D, Suruda A, Bloswick D, Lee J, Dumas M: Ergonomic risk exposure and upper extremity cumulative trauma disorders in a Maquiladora medical devices manufacturing plant. Submitted to *Journal of Occupational & Environmental Medicine* on September 7, 1995.

Perkins M, Bloswick DS: The effectiveness of back belt use in preventing low back injury. Accepted for *Journal of Occupational Medicine*, 1995/96.

Smutz WP, France EP, Bloswick DS: Measurement of creep strain of flexor tendons during low-force high-frequency activities such as computer keyboard use. *Clinical Biomechanics* 10(2):67-72; 1995.

Smutz WP, Miller SC, Eaton CJ, Bloswick DS, France EP: Investigation of low-force high-frequency activities on the development of carpal tunnel syndrome. *Clinical Biomechanics* 9:15-20; 1994.

Stans LK, Nicholson DE, Miller ML, Gooch JL, Bloswick DS: An eight week tricycle training program enhances gait in children with cerebral palsy. Accepted as abstract for *Pediatric Physical Therapy*, Winter, 1995.

#### CONFERENCE PROCEEDINGS-FORMALLY REFERRED:

Bloswick DS, Brown DR, King E, Howell G, Gooch J: Development and testing of a hip extensor trike for children with cerebral palsy. *Proceedings of 1st Annual Rehabilitation Ergonomics Conference, International Ergonomics Association* Toronto, Canada; August 1994.

Bloswick DS, Brown DR, Shirley B, King E, Goodenough J, Wright S: Development and testing of wheelchairs with lift seat and knee extension propulsion. *Proceedings of 1st Annual Rehabilitation Ergonomics Conference, International Ergonomics Association* Toronto, Canada; August 1994.

Bloswick DS, Dumas M: Ergonomics and the disabled/rehabilitated Worker: A proposal for using traditional ergonomic analysis tools to assess risk. *Proceedings of 1st Annual Rehabilitation Ergonomics Conference, International Ergonomics Association* Toronto, Canada; August 1994.

Bloswick DS, Dumas M, Brakefield S, Jeffries D: Ergonomic implications of the Americans with Disabilities Act. *Proceedings of 1st Annual Rehabilitation Ergonomics Conference, International Ergonomics Association* Toronto, Canada; August 1994.

Bloswick DS, Hart A, Bonar L: Integrating rehabilitation engineering into a traditional ergonomics course. *Proceedings of 1st Annual Rehabilitation Ergonomics Conference, International Ergonomics Association* Toronto, Canada; August 1994.

Brown DR, Budnick PM, Bloswick DS: A concurrent design framework for the ergonomics of production processes. *Proceedings of the ASME International Computer in Engineering Conference*; August 1992.

King E, Blowski DS, Brown DR, Gooch J, Peters ML: Evaluation of a device to exercise the hip extensor muscles in children with cerebral Palsy: A clinical and field study. *Proceedings of the 16th Annual RESNA Conference*; June 1993.

**APPENDIX  
E&S-3****FULL-TIME/SUPPORTING/VOLUNTEER FACULTY  
AND THEIR ROLES**

<b>FULL-TIME FACULTY:</b>	<b>POSITION</b>
Donald S. Bloswick, PhD, PE, CPE	Associate Professor, Program Director
<b>SUPPORTING &amp; VOLUNTEER (CLINICAL) FACULTY:</b>	<b>POSITION/ASSOCIATION</b>
D. Jeff Burton, PE, CSP, MS	Clinical Instructor, Lecturer
Robert Anderson, PE, CSP, MS	Lecturer
Peter Budnick, PhD, CPE	Lecturer
<b>Mark Dumas</b>	Seated and VDT Workplace Design
<b>Paul France</b>	Occupational Biomechanics, Functional Anatomy
<b>Sanford Meek</b>	Support Controls, Rehabilitation Engineering
<b>Don Brown</b>	Support Design, Expert Systems
<b>Susan Lantz</b>	Support Cervical Spine Biomechanics

**APPENDIX  
E&S-4****PATENTS**

1. Trike exerciser for pre-adolescent children with cerebral palsy. This was a cooperative effort with Dr. Don Brown. Students involved were Jeff Bean (advised by Bloswick) and Glade Howell (advised by Brown). Dr. Judy Gooch of the UU Department of Physical Medicine and Primary Children's Hospital is also involved. Patent pending, 1993.
2. Sit-to-Stand wheelchair for geriatric patients. Students involved are Ben Shirley and Eric King (advised by Bloswick). Patent pending, 1993.
3. Alternative handcart for workers with hand/wrist disorders. Student involved are Glade Howell and Mark Dumas (advised by Bloswick). Invention disclosure submitted to UU Technology Transfer Office in October, 1992.
4. Wheelchair with foot propulsion device. Invention disclosure submitted to UU Technology Transfer Office in 1993. Modified disclosure submitted in 1994.
5. Alternative door latches for people with disabilities. Invention disclosure submitted to UU Technology Transfer Office in 1993.

