

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

**ANNUAL REPORT
July 1, 2005-June 30, 2006**

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Introduction and Executive Summary: RMCOEH

The Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) is an energetic, innovative and growing Occupational Safety and Health (OSH) Education and Research Center (ERC) that has been in existence at the University of Utah since 1977. It is the only ERC in Region VIII (UT, CO, WY, MT, ND, SD), even though these states are annually in the top rankings for occupational fatalities and thus have an urgent need for more OSH professionals. In the past grant period, we have made major progress, including the first piece of major Legislation supporting (OSH) training in the US in many years [Senate Bill (S.B.) 159, 2005 Utah General Legislative Session], along with growth in extent and quality of all of our programs.

The RMCOEH contains academic programs in Ergonomics and Safety (E&S), Hazardous Substances Academic Training (HSAT), Industrial Hygiene (IH), Occupational Injury Prevention Research Training (OIPRT) and Occupational Medicine Residency (OM). We have robust Continuing Education (CE) and Hazardous Substances Training (HST) Programs. The RMCOEH provides specific curricula by Occupational Health Nurses (OHNs) to emphasize the importance of OHN to our trainees. We have trained over 363 graduates to date, and are recognized for high quality trainees and strong, interdisciplinary education programs.

The RMCOEH enjoys unparalleled collaborative relationships with businesses, trade groups, employee groups, governmental units, healthcare organizations, workers compensation insurers, and community groups, and these interactions foster an atmosphere that facilitates state-of-the art training for OSH professionals for the 21st Century. These relationships provide the external 'laboratories' to test critical research theories and develop the innovations to provide safer and healthier workplaces. The RMCOEH has also developed the requisite infrastructure to support the National Occupational Research Agenda (NORA) (I and II), and Research to Practice (r2p) research missions. The RMCOEH's CE and Outreach programs promote and publicize efficacious strategies, helping ensure knowledge is translated into practice. Despite a shrinking national market for CE, the RMCOEH is a bright exception.

B. Significant Changes

In the past one year grant period (July 1, 2005-June 30, 2006) a few of our accomplishments included:

- Develop a new capstone course on Occupational Health Solutions to businesses' OSH problems
- Survey all RMCOEH graduates (currently having successfully received 133/363 = 36.6%)
- Submitted 4 research grant applications, with indications of success
- Developed a new distance based CE course
- Expanded our Outreach efforts
- Intensified our Diversity Recruitment efforts
- Successfully supported the passage of 2SHB009 to study health effects in Firefighters and Police Officers
- Hosted the largest NIOSH NORA II Town Hall meeting, with over 150 in attendance

C. ERC Website

The RMCOEH has a website that is located at: <http://www.rmcoeh.utah.edu/>. Please note that as of this writing, this website is undergoing a major renewal.

Center Wide Programs

A. Director: Kurt T. Hegmann, MD, MPH

B. Program Description

The Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) is an Education and Research Center that has been in existence at the University of Utah since 1977. It is the only ERC in Region VIII (UT, CO, WY, MT, ND, SD).

The RMCOEH contains academic programs in Ergonomics and Safety (E&S), Hazardous Substances Academic Training (HSAT), Industrial Hygiene (IH), Occupational Injury Prevention Research Training (OIPRT) and Occupational Medicine Residency (OM). We have Continuing Education (CE) and Hazardous Substances Training (HST) Programs. The RMCOEH provides specific curricula by Occupational Health Nurses (OHNS) to emphasize the importance of OHN to our trainees.

The RMCOEH is primarily housed in the Department of Family & Preventive Medicine (DFPM), University of Utah (U of U) School of Medicine. The RMCOEH's E&S Program and one half of the OIPRT Program (the Occupational Safety Emphasis) are housed in the Department of Mechanical Engineering, College of Engineering. The Center's Economic and Statistical Evaluation Unit is housed in the Dept of Economics (College of Social and Behavioral Science), while including other faculty with biostatistical, epidemiological and business expertise. RMCOEH has collaborative relationships with countless other U of U entities. The RMCOEH also has collaborative ties with the Training Program Grants' programs in Region VIII including those at Montana State and Colorado State, as well as with the next three largest Universities in Utah (Brigham Young University, Utah State University and Weber State University).

The RMCOEH has 4 Program Directors (CE and HST; HSAT and IH; E&S and OIPRT; and OM). Along with the Center Director, Deputy Director and the Statistical and Economic Evaluation Unit Director (Dr. Waitzman), they constitute the Center Executive Committee, which meets monthly and as needed between meetings. The RMCOEH has a large, active and robust Advisory Board that includes representatives from all major stakeholders. The Advisory Board meets at least twice a year. The Director, Deputy Director, or other faculty meet with the RMCOEH Advisory Board Executive Committee periodically as circumstances necessitate.

The RMCOEH Vision, Mission and Goals statements are critical guiding statements that the RMCOEH faculty and staff review and revise at least annually, at our annual retreats. These statements are also reviewed at the RMCOEH Advisory Board meeting following any changes. Emphases are placed on meeting current and projected OEHS challenges and taking advantage of new educational techniques and other opportunities.

VISION: Be recognized internationally as a leading Center in meeting current and future occupational and environmental health and safety challenges

MISSION: To protect workers and the environment through interdisciplinary education, research, and service.

GOALS:

1. Provide quality academic programs.
2. Accomplish NORA research and translate it into practice.
3. Provide superior continuing education, service, and outreach.
4. Accomplish strong interdisciplinary collaboration.

Each Program Director then revises program-specific goals and objectives to achieve the overall Center goals and guide programmatic efforts. Objectives are structured so that progress in achieving them is evaluated on an ongoing basis. The specific Administration goals and objectives are discussed below.

The RMCOEH meets regional needs by: (1) training students for regional needs (195 of the 363 graduates (54%) of our programs reside in Region VIII states), (2) conducting formal needs assessments, (2) targeting academic and CE/HST programs' contents to regional needs, (3) active involvement of the RMCOEH Advisory Board which raises issues for us to address, (4) answering concerns raised by each program's Advisory Committee, and most recently, (5) tying future research endeavors to the hugely successful NORA II Town Hall meeting held in February 2006 (n>150 participants with extensive regional needs developed and posted on our web). The fact that so many graduates remain in this region attests to the strong, previously unfilled, need for OHS professionals and the success of the RMCOEH in meeting this need. Our graduate surveys confirm

Administration Goals and Objectives (these are discussed along with progress to conserve space)

Responsible Conduct of Science Training

Current Instruction and Student Participation: For over 3 years, all RMCOEH trainees have been required to complete HIPAA and IRB training during orientation. Orientation activities typically take place during the trainee's first week. Trainees do not participate in research activities prior to HIPAA and IRB training. All faculty and staff are required to complete this training. Certificates of completion are documented. Courses, such as Epidemiology, Introduction to Biostatistics, and Social Context of Public Health, also incorporate training in responsible research practices into their curriculum. Ethics are also major topics in Ergonomics, Human Factors Engineering, and Design Implications. The topic of research ethics is also covered extensively in Computer Applications and Research Methods. RMCOEH trainees also attend (beginning 2006) a new mandatory noon lecture series that includes among other topics: conflict of interest, responsible authorship, handling of misconduct, data management, data sharing and animal welfare. Attendance logs are kept to track trainee attendance, and faculty attendance is encouraged. Additional topics include how to write research grant proposals and how to manage research laboratories. Specific reference is made to the University of Utah's Policy and Procedures Manual, with particular emphasis on Part 8, Chapter 10, Sections V and VI, which cover "Student Academic Conduct" and "Student Professional and Ethical Conduct," respectively (<http://www.admin.utah.edu/ppmanual/8/8-10.html>). Faculty participate. Attendance is tracked.

C. Program Activities and Accomplishments

Administration Goals and Objectives

Progress towards achieving each of our goals is below.

Goal 1. Provide proactive administrative support to enable faculty to present quality OEHS academic programs.

Objective 1.a. Assure appropriate utilization of the RMCOEH Advisory Board and provide oversight for other programs to ensure adequacy of functioning Advisory Committees.

Progress and Plans: The RMCOEH Advisory Board continues to meet at least twice each year over the past decade. The next meeting is scheduled for October 13, 2006. It is noteworthy that since the last competing renewal, the RMCOEH Advisory Board has formed an RMCOEH Advisory Board Executive Committee (Messrs. Marano, Lloyd, and Drs. Hegmann, and Moser), which has teleconferenced, and met as needed during this past project period. This Board Executive Committee (to be distinguished from the RMCOEH Center Executive Committee consisting of Program Directors) has been instrumental in the great success that the RMCOEH has enjoyed, as this group has been both highly functional and quite nimble. We will be continuing this successful format. Breakout sessions occurring with our RMCOEH Advisory Board meetings, consisting of individual program's Advisory Committee members, have been quite effective. The process allows for program-focused efforts and attention, and is followed by group problem solving immediately afterwards. This biphasic approach has been highly valuable in resolving existing concerns and identifying potential problems so they can be addressed before they become manifest. The development of new OMR comprehensive sites provides an example of the result of these efforts. It is planned to continue this format during the next grant period.

Objective 1.b. Complete a survey of graduates of RMCOEH academic programs.

Progress and Plans: A survey was e-mailed and mailed to all graduates of RMCOEH academic programs in June 2006, with follow-up reminders to provide up-to-date information for this application's reviewers. Among the most noteworthy findings are that 91% of RMCOEH graduates rated their satisfaction with our training programs at least 7/10 (0-10 scale), with a majority 9/10 or 10/10. Similar results were given to the question regarding whether they would recommend our programs to other potential students.

Objective 1.c. Provide direction and support for development of innovative educational approaches.

Progress and Plans: We are increasing the quantity of digital images in our teaching programs, have involved more distance education formats, and have developed a summative course in OSH problems solving. We have refurbished our classroom/conference room with new tables, chairs, library shelves and a SmartBoard™. We are investigating new degree programs to continue to seek innovative educational formats and solutions.

Objective 1.d. Assist in developing and implementing plans to maintain and expand the number of RMCOEH faculty.

Progress and Plans: Since June 2002, three IH (Drs. Larson, Pahler and Collingwood) and two OM faculty (Drs. Wood and Edwards) have been added, for a net gain of 3 terminally degreed faculty members. Plans are being developed to further augment the RMCOEH faculty, including additions to the E&S and OIPRT programs, followed by restarting the OHN Program.

Objective 1.e. Monitor numbers of minority students with the objective of increasing minority student enrollment in MSPH and MPH programs.

Progress and Plans: We have markedly expanded our activities in this area, and those activities are now discussed under the Diversity Recruitment Plan section.

Goal 2. Provide administrative support needed to enable faculty to design and accomplish research studies that focus on NIOSH priority areas and translate it into practice.

Objective 2a. Encourage research directly related to NORA, NORA II, r2p and WorkLife Initiative priority areas.

Progress and Plans: Recent and current RMCOEH efforts and proposals have focused on the following NORA priority areas: Exposure Assessment, Low Back Disorders, Musculoskeletal Disorders of the Upper Extremity, Traumatic Injuries, Risk Assessment Methods, Social and Economic Consequences of Workplace Illnesses and Injuries, Intervention Effectiveness, Special Populations at Risk, and Organization of Work. The Pilot/Small Projects Program discussed below is planned to target these NIOSH research priority areas.

Objective 2b. Obtain funding to support research training and enhancement of research expertise of junior faculty.

Progress and Plans: Faculty have succeeded in obtaining major research awards. These awards have involved large, cross-disciplinary projects that have resulted in practical training in major research projects. Junior faculty also have received training in research from the University of Utah. We are continuing to develop our research training and expertise. It is planned that all senior faculty will continue to work with junior faculty to develop their research expertise and extramural proposals.

Objective 2.c. Continue to explore potentials for joint research programs and efforts with other academic institutions.

Progress and Plans: We have succeeded in initiating and conducting two major joint research programs that have involved large teams of researchers from many institutions. We plan to continue to search for such opportunities and one such project has been submitted to NIOSH (July 2006). Others are pending.

Goal 3. Assist faculty in providing superior continuing education, service and outreach that protect and enhance the health and safety of workers, their families, and those exposed to environments impacted by work activities.

Objective 3.a. Provide support to CE and HST efforts to develop Internet-based training programs.

Progress and Plans: The Center's distance based courses continue to prove popular. We have also developed on Occupational and Public Health Journal Club format for continuing education students in 2006. We are now offering a distance-based safety training program beginning in 2006, which is patterned after a successful traditional training program. We continue to seek other distance-based educational opportunities.

Objective 3.b. Improve CE and HST facilities.

Progress and Plans: This goal has been completely met. The RMCOEH has moved to newer facilities, which include the conference room with a SmartBoard™ described above. The other DFPM classroom space is now adjacent and also available for CE and HST functions. The University of Utah has markedly improved facilities, including an adjacent Guest House, as a result of the Olympics.

Objective 3.c. Provide administration support to outreach and service support activities.

Progress and Plans: This objective is now discussed under the new Outreach section.

Goal 4. Provide administrative support to programs and activities that will maintain and expand the Center's interdisciplinary foci and collaboration in accomplishing education, research, and service.

Objective 4.a. Provide administrative support to strengthen the Center's strong interdisciplinary orientation in all areas.

Progress and Plans: The greatest improvement in this area is the development of the new Occupational Safety and Health Solutions Course (scheduled for Spring 2007). This exciting, innovative course and other aspects are discussed in more detail under the Interdisciplinary Coordination Plan section.

Objective 4.b. Assist Center faculty in expanding local, regional, and national collaborations with government, industries, and professional organizations.

Progress and Plans: Center faculty continue extensive collaborations with other agencies and organizations, which is discussed under the Outreach Plan section.

Trainee and Faculty Honors, Awards, Scholarships, Appointments, New Faculty Positions, New Courses.

Details are in the program specific progress reports. This is a brief summary. Several trainees have received Paul S. Richards Safe Workplace Scholarships sponsored by the Workers Compensation Fund.

Dr. Wood became the first ACOEM/FMCSA (Federal Motor Carrier Safety Administration) Research Fellow after a competitive national application. Dr. Hegmann has been appointed as Chair of the ACOEM Evidence Based Practice Committee. He also has been recently appointed by Secretary Mineta (Department of Transportation) and now is Chair of the Medical Review Board of the Federal Motor Carrier Safety Administration to establish medical standards for safe commercial vehicle operation.

Trainee and Diversity Recruitment and Recruitment

This is discussed in each program. Although states in Region VIII have much lower percentages of minority groups than many other states, Center members recognize that the proportion of minorities is increasing. Further, special effort is needed to overcome the constraints that minorities face. In order to develop a coordinated approach to minority recruitment, the RMCOEH has organized its efforts in this area under the direction of Don Bloswick, Ph.D., E&S program director. Faculty are interacting with numerous University of Utah and community minority groups and schools in an attempt to improve minority recruitment. The efforts have resulted in successes, e.g. those discussed in the OM section of this application. Minority Recruitment remains a priority for the Center and current contacts and efforts set the stage for continued success in this area in the future. We have made contacts with other university's minority and diversity personnel. We have also made contacts with Native American education programs.

D. Program Products

These are discussed in each program's narrative in detail.

As an overview, the Center has:

- Increased the number of faculty and staff
- Received awards for major NIOSH research grants. These research projects have major potential impacts involving widespread OSH issues that include shoulder tendinosis, CTS, low back pain, chemical exposures among pregnant women and silica-related toxicity.
- Extensively revised curricula to respond to the changing OSH environment
- Obtained major new funding sources
- Markedly increased the numbers of Continuing Education (CE) courses and registrants
- More than doubled the annual number of publications to over 30 per year
- Expanded Outreach efforts with resultant dramatically expanded support to commercial, government, non-profit, and other organizations that have, in turn, resulted in increased commitment by these groups to Center advocacy
- Moved into more modern, user friendly, facilities
- Greatly enhanced its NORA activities

E. Future Plans

We plan to emphasize: (1) additional growth in extramural research programs that emphasize NORA (as well as NORA II, r2p, the WorkLife Initiative) and build on our regional NORA II Town Hall meeting held in Salt Lake City, (2) increasing the numbers of trainees, (3) developing post-doctoral training, (4) further developing distance-based education programs, (5) further increasing external support, (6) increasing numbers of faculty in all cores, (7) increasing the integration of the Statistical and Economic Evaluation Unit, and (8) re-starting our Occupational Health Nursing Program after the prior 6 steps are completed. In our upcoming competing renewal, we will include a request to redevelop a Pilot/Small Projects Program and partially support the RMCOEH Statistical and Economic Evaluation Unit to help us achieve those emphases. We will also include requests for specific, well defined NORA Projects that serve as research training platforms for all trainees, while including highly practical r2p techniques and tools that will serve them well in professional careers.

Outreach Program

A. Program Director: Royce Moser, Jr., MD, MPH

B. Program Description, Activities and Accomplishments, Program Products and Future Plans

Faculty of the RMCOEH have recognized the significance of outreach since the Center was established. Extensive outreach activities have been documented in prior competing and non-competing applications. The significance of outreach is underscored by the fact that one of the four major goals of the RMCOEH has been to "Provide superior service and outreach," long before it was a required element. The Outreach Program has focused on:

1. **Complementing the CE and HST Programs with activities designed to additionally enhance the capabilities of OSH practitioners.**
2. **Interacting with other University departments and with other local and regional academic institutions to enhance OSH education programs.**
3. **Supporting OSH professional organizations.**
4. **Supporting businesses, labor organizations, and government entities through provision of OSH information and other OSH activities.**
5. **Designing programs to translate research to practice and to encourage submission of follow-on research applications.**

During recent RMCOEH strategic planning sessions, faculty determined that outreach efforts could be accomplished more efficiently, and have greater visibility, if the program were structured more formally. As a result, an outreach program director was selected, and all faculty committed to provide support to outreach. A tracking program was developed and implemented to help delineate progress in accomplishing outreach. The significance of the outreach program is emphasized by the appointment of Royce Moser, Jr., M.D., MPH, former RMCOEH Director and currently Deputy Director, as Director of Outreach. The commitment of the faculty members is documented in a formal policy, as depicted in Figure 1.

Table 1 below contains a synopsis of the Outreach activities over the past year. It should be noted that some of the professional presentations were one hour or more in length and Category 1 CME or CE credits were awarded. However, a conservative allocation was used to place these in Outreach rather than include them as Continuing Education or Hazardous Substances Training. **RMCOEH members provided over 85 separate outreach activities during 2005-2006, with some outreach efforts providing over 1000 contact hours of information.**

Outreach Program Plan:

RMCOEH faculty will continue to provide outreach support to OSH professionals; to other academic institutions; to professional organizations; to businesses, labor organizations, and government entities; and to efforts to translate research results to practice. Outreach target groups currently include:

1. **Governmental entities locally**
2. **Governmental entities nationally**
3. **Research and teaching communities at the University of Utah**
4. **Academic institutions regionally**
5. **Academic institutions nationally**
6. **Business and trade groups locally and regionally**
7. **Business and trade groups nationally**
8. **Employee groups**
9. **Healthcare Organizations**
10. **Insurers**
11. **Community groups**
12. **OEHS Professional organizations**
13. **National and International Professional Conferences**

Planned activities include the following emphases:

1. Provide support to OSH professionals by:

- a. Making presentations of advances in OSH practice or research at national and regional professional meetings, such as those of the American College of Occupational and Environmental Medicine (ACOEM), American Industrial Hygiene Association (AIHA), and the Human Factors and Ergonomics Society.
 - b. Publication of peer-reviewed articles in professional journals to document proven interventions and other practice advances.
 - c. Preparation of additional videotapes such as the practical RMCOEH musculoskeletal physical examination techniques tapes that are in use in the United States, Korea, and other locations. (r2p)
 - d. Provision of additional on-line resources such as "Emergency Planning for Natural Disasters, Major Accidents, Terrorism, and Pandemics" used by OSH providers and by OHNs for employee groups. (<http://rocky.utah.edu> Emergency Planning link).
 - e. Enhancement of the on-line course, "Home Workplace Health and Safety", for telecommuters and others working at home and for professionals supporting such groups; consideration of other on-line outreach programs for OSH professionals and workers.
2. Interact with other University Departments and with other local and regional academic institutions by:
- a. Making OSH presentations to first year medical students on OSH topics as part of the Social Medicine course.
 - b. Serving as a facilitator in the first year medical school program to acquaint students with OSH.
 - c. Presenting OSH graduate degree opportunities to students in the Utah State University undergraduate Industrial Hygiene program and to other students at regional institutions.
 - d. Presenting OSH discussions in the new undergraduate course, FPMD 4500/5500, Introduction to Public Health, A Global Perspective.
 - e. Obtaining support from visiting scholars such as Thomas Bernard, Ph.D. (NORA Symposium) and Dae-Hwan Kim, M.D., MPH, visiting professor from Korea, 2005-2006.
 - f. Including University School of Business faculty in RMCOEH programs to evaluate financial benefits of OSH programs.
 - g. Developing additional diversity recruitment programs to include Tribal Colleges in Region VIII and efforts with Hispanic and Latino groups.
3. Support OSH professional organizations by:
- a. Providing scholarships for student membership in local AIHA chapter.
 - b. Continuing as member of the Evidence-Based Practice Committee of ACOEM.
 - c. Continuing as member of the Ergonomics Committee of ACOEM.
 - d. Continuing as trustee of the American Board of Preventive Medicine.
 - e. Accepting new committee and officer positions in professional organizations as time and resources permit.
 - f. Working with professional organizations to develop educational programs for members and others who attend conferences and meetings.
4. Support businesses, labor organizations, government entities by:
- a. Providing consultations or other support to local and regional businesses to the benefit of over 100 organizations annually.
 - b. Continuing to have the President of the Utah State AFL/CIO as a member of the RMCOEH Advisory Board.
 - c. Providing consultations regarding toxic exposures to Salt Lake County Risk Management.
 - d. Serving as member, Utah Labor Commission's Workers Compensation Advisory Committee.
 - e. Working with Utah legislators to develop proposals for enhanced funding of the RMCOEH.
 - f. Working with labor organizations to obtain funding to study health impacts of toxic work exposures of fire fighters and police.
 - g. Evaluating and reporting effectiveness of intervention programs to improve workplace health and safety.

- h. Utilizing the XPDNC web site to identify union organizations within HHS Region VIII that will be targeted for information about pertinent RMCOEH programs.
 - i. Developing distance learning OSH programs for businesses and workers.
5. Designing programs to translate research to practice by:
- a. Conducting the Regional National Occupational Research Agenda (NORA) Young/New Investigator Symposia annually.
 - b. Designing and conducting information programs for large and small businesses on etiologies and prevention of musculoskeletal disease of the upper extremity and of the back.
 - c. Preparing professional publications and presentations to provide information from research studies as the information becomes available.
 - d. Preparing publications for members of the workforce to assist in disseminating practical information on prevention of illnesses and injuries, using results of research as the information becomes available.

Figure 1. RMCOEH Outreach Policy

Outreach is a critical element of the vision, mission and goals of the RMCOEH, as specifically delineated in Goal 4. All faculty are expected to help achieve the Outreach goal. Outreach is defined as any educational, consulting, or other professional activity that impacts non-RMCOEH personnel and does not meet the criteria for academic courses, continuing education presentations, or research activities. Outreach includes support to local/regional universities, Regional Training Program Grantees, local and regional business/worker communities, local, regional or national professional or other organizations and groups, and international activities. All who have been faculty at the RMCOEH for over 1.5 years must partake in Outreach activities.

- 1. Faculty are expected to accomplish five outreach activities each year in any of the following categories:**
 - a. University of Utah or other Region VIII University educational seminar, session, academic class, advisory committee, board or other service.**
 - b. Local or Region VIII business, trade, employee group educational seminar, session, class, consultation, or service on organizational committees or boards.**
 - c. National or international educational seminar, session, class, consultation, research presentation, study sections, or professional committee service.**
- 2. Other activities may be included as determined in consultation with the Outreach Program Director.**

Representative Examples of Outreach

Following are representative examples of Outreach from 2005-06 in each of the categories of Outreach that we track (see Table 1). Some single activities involved over 1,000 contact hours.