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## CONTINUING EDUCATION APPENDICES

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**APPENDIX  
CE-1**

**ADJUNCT/CLINICAL FACULTY  
AND CE COURSE RESPONSIBILITY**

ADJUNCT & VOLUNTEER (CLINICAL) FACULTY:	CE COURSE RESPONSIBILITY
<b>INDUSTRIAL HYGIENE</b>	
D. Jeff Burton	Lecturer for three "Comprehensive Review of Industrial Hygiene" courses and "Indoor Air Quality/Ventilation".
Dave Nelson, MS	Lecturer for three "Comprehensive Review of Industrial Hygiene" courses.
J.H. Nelson, PhD	Lecturer in three "Comprehensive Review of Industrial Hygiene" courses and Course Director for "Introductory Industrial Chemistry" and "Advanced Industrial Hygiene Chemistry".
William Wagner, MS	Lecturer in three "Comprehensive Review of Industrial Hygiene" courses and in asbestos abatement courses.
<b>SAFETY AND ERGONOMICS</b>	
Mark Dumas, MSPH	Lecturer in "Introduction to Industrial Ergonomics".
<b>OCCUPATIONAL HEALTH NURSING</b>	
Tim Aldrich, PhD	Lecturer and Co-Director of "Environmental Contamination: Risk Assessment and Management" course.
<b>OCCUPATIONAL MEDICINE</b>	
Richard Johns, Jr., MD	Course Director for "Annual Managing Compensable Disability" Seminar.

Additional course and conference speakers come from other universities, government agencies, and private industry. (See Appendix CE-2.) This participation is accomplished to ensure that diversity and currency are maintained throughout the field of occupational and environmental safety and health training.

**APPENDIX  
CE-2****ADDITIONAL COURSE AND CONFERENCE SPEAKERS/FACULTY****Asbestos**

Russell D. Baker - Vice-President, Thermal West Industrial  
Bryce Bird - Utah State Department of Environmental Quality  
Mike Blumer, MSPH, CIH - Industrial Hygiene Consultant, IHI, Inc.  
Frank DeRosso, MSPH, CIH - Hazards Analyst, IHI, Inc.  
Merlynn Densley - IHI, Inc.  
Gale Francis - Attorney  
Randy Haslam - District Architect, Jordan Schools  
Jay Hill - Insurance Executive, Johnson & Higgins  
Bruce Holmes - Department of Transportation  
Craig Kevern - J.B.R. Consultants  
Donald E. Marano, PE, CIH - IHI, Inc.  
Randy McClure - IHI, Inc.  
Scott Nordstrom - IHI, Inc.  
Brian Olson - Granite School District  
Sarah Panzitta - Utah Department of Air Quality  
Eldon Romney - Environmental Specialist, IHI, Inc.  
R.J. Sartori - President, Thermal West Industrial Inc.  
Al Schnegelberger - President, Safety-West, Inc.  
Deborah Teynor, MD - WorkMed, Inc.  
Joan Thallman - Utah Department of Environmental Quality  
Miriam Vaughn, MS, CIH - Industrial Hygienist, University of Utah Safety Services

**Hazardous Substances**

Karl Albrecht, CSP - Senior Safety & Health Engineer, National Semiconductor  
Tim Aldrich, Ph.D. - North Carolina Central Cancer Registry  
Renette Anderson - Community Relations, Utah Department of Environmental Quality  
Kim Blindauer - Manager, Risk Assessment Project, Utah Department of Health  
Mike Blumer, MSPH, CIH - Industrial Hygiene Consultant, IHI, Inc.  
Dan Crane, MS - Supervisory Physical Scientist, USDOL  
Frank DeRosso, MSPH, CIH - Hazards Analyst, IHI, Inc.  
Wesley Dewsnup - TW Company  
Mark Dumas - Industrial Hygienist, Worker's Compensation Fund of Utah  
Nancy Fox - Chemical Hygiene Officer, Utah State University  
Larry Howard - Amoco  
Roy Jensen - Chevron  
Calvin Latsis - TW Company  
Mike Montmorency - Hazardous Materials Institute  
Dave Mcallister - Amoco  
Dave Nelson - President, EnviroSearch Intl.  
Neil Taylor - Emergency Response coordinator, Utah Dept. of Environmental Quality  
Joe Trujillo - Tooele County Sheriff's Department

Miriam Vaughn, MS, CIH - Industrial Hygienist, University of Utah Safety Services  
Ed Yeates - Science Specialist, KSL Television  
Robert T. Zeigler - Environmental Assessor, IHI, Inc.