Outreach Summary and Plans. **Access to and communication with the above organizations is critical to the success of the RMCOEH. We are fortunate to be able to demonstrate and enjoy such vigorous support in academia, business, organized labor, trade associations, government, healthcare organizations, insurers, community groups, and professional organizations. We plan to continue our extensive Outreach efforts and will seek to optimize the impacts of our efforts through selecting the most beneficial venue when scheduling conflicts arise.**

Table 3. Representative Examples of Outreach from 2005-06.

Entity	Faculty/Staff Member	Activity	Date	Population/ Contact Hours
1. Government (local)	Drs. Sesek /Bloswick	Ergonomic consultation on NIOSH RLE for Utah OSHA	12/2/05, 12/8/05	16 hours
	Dr. Holmes	Member, Labor Commissions' Workers Comp Adv. Committee	Quarterly meetings	10-20/meeting

Entity	Faculty/Staff Member	Activity	Date	Population/Contact Hours
	Drs. Larson/Wood	Members of Utah Asthma Task Force	2005 to present	10-15/meeting
2. Government (nationally)	Dr. Pahler	Reviewer of NIOSH research grant applications (RFA)	June 5-7, 2006	N/A
	Dr. Hegmann	Medical Review Board, Federal Motor Carrier Safety Admin. (appointed, U.S. Sec. Transport)	2006-2008	N/A
3. U. of Utah	Drs. Seseck/Larson/Bloswick/	Campus consultations regarding occupational safety	Ongoing	80 hours / year x 5 years = 400 hours
	Dr. Pahler	1. Noise lecture/Eng. Dept. 2. OSHA/Env/Eng. Dept.	Spring 2006	6.5 hours lectures
	Dr. Wood	"Air Pollution and Public Health," Env. Studies Program	11/28/05	50 participants
	Dr. Hegmann	Science of Medicine course instructor	Spring, Block III	105/class x 8 hours
4. Regional Academia	Dr. Bloswick	Lectures to IH Program, Utah State University	11/17 - 11/19/05	80 hours
	Dr. Hegmann	Western Slope Medical Conference, Grant Junction CO.	8/11/06	122 participants 183 contact hrs.
	Dr. Larson	Meetings with faculty of SLC Community College to identify areas of interest for projects	10/06/05 & 07/18/06	1-3 hr. meetings
5. National Academia	Dr. Bloswick	"Ergonomics & Rehabilitation Engineering," Auburn University Industrial Engineering Seminar	03/06	1 hour x 30 participants = 30 hours
	Dr. Hegmann	"Shoulder Disorders" to US School of Aerospace Medicine, San Antonio, TX	03/09/06	2.5 hours x 32 MDs = 80 Contact hours
6. Business and trade groups locally and regionally	Drs. Bloswick/Seseck	Facility Walkthrough Inspection Paramed Systems SLC, UT	3/22/06	2 hours x 2 faculty = 4 hours
	Dr. Bloswick	"Ergonomics Overview," AIHA Nevada Chapter	06/06	1.5 hours x 14 participants = 21 hours
	Dr. Moser	"Preparation for Natural Disasters, Major Accidents, Terrorism and Pandemics,"		Training by local manuf. company
	Howard/Dr. Bloswick	Ergonomic training for Dupont Holographics in Logan UT	7/27/06	20 hours
	Howard/Drs. Seseck/Bloswick/Pahler/	Vibration analysis of Heavy Equipment Operation for Kennecott Utah Copper Magna	6/05-12/05	200 hours
	Dr. Seseck	Ergonomic Training Martin Door SLC, UT	5/4/05	2 hours x 100 = 200 hours
7. Business and trade groups nationally	Dr. Seseck	Present and participate at John Deere Annual Ergonomics Conference	5/7/06-5/18/06	16 hours x 65 participants = 1040 hours

	Dr. Seseck	Human Factors and Ergonomics presentation at Annual Conoco Safety Conference	7/19/05	3 hours x 75 participants = 225 hours
8. Employee Groups	Drs. Bloswick/Seseck	Ergonomic Training at UAW-Ford Training Center Detroit MI	10/26/05	8 hours x 2 sessions x 75 people/session = 1040 hours
	Drs. Larson/Hegmann These	Meetings with police officers, narcotics officers and firefighters' union leaders	2/06-7/06	5 meetings, 2 hours, 80 contact-hours
9. Health Care Organizations	Dr. Holmes	"Disability and Impairment" Greenwood Health Center	11/23/05	25 MDs x 1 hr., 25 contact hrs.
10. Insurers	Drs. Holmes/Hegmann/Wood	Workers Compensation Fund and other Insurers consultations	Episodic	N/A
11. Community Groups	Dr. Seseck/Merryweather	(2 nd and 3 rd Graders) field trip and presentation in the Ergonomics and Safety Laboratory	3/20/06	2 hours x 26 = 52 hours
	Drs. Seseck Bloswick/E&S students	Engineering Day Ergonomic Display (annually). Numerous students	Spring annually	8 hours x 5 yrs = 40 hours
12. OEHS Professional Organizations	Drs. Wood/Holmes/Edwards/Hegmann	American College of Occupational and Environmental Medicine's Evidence Based Practice Committee	2005-	N/A
	Dr. Larson	Member, AIHA Tox Committee and Responsible for developing and presenting Tox PDC (Prof. Dev. Cse) working on '07 conf.	Quarterly meetings by Conf. call	1 hour x quarterly conference calls
	Dr. Seseck	Ergonomics research presentation to local chapter of ASSE	3/2/06	2 hours x 25 participants = 50 hours
	Dr. Hegmann	Trustee, American Board of Preventive Medicine		N/A
13. National and International Professional Presentations	Dr. Bloswick	"Workshop on Ergonomics," Occupational Health Best Practices Conference and Workshop 2005, Singapore	11/2005	12 hours x 120 attendees = 1440 hours
	Drs. Bloswick, Seseck, Wood Drinkaus & students	2006 Regional National Occupational Research Agenda (NORA) Young/New Investigators Symposium	April 2006	1 conference x 11 hours x 50 attendees = 550 hours
	Dr. Hegmann	"Common Hand/Wrist Problems." Update in Clinical Med, Scottsdale, AZ.	11/07/05	40 min. x 52MDs = 35 hours
	Dr. Wood	<i>Seasonal Influences on Low Back Pain</i> , NORA 2006: Washington, DC.	04/19/06	1 hour x 100 attendees
	Dr. Wood	<i>Respiratory Protection Among Health Care Workers</i> . Hanoi, Vietnam.	11/16-18/05	2 hours x 100 attendees

Interdisciplinary Coordination Plan.

A. Program Director: Kurt T. Hegmann, MD, MPH

B. Program Description

RMCOEH faculty continue to emphasize interdisciplinary interactions in all areas of RMCOEH-based education and research so that every trainee is immersed in an environment of interdisciplinary training and research experiences, and we believe it is not possible to graduate without understanding the importance of such interactions. This focus is considered by all faculty to be of prime importance, particularly due to the increasingly complex nature of problems and the requirements for interdisciplinary, if not transdisciplinary, approaches for successful 'real world' OSH problems-solving. We address interdisciplinary activities in Center Executive Committee meetings, as well as at all faculty/staff retreats. This is also a periodic topic for RMCOEH Advisory Board meetings. Accordingly, we have further expanded our interdisciplinary educational activities.

Occupational Safety and Health Solutions Course

The most recent example of the intensity with which we pursue this issue is the development of a wholly new, capstone course, "Occupational Safety and Health Solutions" (MEEN 6960-3) planned to be initially taught Spring 2007. Three RMCOEH faculty representing 3 RMCOEH core programs worked together to design the course, applied for, and received a small intramural grant award for development of multidisciplinary courses. This effort also happens to be in alignment with the mission of the President of the U of U as he has stressed interdisciplinary teaching and involvement by U of U members in the 'real world.' Students will work in interdisciplinary teams under multidisciplinary faculty supervision to take real occupational safety and health problems presented by interested businesses, and solve the problems with practical solutions under close, interdisciplinary faculty supervision. We also have agreement from one of the School of Business faculty to be involved in this course and it is expected that meaningful quantification of costs and benefits of proposed interventions will be taught and calculated. Thus, our RMCOEH graduates will be better prepared to discuss proposed OSH interventions with their business trained colleagues, enter the workforce with an ability to perform interdisciplinary OEHS problems-solving at a high level, and discuss the financial implications with human resources personnel and others with whom they must typically interact.

C. Interdisciplinary Coordination Program Activities and Accomplishments

The following summarizes some of the RMCOEH's Interdisciplinary activities (please see Table 1 for Matrix of activities by program):

- Interdisciplinary orientation and social settings
- Numerous interdisciplinary OSH and Public Health classroom courses
- Specialty courses with other departments and schools
- Interdisciplinary classroom projects in several classes
- Interdisciplinary Field Trips course (FPMD 6759),
- Interdisciplinary journal club
- Occupational Medicine clinic rotations and experiences
- Public Health Programs' comprehensive examination
- Noon lunch meetings with OHN presentations
- Interdisciplinary Occupational Safety and Health Problems Solving Course (New)
- All RMCOEH current extramural research projects are interdisciplinary

RMCOEH's graduate programs' educational activities are interdisciplinary on the first day, literally starting with orientation. We emphasize the need for interdisciplinary approaches at orientation, and immediately initiate IRB/HIPAA training in a joint session. This is carried forth with most classes having representation from two or all three cores. A particularly noteworthy class for interdisciplinary activities is FPMD 6790, *Interdisciplinary Field Trips*, which is quite popular, and offers the opportunity for interchanges and demonstrations of team approaches in OEHS activities at in-plant settings. Thus, the students are exposed on a weekly, if not daily, basis to multidisciplinary OEHS teams.

We monitor academic, continuing education, research, publications and service interactions during the grant period to identify areas for improvement. In the past grant period, we have also initiated a multidisciplinary journal club. Pertinent interdisciplinary articles are reviewed and critiqued and all students from the core areas also have the opportunity to present relevant information related to their research activities.

Research-Related Interdisciplinary Activities

It is particularly noteworthy that almost all of our research projects are multidisciplinary with involvement of at least 2 cores. Nearly all research projects have students and/or residents involved in them. Thus, the issue of interdisciplinary problems solving is demonstrably carried out with real issues, rather than merely discussed in a classroom session. At least 2 disciplines are also represented on every thesis/dissertation committee.

Continuing Education Interdisciplinary Activities

Another major series of interdisciplinary interactions occurs in the course of the Center's CE program. This includes the annual fall Utah Conference on Industrial Hygiene and Safety. It also prominently and perhaps most critically involves the annual NORA New/Young Investigators Conference. The former is an Autumn conference and is a wonderful opportunity for multiple cores to interact in learning from a wide array of speakers. The latter conference is in Spring and involves students and junior faculty from all cores presenting their research along with outside students and other young investigators. RMCOEH students also frequently attend ongoing CE courses in interdisciplinary groups. Thus, through demonstration, rather than mere discussion, RMCOEH students experience interdisciplinary emphases in classrooms, in CE settings, and in teaching others.

Exposure to Occupational Health Nursing Principles and Practice

The RMCOEH does not have an OHN core at the current time, although as noted elsewhere, we have two of the four building blocks in place. Regardless, all RMCOEH faculty recognize the importance of meaningful exposure and involvement of all students in the principles and activities of Occupational Health Nursing (OHN). The following actions have maintained the exposure of RMCOEH students to the principles of OHNs:

1. We have maintained increased OHN representation on the RMCOEH Advisory Board (Ms. Connie Kirkpatrick (OHN) and Ms. Maureen Newman (President of the Utah Association of Occupational Health Nurses) that we had increased when the OHN program was phased out. They are actively providing advice and assistance to Center members to assure extensive OHN information is provided to all students. They also are working with the Center to build enthusiasm for the possible resumption of the OHN program.
2. The RMCOEH continues to be fortunate in having a number of OHNs in senior positions in industries in the Salt Lake Valley who continue to support RMCOEH programs. The following OHNs have committed to provide instruction in academic programs. This instruction has included assistance with class lectures, noon OHN educational sessions (see below) and the Field Trips course (see below) (Also see attached letters in the last pages of the PDF of Appendices LOS, end of the PDF of Appendices):
 1. Connie Kirkpatrick, MSN, MSPH, COHN-S, FNP, O.C. Tanner Corporation
 2. David Allcott, MS, APRN, BC, ATK Launch Systems Group
 3. Heather McMaster, RN, COHN-S, Delta Airlines
 4. William Fung-Schwarz, APRN, ANP-BC, Elase Medical Spas
 5. Maureen Newman, RN, BSN, President Utah Association of Occupational Health Nurses
 6. Kathleen L. Sitzman, RN, MS, Weber State University
3. Field trips in the *Interdisciplinary Field Trips* course (FPMD 6790) includes sites directed by OHNs, including the four of the five OHNs listed in the prior section. The trips will continue to provide maximum interaction with "real world" OHNs so that all student recognize the fact that OHNs are absolutely essential in any comprehensive OEHS program.
4. To emphasize the significance of the OHN inputs, OHNs who provide instructional support continue to be processed for clinical volunteer faculty appointments in DFPM, with some already approved.
5. RMCOEH faculty are working with William Fung-Schwartz, RN, MSN, OHNP, an experienced OHN and PhD candidate in the College of Nursing in developing his research study, "Needs Assessment for Occupational and Environmental Health Nursing Programs."

Principal Investigator/Program Director (Last, First, Middle): Hegmann, Kurt T., M.D., M.P.H.

The RMCOEH faculty are confident that this program will continue to assure that all graduates fully recognize the vital contributions that OHNs make to occupational safety and health and are well acquainted with OHN principles, practice, and contributions.

Table 1. Overview of RMCOEH Interdisciplinary Activities

Course:	IH	OM	E&S	HSAT	OIPRT OSE/ ME	OIPRT OIE/ (Pub Hlth)
FPMD 6100 Biostatistics	X	X	X	X	X	X
FPMD 6300 Epidemiology	X	X	MPH/E	X	X	X
FPMD 6760 OEHS Management Group Exercises	X X	X X	MPH MPH	X X	E E	E E
FPMD 6500 Introduction to Public Health	X	X	MPH	X	E	E
FPMD 6600 Social Context of Public Health	X	X	MPH	X	E	X
FPMD 6700 Environmental Health Problems	X	X	MPH	X	E	E
FPMD 6730 Quantitative Risk Assessment	E			X		
FPMD 6741 OSH Interdisciplinary Seminar	X	X	X	X	E	E
FPMD 6750 Fundamentals of Industrial Hygiene	X	X	X	X	E	E
FPMD 6751 Advanced Industrial Hygiene	X			X		
FPMD 6752 Industrial Toxicology & Physiology	X	X		X	E	E
FPMD 6753 Industrial Ventilation	X	E	X	E	E	E
FPMD 6754 Noise and Physical Agents	X	E	X	E	E	E
FPMD 6756 Hazardous Substance	E			X		
FPMD 6759 OEHS Interdisciplinary Field Trips	X	X	X	X	E	E
ME6100 Introduction to Ergonomics	E	E	X	E	X	X
ME6110 Industrial Safety	E	E	X	E	X	X
ME 7105 Advanced Ergonomics Interdisciplinary Group Exercise	E E	E E	E E	E E	E E	E E
ME 7110 System Safety Interdisciplinary Group Exercise	E E	E	E E	E E	X X	X X
FPMD 6758 OM Clinic	X	X	E	X	E	E
Other:						
Half-day Orientation	X	X	X	X	X	X
Journal Club	X	X	E	X	E	E
Theses, Research Committees With Interdisciplinary faculty	X	X	X	X	X	X
OHN Special Lunch Hour Sessions	X	X	X	X	X	X
Summative:						
ME 6960 OSH Solutions	X	X	X	X	X	X
Comprehensive Examination (4 days group work, ½ day presenting to Interdisciplinary Faculty)	X	X	MPH	X	NO	NO

X = required

E = elective

OSE = Occupational Safety Engineering Emphasis

OIE = Occupational Injury Epidemiology Emphasis

Principal Investigator/Program Director (Last, First, Middle): Hegmann, Kurt T., M.D., M.P.H.

Pilot/Small Projects Program

This is not currently applicable. We have applied for resuming this program in our competitive renewal.

NORA Research:

A. Program Director: Royce Moser, Jr., MD, MPH

B. Program Description

Over the past 5 years, the RMCOEH has markedly increased its involvement in many areas of the National Occupational Research Agenda. We have placed significant emphasis on including practical r2p aspects in our research projects. We have developed a Statistical and Economic Evaluation Unit to support RMCOEH faculty and trainee projects, as well as to further OSH research into related fields. We also have worked on communicating those results to the communities for maintaining state of the art OSH programs in Region VIII. RMCOEH involvement in NORA-related research includes both major extramurally funded research proposals, all of which involve trainees, as well as internally funded student projects. A few of these include:

- ✓ A large scale, prospective cohort study on distal upper extremity disorders. This study also involves the University of Wisconsin and Medical College of Wisconsin. The OM, OIPRT and E&S programs are all involved and all trainees in all of those programs participate.
- ✓ A large scale, prospective cohort study on low back pain. This study involves the University of Wisconsin, and Texas A&M University. This study similarly includes all trainees and all faculty in the OM, E&S and OIPRT programs. We have been informed that this is the only such major study in the US on low back pain.
- ✓ A third major prospective cohort study, the National Children's Study (NCS) which has been initiated by the University of Utah and others to study health effects in children and involves the measurement of occupational and environmental factors in expectant mothers. This project relies on the IH core and HSAT programs, with some nominal support from the OM core.
- ✓ Numerous industry-funded projects have been undertaken. These involve work with the mining, minerals processing, and chemotherapeutics industries.
- ✓ Additional research applications are currently pending.

We track two main research measures: 1) Extramural funding and 2) Publications. Our measures are showing positive trends.

Responsible Conduct of Science Training

Current Instruction and Student Participation: For over 3 years, all RMCOEH trainees have been required to complete HIPAA and IRB training during orientation. Orientation activities typically take place during the trainee's first week. Trainees do not participate in research activities prior to HIPAA and IRB training. All faculty and staff are required to complete this training. Certificates of completion are documented. Courses, such as Epidemiology, Introduction to Biostatistics, and Social Context of Public Health, also incorporate training in responsible research practices into their curriculum. Ethics are also major topics in Ergonomics, Human Factors Engineering, and Design Implications. The topic of research ethics is also covered extensively in Computer Applications and Research Methods. RMCOEH trainees also attend (beginning 2006) a new mandatory noon lecture series that includes among other topics: conflict of interest, responsible authorship, handling of misconduct, data management, data sharing and animal welfare. Attendance logs are kept to track trainee attendance, and faculty attendance is encouraged. Additional topics include how to write research grant proposals and how to manage research laboratories. Specific reference is made to the University of Utah's Policy and Procedures Manual, with particular emphasis on Part 8, Chapter 10, Sections V and VI, which cover "Student Academic Conduct" and "Student Professional and Ethical Conduct," respectively (<http://www.admin.utah.edu/ppmanual/8/8-10.html>). Faculty participate. Attendance is tracked.

C. Program Activities and Accomplishments

Assessing Regional Research Needs

The RMCOEH made major efforts for its NORA II Town Hall meeting of February 27, 2006 and by all accounts, it was an unqualified spectacular success. NIOSH personnel commented that it was "by far" the best of these meetings. Over 150 were in attendance, making it by far the largest such meeting in the US. Roundtables were held to solicit as much information as possible. We have carefully evaluated the input, as this is an entirely new source of regional NORA needs. The information is posted on our website.

The Center continues to implement an extensive needs assessment program to research the NORA priority needs of each state within the Center's designated region by needs assessment surveys and questionnaires. Impact evaluations, which also address future needs, are distributed on an every-other-year basis; the most recent survey was sent in 2006. In addition, the Center will continue to use the needs assessment network of the ERC Continuing Education Directors. A regional assessment to occupational physicians was conducted in 2004.

Providing Administrative and Technical Research Support

Royce Moser, Jr., M.D., MPH, Professor and RMCOEH Deputy Director continues to be Director of Research Planning since July 1, 2002. In this role, he leads the faculty in planning and accomplishing research that will concentrate on NORA priority areas. He specifically directs planning that will focus the Center's research on a limited number of priority areas. This permits development of more extensive expertise than might occur with dilution of efforts by attempting to study all priority areas. He works to ensure that projects complement other RMCOEH research and support NORA objectives. He is assisted in these efforts by Ms. Deanne Clegg, Research Coordinator. Ms. Clegg has assumed the duties of maintaining a tracking system that has proven particularly helpful in monitoring grant submissions and results by program and by investigator.

Coordinating Interdisciplinary Research

Dr. Moser previously initiated actions to develop a research plan for the Center, and he has scheduled six month reviews by RMCOEH faculty to assure the plan remains relevant and pertinent. During the current year, efforts continue to include investigators from other components of the Department of Family and Preventive Medicine (DFPM). This thrust has resulted in interdisciplinary NORA projects and other research projects that have taken advantage of the diverse capabilities, including biostatistical and epidemiologic, of DFPM. One of the outgrowths of these efforts has been the formalization of an Economic and Statistical Evaluation Unit of the RMCOEH that is led by Norm Waitzman, PhD, an internationally known economist who specializes in robust economic analyses of industrial health and safety issues, particularly of the construction industry.

The \$2M NIOSH Distal Upper Extremity musculoskeletal disorders and the \$1.5M Low Back Pain grants are evidence of such interdisciplinary efforts in that Drs. Hegmann (Occupational Medicine) and Bloswick (Ergonomics and Safety) are lead RMCOEH investigators. The primary Biostatistician on the grants is from Pediatrics (Dr. Holubkov), reflecting the efforts to expand interactions with disciplines outside the RMCOEH.

Training Graduate Students with NORA Focus

The OIPRT and E&S Programs are developing young PhD trained investigators all of whom target NORA priority areas for research efforts. The masters students in all cores also target NORA priority areas for nearly all the theses and research projects.

Drs. Moser, Blosswick, Hegmann, Holmes, and Larson continue to provide constructive critiques to junior investigators. The senior faculty also serve as mentors for the junior faculty and students. All senior faculty also serve as mentors and provide assistance to junior faculty and students who are accomplishing other research efforts. These efforts will continue during the remainder of the grant period. Faculty regularly assist each other and students in developing papers to be peer-reviewed for consideration for publication in professional journals.

Utilizing NORA Support funds, RMCOEH faculty are again organizing the Fourth Annual NORA Young/New Investigators Symposia in Salt Lake City scheduled for April 19-20, 2007. Financial support is provided to young and new investigators, in particular those who have obtained support, to facilitate their attendance at the meeting. This effort is specifically designed to enable junior faculty and students to gain experience in developing a presentation and then presenting it to peers and colleagues. This venue has been particularly successful in accomplishing these goals.

Administration of Pilot Project Research Training Program

The RMCOEH will reapply for a Pilot Projects program in the coming competing renewal cycle. The Center voluntarily dropped its prior Pilot Projects program when despite much effort, the previous operational rules were unworkable for Region VIII.

D. Program Products

A few of our NORA Program Products include:

- ✓ A large scale, prospective cohort study on distal upper extremity disorders. This study also involves the University of Wisconsin and Medical College of Wisconsin. The OM, OIPRT and E&S programs are all involved and all trainees in all of those programs participate. We applied for a competing renewal.
- ✓ A large scale, prospective cohort study on low back pain. This study involves the University of Wisconsin, and Texas A&M University. This study similarly includes all trainees and all faculty in the OM, E&S and OIPRT programs. We have been informed that this is the only such major study in the US on low back pain. We applied for a competing renewal and have written this project as a NORA project in our competing renewal.
- ✓ A third major prospective cohort study, the National Children's Study (NCS) which has been initiated by the University of Utah and others to study health effects in children and involves the measurement of occupational and environmental factors in expectant mothers. This project relies on the IH core and HSAT programs, with some nominal support from the OM core.
- ✓ Numerous industry-funded projects have been undertaken. These involve work with the mining, minerals processing, and chemotherapeutics industries.
- ✓ Additional research applications are currently pending.
- ✓ Wonderful NORA research-related training experiences for our masters and doctoral trainees.