### Industrial Hygiene

Dr. Robert Arnold, Jr - International Loss Control Institute (Loganville, Georgia)  
Stephen Aust, Ph.D. - Utah State University  
Louis R. Barrows, Ph.D. - Associate Professor, University of Utah  
Rush Bowers, MSPH, CIH - Senior Industrial Hygienist, IHI, Inc.  
John Burkart - Burkart & Associates  
Jeff Burton - IVE, Inc.  
Bobby Craft, Ph.D., CIH - IHI, Inc. (Denver, Colorado)  
Kevin Cummins - OSHA Salt Lake Technical Center  
Robert Curtis - USDOL/OSHA  
Noel deNevers - Engineering, University of Utah  
Howard M. Deer, Ph.D. - Extension Pesticide and Animal Drug Coordinator, Utah State University  
Lance Eggenberger - DataChem Laboratories  
Carolyn Freeman - USDOL/OSHA (Washington, DC)  
U.E. Garrison - Thiokol Corporation  
Mark Goldman - Anderson Laboratories, Inc. (Dedham, Massachusetts)  
Lee Hathon - OSHA Salt Lake Technical Center  
Patrick Hearty - OSHA Salt Lake Technical Center  
Tom Hopkins - IHI, Inc.  
Joseph Jarvis, MD - National Jewish Center for Immunology & Respiratory Medicine (Denver, Colorado)  
Dick Jordan - Director, Health and Safety, EnviroSearch International  
Stanley Judd, CIH - American Industrial Hygiene Association (San Francisco, California)  
Harold Lee - Sensar Corp.  
Sim D. Lessley, Ph.D. - Executive Vice-President, DataChem Laboratories  
Jay Longmire - ISEC, Inc. (Superior, Colorado)  
Charles McCammon - USPHS, NIOSH (Littleton, Colorado)  
J.B. McCandless - Consultant  
Barbara McCusker, MD  
Lynn Meiner - Bureau of HIV/AIDS  
J. Donald Millar - Past Director, NIOSH (Atlanta, Georgia)  
Dave Nelson - President, EnviroSearch International  
James H. Nelson, Ph.D. - President, DataChem Laboratories  
Richard Neves - OSHA Salt Lake Technical Center  
Dianne R. Nielson, Ph.D. - Utah State Division of Environmental Quality  
Jim Perkins - Vice President, DataChem Laboratories  
Roberta Popp - University of Utah  
Randol Potter - DataChem Laboratories  
Douglas E. Rollins, MD, Ph.D. - Director, Center for Human Toxicology - University of Utah  
Lucy Shoell, RN - Salt Lake Veteran's Administration  
Robert Sheriff - Past President, American Industrial Hygiene Association  
Bruce Spiegel, PE - Utah State Division of Risk Management

Michael J. Taylor, MSPH, CIH - LDS Church  
Francis Urry, Ph.D. - Director of Toxicology, ARUP  
Tamara Wharton - Governor's Council on Disabilities

**Lead**

Richard Baker, CPS - Ramsey-Schilling Consulting Group, Inc.  
Rush Bowers - IHI, Inc.  
Jack Holt - Senior Partner, IHI, Inc.  
Jay Hill - Insurance Executive, Johnson & Higgins  
Craig Jones, MSPH - Program Manager, Utah Division of Radiation Control  
William Wagner, MSPH, CIH, CSP, MS - Senior Partner, IHI, Inc.  
Kenneth White, MS, MSPH, CIH - Senior Partner, IHI, Inc.

**Occupational Medicine**

John Barbuto, MD - Wasatch Neurological Clinic  
Jim Behnke, MS, CPFT - Technical Director, Pulmonary Lab, University of Utah  
Joel Campbell - Special Investigator, Worker's Compensation Fund of Utah  
Alan Colledge, MD - Co-Director, Spine Center  
Michael Dyer - Attorney  
James Elegante - Attorney  
Dell Felix, PT - Marketing Director, Rocky Mountain Physical Therapy  
Wilbert Fordyce, Ph.D. - (Seattle, Washington)  
Darrell Hart, Ph.D. - Director, Intermountain Spine Institute  
Scott Hill, Ph.D. - Psychologist, VA Medical Center  
Ted Hintze, C-CPT - Hercules  
Richard Johns, MD - Medical Director, Hercules  
Ed Mayne - AFL-CIO General Office  
F.D. Pierce, MSPH, CIH, CSP - Manager of Safety, Western Zirconium (Westinghouse)  
Glenn Richardson, Ph.D. - College of Health, University of Utah  
Scot Russell, Ph.D. - Assistant Professor, Psychiatry, University of Utah  
Joyce Sewell - Director, Industrial Accident Division of the Industrial Commission of Utah  
Robert Short - Workers' Compensation Fund of Utah  
James Smirles - Kemper National Insurance Co.  
Roger Stephens - Ergonomist, USDOL/OSHA (Washington, DC)  
Ed Tapley - DTA, Inc.  
Alan Tebb - Executive Director, California Workers Compensation Fund  
Andy Tolsma - H.R. Industrial Analyst, Sinclair Oil Corporation