Administration of Continuing Education/Outreach Program to apply NORA Research Findings

Another set of program products from our NORA Research Program involve educational activities (Continuing Education, Outreach and other). Many of our outreach activities also involve findings from this program and examples are listed in the Outreach section.

We utilize our NORA research projects to great effect in educational fora. The RMCOEH delivered an extremely successful 2-day State of the Art Conference on Musculoskeletal Disorders on February 23-24, 2006. This conference was intentionally designed to present up-to-date research findings from our 2 prospective cohort studies, along with the results of other major researchers performing NORA related research. While the final results are not in, from all accounts, this meeting was highly successful in meeting

Principal Investigator/Program Director (Last, First, Middle): Hegmann, Kurt T., M.D., M.P.H.

and exceeding expectations of excellence. We plan to hold the Second Annual State of the Art Conference on Musculoskeletal Disorders this coming March 1-2, 2007.

The Regional NORA New/Young Investigators symposium represents another significant effort to promote occupational safety and health throughout the region. Regional investigators are invited to participate in the symposium to exchange research activities. In addition, the Center exhibits at national and regional association meetings as available funds allow. The CE program will also continue its established marketing efforts to disseminate course information, including listings in association journals as well as collaborating with the University Health Sciences Center departments to ensure widespread notification of upcoming programs. Current marketing strategy combines direct mail with electronic notification through targeted lists.

Lastly, the RMCOEH Newsletter, "Gateway to OSH" is an additional platform to promote NORA research findings and is currently in its fourth edition.

E. Future Plans

The NORA Research Program at the RMCOEH will undergo major changes in the coming competing renewal application. We have applied to fund 3 major NORA research projects. Each of these projects has major r2p aspects and all involve trainees. These projects have interdisciplinary research activities that cover at least 2 if not 3 programs. These projects are supported by the Economic and Statistical Evaluation Unit to provide robust data analyses and economic analyses that properly account for costs and benefits.

Program Title: Ergonomics & Safety

A. Program Director: Donald S. Bloswick, PhD, CPE

B. Program Description

Description/Background. The Ergonomics and Safety (E&S) Program was initiated as one of the core academic programs at the University of Utah Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) in 1982. In 1986, Donald S. Bloswick, Ph.D., P.E., CPE was appointed as full-time Program Director. He received tenure in 1993. Dr. Richard Sesek, Ph.D., M.P.H., CSP was hired as a full-time E&S faculty member in December 1999. Dr. Phillip Drinkaus, Ph.D. was hired as a full-time E&S faculty member for AY 05/06, and will continue to teach and collaborate on research in AY 06/07 and beyond. The E&S Program is formally recognized as one of eleven graduate teaching and research emphasis areas in the University of Utah Department of Mechanical Engineering (ME).

The NIOSH-sponsored E&S Program is located within the Department of Mechanical Engineering and focus is on the Master of Science (M.S.-Thesis, M.S.-Non-thesis) and Doctor of Philosophy (Ph.D.) degrees. Students can also pursue the Master of Science in Public Health (M.S.P.H.), and Master of Public Health (M.P.H.) degrees, but are not eligible for NIOSH funding through the E&S Program. Students entering this program must have a Mechanical Engineering undergraduate degree or meet the requirements for graduation from a University Mechanical Engineering program. During the most recent three-years of the grant period (July 04 - June 07), it is projected that there will be a total of 10 trainee graduates. Additionally, there were also 7 non-NIOSH supported graduates who completed the E&S engineering core courses (ESEC). During the final year of the grant period (July 06 - June 07), it is projected that there will be 6 full-time E&S engineering students (3 Masters, 1 Master/Ph.D., 2 Ph.D.) and 3 masters-level part-time engineering students in the E&S Program.

The RMCOEH's E&S program meets documented regional needs by: (1) training masters and doctoral level E&S professionals to address the ergonomics and safety issues of Region VIII, (2) targeting our academic and CE programs' contents to meet Region VIII needs, (3) active involvement of the E&S Program Advisory Committee and the RMCOEH Advisory Board which raise Regional issues for us to address, (4) active research collaboration with regional industries, and (5) tying future research endeavors to the very successful NORA II Town Hall meeting held in February 2006 (n>150 participants with extensive regional needs developed and posted on the RMCOEH website). Our graduate surveys confirm our success in training our students to meet challenges and underscore the RMCOEH E&S Program's ability to continue to meet regional needs and to adapt to new developments in the E&S field. In addition to the core responsibilities for providing education and training to E&S trainees, the E&S faculty provide E&S-related instruction to students in IH, HSAT, OIP, OM and Public Health, as well as engineering disciplines other than Mechanical Engineering.

Graduates of the RMCOEH have become leaders in occupational and environmental health. In our most recent graduates' survey (6/06), 43% of RMCOEH E&S graduates identified themselves as Senior Professionals or Managers in their work setting. Due to the quality of the RMCOEH programs, RMCOEH trainees are highly sought, and it is not unusual for our students to receive multiple job offers prior to graduation. Overall satisfaction with training is highly rated by RMCOEH E&S students with 77% of graduates rating their training at '8' or higher (0 = "Very Dissatisfied" and 10 = "Very satisfied"). When asked how likely they would be to recommend any of the RMCOEH's programs 68% rated it \geq '8' (0= Advise Against, '10' = 'Enthusiastically Recommend').

Goals and Objectives. Our greatest areas of development have been (1) improvements in the E&S academic program, (2) increases in our research programs, and (3) instituting major CE courses. The RMCOEH E&S program has markedly expanded its research programs to emphasize NORA, r2p and WorkLife Initiative projects. To date, these efforts have resulted in the successful funding of two prospective cohort studies on musculoskeletal disorders (upper extremities and low back pain) through a consortium with the University of Wisconsin Milwaukee, Texas A&M, and the Medical College of Wisconsin. Other projects involve work with the

mining industry, manufacturing, and minerals processing. Additional research applications are currently pending. A summary of progress versus the E&S programs' Goals and Objectives follows.

Goal 1. Provide a quality ergonomics and safety academic program.

All topics (both "highly recommended" and "recommended") from the "NIOSH Guidelines for Graduate Programs in Occupational Safety" (by The Occupational Safety Academic Training Program Panel) are well covered in M.S. and Ph.D. program courses.

Goal 2. Accomplish NORA-related ergonomics and safety research and translate it into practice (r2p).

In addition to field training and on-site visits that are incorporated into the academic curriculum, students assist in the on-site collection of data for on-going ergonomic epidemiology studies. All current E&S students have participated in the data collection (field work) and/or ergonomic analysis (laboratory work) phases of the Upper Limb Musculoskeletal Disorders: Quantifying Risk study and/or the Low Back Pain: Quantifying Risk Factors study. Ph.D. candidates are strongly encouraged to publish three or more related peer-reviewed journal articles rather than conduct a traditional dissertation (which may or may not result in a publication). All recent graduates, and several active students, of the E&S program have presented their research at the annual Regional National Occupational Research Agenda (NORA) Young/New Investigators Symposium, which includes a peer-reviewed proceedings.

Goal 3. Provide superior E&S-related continuing education, service and outreach.

Dr. Bloswick has developed a program for ATK Thiokol through which 38 ME graduate students are pursuing their M.S. degrees off-campus. Nearly all of these students take at least one of the E&S core courses and most take two or three. Twenty-three modules integrating ergonomics and safety material into undergraduate engineering curricula have been developed and are made available via the Internet to engineering faculty throughout the world.

Goal 4. Accomplish comprehensive interdisciplinary efforts.

All three academic cores (IH, E&S, and OM) work together on major research projects. In addition to the two prospective cohort studies on musculoskeletal disorders noted above, in summer 2005 an interdisciplinary project (E&S, IH, approx 100 on-site and analysis hours) was completed at Kennecott Utah Copper Corporation (KUCC). The student chapter of the American Society of Safety Engineers (ASSE), directed by Dr. Seseck, includes diverse membership across the RMCOEH and the College of Engineering. With respect to teaching, Dr. Seseck teaches FPMD 6759 (*Occupational Safety and Health Field Trips*), a required course for all cores. Drs. Bloswick and Seseck also lecture regularly in FPMD courses such as FPMD 6750 (*Occupational Safety and Health*) throughout the academic year. The new course *Occupational Safety and Health Solutions* will be team taught by Drs. Seseck, Collingwood, and Wood. IH, E&S, and OM cores will be represented by both faculty and students. Dr. Seseck recently advised several students from the IH core on their research. In addition, the E&S Program has ongoing collaborative research projects with the University of Wisconsin Milwaukee, the University of Wisconsin Madison, and the University of South Florida USF. Collaborative research efforts are projected with Auburn University, the Alaska Marine Education Association (AMSEA), and Colorado State University.

Training in Responsible Conduct of Science. For over 3 years, all RMCOEH trainees, faculty and staff have been required to complete HIPAA and IRB training. All students must complete a web based training program in the protection of human research subjects: "Human Participant Protections Education for Research Teams" (<http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp>). The tutorial satisfies the NIH human subjects training requirement for obtaining Federal Funds and the Institutional Review Board's (IRB's) requirements for training initiatives. Courses, such as Epidemiology, Introduction to Biostatistics, and Social Context of Public Health, also incorporate training in responsible research practices into their curriculum. Ethics are also major topics in Ergonomics, Human Factors Engineering, and Design Implications. The topic of research ethics is also covered extensively in Computer Applications and Research Methods. In addition to direct training on these topics, ethics content is integrated into course materials with lectures on how to present results in an unambiguous manner without "overstating" conclusions and how to interpret the results of other

researchers. RMCOEH trainees also attend (beginning 2006) a new mandatory noon lecture series that includes among other topics: conflict of interest, responsible authorship, handling of misconduct, data management, data sharing and animal welfare. Attendance logs are kept to track trainee attendance, and faculty attendance is encouraged. Additional topics include how to write research grant proposals and how to manage research laboratories. Also, beginning in 2006, a module on research ethics was created and is presented in every E&S core course.

Faculty Participation. The E&S Program is directed by Donald S. Bloswick, Ph.D., P.E., CPE. Dr. Bloswick is a Professor in the Department of Mechanical Engineering, College of Engineering and is responsible for E&S grant management and student recruitment/selection. Dr. Bloswick teaches ME 6100 (Ergonomics), ME 7100 (Advanced Ergonomics and Occupational Biomechanics), ME 7110 (Systems Safety), and co-teaches ME 6110 (Introduction to Industrial Safety) with Dr. Sese. Dr. Bloswick also directs research activities and supervises student research. He has adjunct appointments in Family and Preventive Medicine, Physical Therapy, Occupational Therapy, and Bioengineering. Dr. Bloswick is assisted by E&S faculty Dr. Sese (human factors, safety, ergonomics) and Dr. Drinkaus (ergonomics, research design) with academic training and research, and by Ms. Roanna Keough with program administration. Dr. Sese teaches ME 6120 (Human Factors Engineering), ME 6130 (Design Implications for Human-Machine Systems), ME 7120 (Functional Musculoskeletal Anatomy for Engineers), ME 7105 (Advanced Ergonomics and Occupational Biomechanics Lab), and co-teaches ME 6110 (Introduction to Industrial Safety) with Dr. Bloswick. In 2006 he received University funding to develop and teach a new interdisciplinary course, Occupational Safety and Health Solutions, that will replace ME 6960-3 (Engineering Controls and Personal Protective Equipment). He also co-directs FPMD 6759 (Occupational Safety and Health Field Trips) with IH and OM faculty and lectures in ME 6100 (Ergonomics). Dr. Sese advises graduate students, serves on graduate committees, and participates in E&S Ph.D. Qualifier exams. Adjunct appointments at the University of Utah include Family and Preventive Medicine and Bioengineering. Dr. Drinkaus teaches ME 7960 (Computer Applications and Research Methods in Health and Safety). Dr. Drinkaus specializes in ergonomic epidemiology and modeling and has assisted significantly with field data collection and subsequent laboratory analysis. Dr. Drinkaus is an expert in research methods and is heavily involved in the development of experimental data collection systems, the analysis of ergonomic data, and the preparation of subsequent journal submissions.

Other University of Utah faculty include Dr. **Stacy Bamberg, Ph.D.** (Assistant Professor, Mechanical Engineering) who is an expert on gait instrumentation and analysis. Dr. **Sanford Meek** (Assistant Professor, Mechanical Engineering) is an expert in engineering control of prosthetic and orthotic devices. Dr. **AK Balaji** (Assistant Professor, Mechanical Engineering) is an expert on wet and dry machining and manufacturing processes. Dr. Balaji's research interests include environmentally conscious manufacturing and he has collaborated with both E&S and IH faculty in research that has resulted in several conference presentations, proceedings, and in two journal submissions. Dr. **David Hoepfner** (Professor, Mechanical Engineering) is world renowned for his work on aircraft reliability and failure analysis. Dr. **Gary Sandquist** (Professor, Mechanical Engineering) has expertise in nuclear safety, probabilistic risk analysis, and systems safety. He is also an American Society for Quality (ASQ) certified quality auditor and regularly consults in the areas of systems safety and radiation safety. Dr. **Robert P. Tuckett** (Associate Professor, Physiology) is a national expert on peripheral nerve function and quantification of tactile sensitivity. Dr. **Clay Mann** (Assistant Professor, Pediatrics) is an expert on experimental design and analysis. Dr. **Kent Bachus** (Associate Professor, Orthopaedics) is an expert on biomechanics and failure analysis of anatomical structures.

Faculty outside the University of Utah include Dr. Thomas Bernard, Ph.D. (Professor and Chair, Department of Environmental and Occupational Health, University of South Florida, Adjunct Professor, Mechanical Engineering, University of Utah). Dr. Bernard spent Autumn semester 2002 in the E&S Program at the University of Utah as a Visiting Professor, at which time he developed and taught ME 6960-4 (Work Physiology and Occupational Heat Stress). Dr. Bernard returns on an alternate year basis to teach this course (2004, 2006, and beyond). He also serves on graduate committees, and provides guidance in the continued development of the graduate programs in Occupational Injury Prevention. He also co-directed the research and served on the Ph.D. committee of Phillip Drinkaus, a RMCOEH trainee who received his Ph.D. in 2004.

In addition, other RMCOEH core faculty (Drs. Pahler, Collingwood, Hegmann, Edwards and Wood will continue to be involved as lecturers and graduate committee members for E&S students. For example, Dr. Pahler (IH) co-instructed FPMD 6759 (Occupational Safety and Health Field Trips) with Drs. Seseck and Edwards (OM). Drs. Collingwood (IH) and Wood (OM) co-instruct the new Occupational Safety and Health Solutions class with Dr. Seseck.

Curricula. A detailed illustration of the M.S. and Ph.D. Program course curricula are available elsewhere in our competitive renewal (available on request as well). The M.S. requires 31 semester course credits and a 9-credit thesis. Of the 31 course credits 23 are in the Department of Mechanical Engineering and 8 are in the Department of Family and Preventive Medicine.

C. Program Activities and Accomplishments

Progress Toward Goals and Objectives. Progress toward goals and objectives is included in Section C above.

Trainee Honors, Awards, and Scholarships. Brian Howard (Ph.D. student) and Sharon Davis (M.S. student) received 2006/7 Worker's Compensation Fund Safe Workplace Scholarships. Sharon Davis also received the BD Academic Scholar scholarship from BD Medical Systems. Jennifer Tolbert (M.S. student) received the 2006 ASSE Arizona Chapter Graduate Scholarship.

Trainee Theses and Dissertations.

Matthew Reading (Bloswick, Seseck, Co-Advisor)

Research Project (thesis): "A Comparison of Ergonomic Analysis Tools in Jobs with High Rotation" (Safety Engineer with Sandia National Laboratory).

Juan Rodriguez (Seseck, Bloswick, Co-Advisor)

Research Project (thesis): "Inter-Rater Reliability in UEMSD Risk Factor Analysis" (Ergonomics Engineer and Associate Consultant with Humantech, Inc in Ann Arbor, Michigan).

Jen Tolbert (Seseck, Bloswick Co-Advisor)

Research Project (thesis): "Development of a Method to Simplify the Analysis of Multi-Task Jobs Using the NIOSH RLE" (Design Engineer with the DJH Engineering Center.)

Bryan Howard (Bloswick)

Research Project (dissertation): "Analysis of Low-Back Bone Density as a Function of Vibration Exposure"

Bill Mechem (Bloswick, Seseck, Co-Advisor)

Research Project (dissertation): "UEMSD's in Assembly Work with High Task Rotation"

Sharon Davis (Seseck, Bloswick, Co-Advisor)

Research Project (thesis): "Validation of the UAW-Ford Ergonomics Survey Tool (EST)"

Derrick Franklin (Bloswick, Seseck, Co-Advisor)

Research Project (thesis): Undecided (started Autumn 2006)

Mike Johnson (Bloswick, Seseck Co-Advisor)

Research Project (dissertation): Undecided (started Autumn 2006)

New Courses. The new course, *Occupational Safety and Health Solutions*, will be team taught by Drs. Seseck, Collingwood, and Wood. IH, E&S, and OM cores will be represented by both faculty and students. Course faculty (Seseck (E&S), Collingwood (IH), and Wood (OM)) were awarded a University teaching grant for development of the course, which is planned to become the capstone course for all our graduate students,

including E&S students. This course will take real world problems presented by businesses interested in having multidisciplinary teams of students under close faculty supervision work to solve those problems. Faculty from the School of Business and Dept. of Economics (Dr. Waitzman) have agreed to participate in this course, with a plan for all RMCOEH trainees, including E&S, to become familiar with quantification of costs and benefits from proposed interventions. Some graduate students from the School of Business will likely enroll in the class and provide additional perspectives on interdisciplinary teams and further those interactions that are so essential to success in today's business environment.

Trainee recruitment. The University of Utah E&S Program is moving from a predominantly "in-house" effort to one that is more regional and national in scope. For example, the two new E&S trainees for Autumn 2006 are from Brigham Young University and Mississippi State University. At present, 2 of 6 trainees are female and 1 is African American. Thus 50% of the present trainee population is composed of persons from groups generally underrepresented in occupational safety and health, and particularly underrepresented in mechanical engineering. A \$500 E&S diversity fellowship was initiated and first awarded in AY 05/06. In September 2002, Dr. Sesek attended a one-day course on recruiting and retaining qualified minority students entitled "Minority Graduate Education at Mountain States Alliance" and "Western States Alliance to Expand Student Opportunities." Emphasis at the course was on recruiting qualified minority doctoral students. In addition, Dr. Bloswick has coordinated with Anthony Shirley, the American Indian Student Advisor at the University of Utah and has established a \$10,000 American Indian Graduate Mechanical Engineering Fellowship for AY 07/08 (and hopefully beyond). Dr. Bloswick has coordinated with Shawn Newell, Program Coordinator for Native American Recruitment at Northern Arizona University (6th in the nation for Native American engineering graduates), and plans to make recruitment visits to Northern Arizona University, as well as to Montana State University, to recruit mechanical engineering graduate students through this program. During the 06/07 (scheduled for November 2006) AY Derrick Franklin, an African-American trainee recently recruited from Mississippi State University for the E&S Program, will present a seminar at his alma mater in an effort to identify and recruit additional ethnic-minority trainees, including for the E&S Program. Program flyers have been sent to the Department Chairs of engineering programs at all historically black colleges with programs that could provide students with undergraduate degrees capable of participating in E&S.

D. Program Products

PUBLICATIONS/PRESENTATIONS

E&S faculty were productive with respect to publications and were actively involved in nine publications as well as nine presentations.

SPONSORED SYMPOSIA

All recent graduates, and several active students, of the E&S program have presented their research at the annual Regional National Occupational Research Agenda (NORA) Young/New Investigators Symposium sponsored by RMCOEH, which includes a peer-reviewed proceedings. The NORA Symposium provides a forum for students (undergraduate and graduate) and young/new investigators from the region (Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming) and other interested parties to present and discuss NORA-related research. At the last four conferences there were 11 research presentations given by IH students, 7 by OM residents, 10 by E&S students, and 4 by OIP students.

E. Future Plans

The E&S program anticipates further success in the next five years through (1) continuous improvement in existing courses and the development of enhanced course offerings, particularly the new interdisciplinary course "Occupational Health Solutions" required of all E&S, IH, OIP, and OM trainees, (2) continued emphasis on interdisciplinary research, (3) increased emphasis on research-to-practice (r2p) publications for all trainees, (4) continuous improvement in CE and outreach activities, and (5) recruitment of additional E&S faculty through a national search.

Program Title: HSAT Program

A. Program Director: Rodney Larson, PhD, CIH

B. Program Description/Background

The Hazardous Substance Academic Training (HSAT) program was begun at the Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) in 1990. At that time, it was the only HSAT program in Region VIII (UT, CO, MT, ND, SD, WY). Today, the HSAT program at the University of Utah is still the only HSAT program in the region and remains part of a comprehensive NIOSH sponsored Education and Research Center (ERC). Based on address information and receiving responses from HSAT graduates to our 2006 graduates survey, we estimate that more than 50 percent of our HSAT graduates continue to work in Region VIII after graduation with approximately 33% remaining in Utah. These data confirm the RMCOEH HSAT program fulfills an important regional need. These data also suggest the program is fulfilling a national need as further evidenced by the professional placement of many of its graduates in other regions of the U.S.

The HSAT program at RMCOEH provides educational resources not only to HSAT students, but also to students in local industries through the Hazardous Substance Training (HST) program. The RMCOEH HST program provides training and educational resources to many individuals responsible for safe(er) handling of potentially hazardous materials in their respective industries and organizations in Region VIII.

The RMCOEH HSAT program is very successful in producing graduates with the necessary skills to work effectively in what has been regarded as an underserved profession in an underserved region. **There are a total of 49 hazardous-waste sites in Region VIII on the National Priorities List (NPL)** that are being cleaned up under the EPA managed Superfund Program in Region VIII. In addition, there are numerous other specific facilities regulated (licensed) by the U.S. EPA that handle materials designated as hazardous waste. Hazardous waste is any by-product of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. A significant example of the program's value has been a reduction in compliance, litigation and insurance costs to companies that have employed our HSAT graduates to assist in either providing guidance to contractors involved in clean up of hazardous waste, or as employees of companies regulated to handle hazardous waste materials. We anticipate further growth of the HSAT program based on the need for such expertise in this area, and the increased success in our efforts to train highly skilled and competent professionals for managing programs and situations involving the handling of potentially hazardous materials.

The RMCOEH's HSAT program is housed in the Department of Family and Preventive Medicine (DFPM) at the University of Utah and this HSAT Program has been continuously supported by NIOSH since 1990. To date, we have graduated 32 HSAT students. In the last five years, we have maintained an HSAT student population between 3 and 4 with 2-3 graduates each year. In 2005 and 2006, we annually graduated three HSAT students. These students have accepted positions in a variety of organizations (agencies and companies) in Region VIII. A number of the HSAT graduates have become managers of hazardous material/substance programs in their own organizations as well having become active in professional associations (e.g., Air and Waste Management).

Goals and Objectives:

The RMCOEH's Hazardous Substance Academic Training (HSAT) Program is in existence due to historic and current NIOSH grant support. We will be building upon our existing success by further improvement of course content and expanding the student research into new areas. For example, some of the research related to the HSAT program that is planned to be conducted includes: (i) solubility of metals and other inorganics in various body fluids (e.g., lung, gastric, intestinal fluids) to determine the capacity of the inorganic to enter the blood distribution system in the human body; (ii) evaluate the effectiveness of exposure control equipment and methods for materials that may occur in the nanoparticle size; and (iii) evaluate associations between exposures to airborne contaminants from sources such as hazardous waste sites and adverse health effects such as asthma, coronary artery disease or kidney disease).

We have mapped our relevant background and progress against our HSAT Goals and Objectives.