**Occupational Health Nursing**

Tim Aldrich, Ph.D. - Central Cancer Registry (Raleigh, North Carolina)  
Alvis Barrier, MD - Otolaryngologist, St. Benedict's Hospital  
Wendy Hanks, Ph.D. - Assistant Professor, Brigham Young University  
Richard Harris, Ph.D. - Director of Audiology, Brigham Young University  
Larry Keyes, MS - Director of Risk Management & Health Promotion, Unisys Corp.

**Safety**

Dan Andrus - Salt Lake City Fire Department  
Ben Bringhurst - Utah Fuel Co.  
Margaret Carroll - President, American Society of Safety Engineers  
Richard Doty - Thatcher Chemical  
Mark Dumas - Workman's Compensation Fund of Utah  
Don Gale - KSL Television  
Robert Gardner - Trojan Corporation  
Michael Gelskey - President, Lift-It, Mfg. Co. (Los Angeles, California)  
Luckey Heath - Thiokol Corporation  
Richard Johns, MD - Hercules  
Bradley Joseph - Corporate Ergonomist, Ford Motor Co. (Dearborn, Michigan)  
C. David Langlois, CSP - Langlois, Weigand and Associates (Baton Rouge, Louisiana)  
Jerry Nordyke - Great Western Chemical  
F.D. Pierce, MSPH, CIH, CSP - Manager of Safety, Western Zirconium (Westinghouse)  
Wayne Price - Kremco  
Jeff Rylee - Salt Lake City Fire Department  
Edward Tapley - DTA, Inc.  
Neil Taylor - Utah Division of Environmental Response  
George Tomer - Lockheed Missiles & Space Co.  
Phillip Ulmer - Past President, American Society of Safety Engineers  
Michael Weigand, Ed.D., CSP - Langlois, Weigand & Associates (Baton Rouge, Louisiana)

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## **AGRICULTURAL SAFETY AND HEALTH APPENDIX**

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APPENDIX  
AG-1**"AGRICULTURAL SAFETY AND HEALTH"  
COURSE OUTLINE**Dr. Jeffrey Lee, RMCOEH, University of Utah  
Dr. Dick Joerger, ASTE Dept., Utah State University

DATE	TOPIC	RESOURCE PERSON AND LOCATION	READING-REFERENCES
3/31/95	Introduction to Agricultural Safety and Health	Drs. Lee and Joerger	Murphy 1-83
4/7/95	Farm Safety Walk Through	USU Dairy Research Center	Rdr 44-79
4/14/95	Livestock Safety Practices; Effective Teaching Methods that Promote Machinery Safety	USU Presenter Darwin Jolly	
4/21/95	Health Studies of Agricultural Workers Including Migrant Workers	Dr. Jeffrey Lee University of Utah/RMCOEH	Murphy 109-133 Rdr 80-99
4/28/95	Farm Safety and Assistive Technology Improving Your Rural Business with the ADA Conducting Agricultural Worksite Assessments	Dr. Barry Delk Agriability Program Purdue University	Assignment One Due: Annotated bibliography with a copy of 3 articles attached
5/5/95	Ergonomics in Agriculture	Dr. Don Blosswick U of U	Murphy 179-202 Rdr 116-118
5/12/95	Pesticides, Chemicals and Other Exposures	Dr. Howard Deer USU	Handouts
5/19/95	OSHA and Other Regulatory Agencies Confined Spaces Agricultural Safety Concerns Relating to Migrant Workers	Mr. David Wallace U of U	Murphy 155-175 Rdr 100-115
5/26/95	Farm Assessment Field Experience	Logan Area	Alternative Farm Surveillance Forms Assignment II Due: Draft of final paper
6/2/95	Student Seminars	RMCOEH and USU	Assignment III Due: (a) Final copy of paper, (b) students to make presentations to class, and (c) students to provide copies of papers for all participants TAKE-HOME FINAL EXAM Presented - DUE JUNE 6, 1995