The objectives of the HSAT program can be classified within four specific goals within the RMCOEH. These goals are as follows:

- 1.) Provide Quality Academic Programs.**
- 2.) Accomplish NORA research and translate it into practice.**
- 3.) Provide superior continuing education, Hazardous Substance Training, service, and outreach.**
- 4.) Accomplish Strong Interdisciplinary collaboration.**

Goal 1: Provide Quality Academic Programs

Objective 1.a: Enhance HSAT academic classes.

The HSAT Program (faculty and staff) utilizes a continuous quality improvement/total quality management model for enhancing the academic curriculum that is parallel to the processes for the IH Program. At least twice a year, the curriculum is comprehensively reviewed in different venues (HSAT Advisory Committee, Center Executive Committee). This is a continuous improvement model.

Objective 1.b: Annually evaluate, replace, purchase, and calibrate IH equipment and instrumentation.

NIOSH Funding has been effectively used to assure our equipment is properly maintained and periodically calibrated by manufacturers at recommended frequencies.

Objective 1. c: Increase RMCOEH Web site information and resources.

We are increasing our website based materials for both internal and external purposes. We have revised and updated our RMCOEH website.

Objective 1.d: Increase recruiting to maximize student quality and diversity, including women and minorities.

We have been increasing our recruitment activities for all students, but particularly focused on Diversity Recruitments. The IH and HSAT Advisory Committee meetings continue to include this as one of the main agenda items for discussion and problem solving. Our efforts have previously been focused on a combination of contacts and visits to local university programs and our RMCOEH website. Our plans for the coming year include additional, more active recruitment of under-represented minorities through more visits to appropriate professionals at these schools, involvement in high school programs by the University of Utah, as well as visits to Tribal Colleges (the closest of which is approx. 500 miles).

Objective 1.e: Train and graduate a minimum of two HSAT students each year who are qualified to take the ABIH Board Examination

The HSAT Program graduates two to three trainees per year. They are qualified to sit for the Certified Hazardous Materials Management (CHMM) examination after fulfilling the practice requirement.

Objective 1.f: Increase the rate at which the HSAT Program graduates obtain CIH certification.

Similar to the IH Program, we are encouraging our graduates to obtain CIH and/or CHMM certification. This is difficult due to the length of practice requirement prior to examination eligibility. However, examinations may well be the best external measures of competence, thus we will continue to encourage this.

Objective 1.g: Maintain ABET accreditation.

The RMCOEH IH Program, including our HSAT Program, was among the first three accredited by ABET in 1989. We are currently accredited through 2007.

Goal 2: Accomplish NORA research and translate it into practice.

Objective 2.a: Conduct NORA related research.

The HSAT Program is expanding its NORA related research activities. For example, in addition to evaluating methods for determining routes and concentrations of exposure, research is being conducted to determine the actual dose received by the exposed individual and the potential routes of movement (e.g., in the system) once it enters the body. Efforts are also being placed on quantifying risk, rather than mere risk assessment.

Objective 2.b: Develop additional interdisciplinary research efforts.

RMCOEH HSAT faculty have increased our interdisciplinary research activities. Recent successful collaborations are reflected in the following examples of studies involving RMCOEH HSAT faculty include the National Children's Study and environmental and indoor monitoring coordination for the Urban Systems Research Center (USRC) project.

Objective 2.c: Implement a research plan to develop HSAT student's research capabilities.

All HSAT students complete a research project. The HSAT students in the MSPH program are required to complete a major project with publishable results or a thesis. All HSAT students are required to present their findings at the annual Regional NORA Young/New Investigators Symposium.

Goal 3: Provide superior continuing education, Hazardous Substance Training, service, and outreach.

Objective 3.a: Increase student participation in local and national professional organizations and conferences.

Students are encouraged to become members of at least one professional organization. Fees for student membership in the Air and Waste Management Association (AWMA) -Utah Section are paid by the HSAT program using non-NIOSH funds. Cost for travel for students who have presentations accepted at meetings, such as at the AWMA annual meeting, is provided. Many alumni continue to maintain professional organization affiliations and many are involved in administrative and technical committees in these organizations.

Objective 3.b: Increase the HSAT program's internet available resources to assist students.

A description of the HSAT program and program curriculum requirements is located on the Rocky Mountain Web Site (www.rmcoeh.utah.edu). Through this web site, the user can also link to course syllabi and other pertinent information. We are developing additional on-line resources.

Objective 3.c: Continue to present high quality and timely Hazardous Substance Training courses.

Based on external input from past courses, the current effort in our Hazardous Substance Training courses is adequate. Examples of continuing education courses that have HSAT emphases presented, in addition to the HST program's courses, include: Quantitative Risk Assessment; Industrial Toxicology; and Decontamination Specialist Training; A review course for methamphetamine lab remediation.

Objective 3.d: Develop partnerships with regional universities; local, state, tribal and federal governments; and private organizations.

The HSAT program engages in strategic linkages with relevant regional and national organizations. This includes involvement in the Region VIII Training Program Grantees.

Goal 4: Accomplish Strong Interdisciplinary collaboration.

The NIOSH grant for the ERC supports strong interdisciplinary interactions at the Rocky Mountain Center.

Objective 4.a: Continue to develop interdisciplinary research and teaching activities with other OSH disciplines.

The HSAT Program is engaged in strong interdisciplinary work involving research and teaching activities.

Training in Responsible Conduct of Science. For over 3 years, all RMCOEH trainees, faculty and staff have been required to complete HIPAA and IRB training. All students must complete a web based training program in the protection of human research subjects: Human Participant Protections Education for Research Teams (<http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp>). The tutorial satisfies the NIH human subjects training requirement for obtaining Federal Funds and the Institutional Review Board's (IRB's) requirements for training initiatives. Courses, such as Epidemiology, Introduction to Biostatistics, and Social Context of Public Health, also incorporate training in responsible research practices into their curriculum. In addition to direct training on these topics, ethics content is integrated into course materials with lectures on how to present results in an unambiguous manner without "overstating" conclusions and how to interpret the results of other researchers. RMCOEH trainees also attend (beginning 2006) a new mandatory noon lecture series that includes among other topics: conflict of interest, responsible authorship, handling of misconduct, data management, data sharing and animal welfare. Attendance logs are kept to track trainee attendance, and faculty attendance is encouraged. Additional topics include how to write research grant proposals and how to manage research laboratories

Faculty Participation. Dr. Larson remains as the HSAT Program Director. The program has three full-time faculty members, many HSAT Adjunct faculty, and affiliated faculty. Dr. Pahler has major experience in Hazardous Materials and is a major contributor to the HSAT program. Dr. Collingwood also contributed to the program. Affiliated faculty include for example, safety and ergonomics faculty (2), occupational/ environmental medicine faculty (3), as well as epidemiology, biostatistics, injury control, environmental health, and general public health faculty. Graduates of the Master's program are well prepared to meet current and projected challenges in management of hazardous material programs, as well as related occupational health and

environmental health and safety programs. The quality of the training program is nationally recognized, and graduates continue to be very successful in quickly obtaining responsible positions within the region and the nation, including positions with multi-national companies involving application of their abilities in other countries.

Curriculum

The HSAT program is comprised of in-depth course work, coupled with field and a research experience as it relates to managing hazardous materials and the field of occupational and environmental health. The interdisciplinary nature of occupational health and safety is emphasized in both courses and research projects. The program is regularly evaluated by program reviews from members of the Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) Advisory Board members, students in the program, other faculty, and national HSAT leaders. Input from all of these sources is considered when considering making changes in the curriculum or in specific course content.

C. Program Activities and Accomplishments

Progress Toward Goals and Objectives. Progress toward goals and objectives is included in Section C above.

Trainees: The HSAT Program graduated 3 HSAT students to date in the current grant period (July '5-June '06). All students are expected to complete a project. Trainees designated (*) did not complete the training program. By year of graduation, the following received NIOSH support during the training period:

2006: John Kannas (Larson) Project "The Dissolution and Bioavailability of Zinc Oxide in Simulated Lung Fluid". A paper with the same title as the project was submitted to the Journal of Occupational & Environmental Hygiene for publication. Mr. Kannas currently works for a consulting company in Minnesota as an industrial hygienist.

2006: Danielle Denne (Larson) Project: Hazard assessment of soap manufacturing plant." Ms. Denne attended the 22nd Annual Utah Conference on Safety & Industrial Hygiene, 2005 Ms. Denne currently works for the Workers Compensation Fund in Salt Lake City.

2005: Dan Nye (Larson) Project "Comparison of indoor and outdoor PM 2.5 measurement at a Utah elementary school: Is EPA guidance to stay indoors during poor air quality days justified?" Mr. Nye currently works for Rocky Mountain Environmental Consultants as an industrial hygienist and the company is located in Salt Lake City, Utah.

New Courses. The new course, *Occupational Safety and Health Solutions*, will be team taught by Drs. Sesek, Collingwood, and Wood. IH, E&S, and OM cores will be represented by both faculty and students. Course faculty (Sesek (E&S), Collingwood (IH), and Wood (OM)) were awarded a University teaching grant for development of the course, which is planned to become the capstone course for all our graduate students, including E&S students. This course will take real world problems presented by businesses interested in having multidisciplinary teams of students under close faculty supervision work to solve those problems. Faculty from the School of Business and Dept. of Economics (Dr. Waitzman) have agreed to participate in this course, with a plan for all RMCOEH trainees, including E&S, to become familiar with quantification of costs and benefits from proposed interventions. Some graduate students from the School of Business will likely enroll in the class and provide additional perspectives on interdisciplinary teams and further those interactions that are so essential to success in today's business environment.

Trainee recruitment. Incoming students for the MSPH program in Hazardous Substance Academic Training are required to have competency in the basic sciences. This competency may be demonstrated through graduation from a science curriculum (e.g., chemistry, biology, physics or related sciences). Incoming students in the HSAT Program will also be required to have past academic course work in both inorganic and organic chemistry, and calculus. Trainees are selected on the basis of academic record, GRE scores, experience (e.g., industrial or government organizations), and letters of recommendation.

The HSAT program is comprised of in-depth graduate course work, coupled with field study and research experiences. This combination of study is focused on those aspects that relate to the field of Hazardous

Substances, especially in educating the trainees on how to anticipate and/or recognize potential concerns based on the materials used in a manufacturing or organizational operation, but also be able to know the methods available for evaluating if a concern exists, and what methods may be considered for control of existing or potential exposures.

The interdisciplinary nature of occupational safety and health (OSH) is emphasized in both RMCOEH courses and research projects. Due to the increasing importance of interdisciplinary activities, the RMCOEH HSAT program has active curricular plans to further augment those interdisciplinary activities to make our graduates even more effective. The program is regularly evaluated by program reviews by members of the HSAT Advisory Committee, the RMCOEH Advisory Board, current students in the program, graduate surveys, other faculty, and national IH leaders. The input from all of these sources is considered when evaluating potential changes in the curriculum or in specific course content.

D. Program Products

CE Courses and Symposium

The HSAT Program has significant academic course and CE activities. Course offerings in both the HSAT and CE related to handling of hazardous materials includes "Industrial Toxicology and Applied Risk Assessment," "Hazardous Substance course (for HSAT only) or OSHA 40-Hour HAZWOPER," "OSHA 8-Hour Hazardous Waste Refresher," "Quantitative Risk Assessment," and "Respiratory Protection & Fit Testing."

Besides the academic and CE courses, the fourth annual Regional (NORA) Young/New Investigators Symposiums was held in 2006. This symposium included significant content relating to HSAT monitoring and exposure control methodology. In addition, a NORA II Town Hall meeting was also held during this funding period. The input has been organized by agenda items, and is being reviewed in more detail to identify additional needs likely to be successful in a CE venue.

E. Future Plans

The RMCOEH HSAT Program has made major changes over the past years. These changes include addition of a course titled "Quantitative Risk Assessment" (FPMD 6730), and a cap-stone course titled "Occupational Health and Safety Solutions" (MEEN 6960). Addition of these courses has resulted an overall significant strengthening in our academic program. In addition, changes have been made to strengthen existing HSAT courses, such as inclusion of training in the Advanced Industrial Hygiene course on types of personal protective equipment to be used when working with hazardous materials, addition of the requirement for taking a course in Quantitative Risk Assessment as part of the HSAT program, and addition of information to the Industrial Toxicology course on potential adverse and/or multiplicative effects of exposures to various types of hazardous substances, especially in mixtures as may be found in a hazardous waste site. Also as noted above, the Occupational Safety and Health Solutions course (MEEN 6960) is now a capstone course for our students, including the both HSAT and IH trainees and should prove highly effective in transitioning from an academic program to the workplace (e.g., R2P).

This is a summary of progress vs. the HSAT programs' Goals and Objectives for the past funding period.

Program Title: IH Program

A. Program Director: Rodney Larson, PhD, CIH

B. Program Description/Background

The Industrial Hygiene (IH) Program at the Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) fills a major need for thoroughly trained IH professionals in Region VIII (UT, CO, MT, ND, SD, WY). The program was originally founded in 1978 as the only IH program in the region, and even today, it is only one of two graduate IH Programs in Region VIII, despite a regional population growing at almost twice the national rate particularly in Utah and Colorado. The RMCOEH's IH Program also remains the only regional program that is part of a comprehensive NIOSH ERC; thus it is the only program in the region to provide its trainees broad-based graduate level OSH interdisciplinary experiences.

The RMCOEH's IH Program meets regional needs by: (1) training IH professionals for both general and the particular needs of Region VIII, (2) addressing concerns raised in the region, (3) active involvement of the IH Advisory Committee, (4) involvement of the RMCOEH Advisory Board which raises Regional issues for us to address, (5) tying future research endeavors to the hugely successful NORA II Town Hall meeting held in February 2006 (n>150 participants with extensive regional needs developed and posted on our web), and (6) conducting graduate surveys. Those surveys confirm our success in training our residents to meet challenges and underscore the RMCOEH IH Program's ability to continue to meet regional needs. To date, we have graduated approximately 170 Industrial Hygiene and HSAT students, with more than 130 of these having graduated from the IH Program (and approximately 50 from the RMCOEH HSAT program). In the 2005-2006 year, we graduated four IH students (and three HSAT students). These IH students have accepted positions in a variety of areas of the U.S., including one in the Navy stationed in Hawaii, and one in a training position in Korea. Over the years since the RMCOEH IH program began, a number of the IH graduates have become managers in their own organizations as well having become active in the professional association (American Industrial Hygiene Association).

The RMCOEH's Graduate Survey results from 2006 (see Appendix IH-1) indicate that 71.4% of our IH graduates interact with other OEHS professionals on a regular basis. This information supports the impression of the RMCOEH faculty that 1) graduates are expected to readily interact with other OEHS professionals, 2) jobs frequently require IH professionals to be conversant in other issues such as E&S, and 3) problems are increasingly solved through interdisciplinary teams. The RMCOEH IH Program has tailored its academic program to meet these challenges. Satisfaction with training is highly rated by IH students with 89.5% of IH graduates rating their training at '8' or higher (0=very dissatisfied and 10=very satisfied). When asked how likely they would be to recommend the RMCOEH IH program 80.6% rated it \geq '8' (0=advise against and 10=enthusiastically recommend). These data support that the RMCOEH IH Program is well designed and meets the needs of the ever changing, modern workforce.

The success of the IH program in producing graduates with the skills needed to work effectively in an underserved profession in an underserved region justifies our continued support. We can point to achievements of past graduates, including reductions in workers compensation costs and other indicators, as evidence of past success of our program. We anticipate further growth of the IH program and increased success in our efforts to train highly skilled and competent industrial hygienists.

Goals and Objectives:

The objectives of the IH program can be classified within the RMCOEH's four specific goals. Those goals are as follows:

- 1.) Provide Quality Academic Programs.**
- 2.) Accomplish NORA Research and Translate it into Practice.**
- 3.) Provide Superior Continuing Education, Service, and Outreach.**
- 4.) Accomplish Strong Interdisciplinary Collaboration.**

Goal 1. Provide Quality Academic Programs

Objective 1.a: Maintain RAC-ABET accreditation.

The IH Program is accredited through 2007. We will be submitting for an extension in December 2006.

Accomplished.

Objective 1.b: Hold an annual faculty retreat to critique and modify program as needed.

This has been previously accomplished. It has now been replaced with a multi-faceted approach to continuous curricular quality improvement/total quality management as described above. Accomplished.

Objective 1.c: Annually evaluate, replace, purchase, and calibrate IH equipment and instrumentation, including computer resources.

Equipment has been obtained and maintained. Computers have been replaced. As computers are no longer significantly expensive, this objective has been modified above. Accomplished.

Objective 1.d: Have students attend at least three AIHA-Student Section meetings per academic year.

Students continue to be encouraged to attend AIHA meetings. Accomplished.

Objective 1.e: Enhance current educational offerings.

We continue to proactively modify our curriculum to improve it as outlined in detail above. Accomplished.

Objective 1.f: Support faculty development.

The RMCOEH supports its faculty, including active mentoring of faculty research proposals by senior faculty members. Accomplished.

Goal 2: Accomplish NORA Related Research to Practice (r2p) and WorkLife Initiative related Research.

Objective 2.a: Emphasize NORA related areas.

We have made major strides in increasing our NORA related research as detailed above. Accomplished.

Objective 2.b: Develop a research strategy that capitalizes on the strengths of a multi-disciplinary faculty.

We have successfully obtained funding on major interdisciplinary research projects. Accomplished.

Objective 2.c: Maintain research mentoring and the development of faculty and graduate students' research skills through a research manual, research seminars, and research projects.

Research mentoring has been formalized and implemented. Research manuals are distributed annually. Didactic sessions and courses are taught. As frequently detailed above, results are tangible. Accomplished.

Goal 3: Provide superior service, outreach, and support of continuing education.

Objective 3.a: Increase student participation in local and national professional organizations and conferences.

Students are engaged in the AIHA local section and are encouraged to become student members of both AIHA and ACGIH. Involvement in the national meetings is more difficult to encourage, although we incentivize this with travel funds in support of accepted presentations. Five attended AIHCE in Chicago. Mostly accomplished.

Objective 3.b: Increase the IH program's internet available resources to assist students.

The website has been completely redesigned. Accomplished.

Objective 3.c: Continue to present high quality and timely CE courses in IH.

The IH program participates in many CE courses that continue to be well received. Accomplished.

Objective 3.b: Increase outreach and recruiting to maximize student quality and diversity, including women and minorities.

The IH Program is more involved in Outreach than at any time in the past. Accomplished. Student recruitment efforts have been increased as noted elsewhere. Accomplished.

Objective 3.c: Develop partnerships with: regional universities; local, state, tribal and federal governments; and private organizations.

Partnerships with multiple organizations are in place. A few of these include: Utah State University, Colorado State University, Montana Technical University, Weber State University, Utah Division of Labor, Utah Division of Environmental Quality, US Department of Labor, NIOSH, and the US Environmental Protection Agency. These activities will continue to be sought out in the future. We have cultivated extensive community ties that resulted in our ability to host the largest NIOSH NORA II Town Hall meeting with over 150 in attendance and an extensive NORA II agenda developed to target future activities (See Appendix IH-12). Additionally, we have a new RMCOEH Center Newsletter, "Gateway to OSH" (See Appendix IH-13) to further our partnerships and outreach. Accomplished.

Goal 4: Accomplish Strong Interdisciplinary Efforts.

Objective 4.a: Continue to develop research and outreach activities with core occupational health and safety disciplines, related occupational health and safety disciplines, and allied professionals.

Interdisciplinary research, teaching and outreach activities are accomplished on a regular basis as noted throughout this application. Accomplished.

Training in Responsible Conduct of Science. For over 3 years, all RMCOEH trainees, faculty and staff have been required to complete HIPAA and IRB training. All students must complete a web based training program in the protection of human research subjects: Human Participant Protections Education for Research Teams (<http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp>). The tutorial satisfies the NIH human subjects training requirement for obtaining Federal Funds and the Institutional Review Board's (IRB's) requirements for training initiatives. Courses, such as Epidemiology, Introduction to Biostatistics, and Social Context of Public Health, also incorporate training in responsible research practices into their curriculum. In addition to direct training on these topics, ethics content is integrated into course materials with lectures on how to present results in an unambiguous manner without "overstating" conclusions and how to interpret the results of other researchers. RMCOEH trainees also attend (beginning 2006) a new mandatory noon lecture series that includes among other topics: conflict of interest, responsible authorship, handling of misconduct, data management, data sharing and animal welfare. Attendance logs are kept to track trainee attendance, and faculty attendance is encouraged. Additional topics include how to write research grant proposals and how to manage research laboratories

Faculty Participation. Dr. Larson directs the overall IH program. The program has three full-time faculty members, one full-time dual trained faculty member shared between IH and OM, eight affiliated faculty and five Adjunct faculty. Affiliated faculty include for example, RMCOEH Ergonomics and Safety (E&S) faculty (2), RMCOEH Occupational and Environmental Medicine (OM) faculty (3), as well as epidemiology, biostatistics, injury control, environmental health, and general public health faculty. The five IH Adjunct faculty are highly qualified IH professionals and assist in providing lectures and training to the IH student. Graduates of the Master's program are well prepared to meet current and projected challenges in occupational health and environmental health and safety. The quality of the training program is nationally recognized, and graduates continue to be very successful in quickly obtaining IH jobs within the region and the nation, including positions with multinational companies involving application of their abilities in other countries.

The RMCOEH IH Program has been continuously expanding its NORA-related research efforts over the past grant period. We now have involvement in major, extramurally funded projects. For example, we have involvement in a major prospective cohort epidemiological study, the National Children's Study (NCS). The IH Program faculty are the national leaders in the area of occupational and environmental exposure assessment for the NCS. Dr. Larson, who has extensive experience in conducting industrial hygiene surveys and program audits, development of industrial hygiene programs, worker training, and design of exposure control programs (greater than 30 years) leads this effort for the Utah portion of the project. He is also a member of the Environmental Team for the Central Coordination Committee for the full NCS study. Dr. Pahler, who has more than 17 years experience in the hazardous waste disposal and hazardous substance handling areas, is also the monitoring program coordinator for the Utah portion of this study. Our roles in the project involve determining what occupational and environmental measurements to be obtained, standardizing those measurements methods and ensuring that the data collection methods are uniform in other centers (e.g., assisting in developing standard operating procedures). The main health outcomes of interest include adverse childhood developmental milestones and disorders that can be attributed occupational and environmental exposures. The project has many opportunities for involvement of students. Students are also involved in research to determine the relation between exposures to specific contaminants, such as pesticides and heavy metals, and the potential association of these agents with child development. There are also multiple public and industry-funded projects that students can elect to participate in. These projects involve work with air pollution, mining, minerals processing, and chemotherapeutics.

The RMCOEH IH Program has made major curricular changes over the past year. These changes have resulted overall in a significant strengthening in our academic program. Changes that have been made include: expansion of course content in the Advanced Industrial Hygiene course (FPMD 6751) to include more

information on new monitoring equipment and personal protective equipment, combining of the Industrial Toxicology course (FPMD 6752) with the Physiology course to allow better correlation of toxic effects on human organs, and addition of an elective course for IH on Quantitative Risk Assessment (FPMD 6730). Also as noted above, the Occupational Safety and Health Solutions course (MEEN 6960) is now a capstone course for our students, including the IH trainees and should prove highly effective in transitioning from an academic program to the workplace.

This is a summary of progress vs. the IH programs' Goals and Objectives since the past competing application. Note that some of these objectives have been revised for the current application

The IH program is comprised of in-depth graduate course work, coupled with field study and research experiences. This combination of study is focused on those aspects that relate to the field of IH, especially in educating the trainees on how to anticipate and/or recognize potential concerns based on the materials used in a manufacturing or organizational operation, but also be able to know the methods available for evaluating if a concern exists, and what methods may be considered for control of existing or potential exposures. The interdisciplinary nature of occupational safety and health (OSH) is emphasized in both RMCOEH courses and research projects. Due to the increasing importance of interdisciplinary activities, the RMCOEH IH program has active curricular plans to further augment those interdisciplinary activities to make our graduates even more effective. The program is regularly evaluated by program reviews by members of the IH Advisory Committee, the RMCOEH Advisory Board, current students in the program, graduate surveys, other faculty, and national IH leaders. The input from all of these sources is considered when evaluating potential changes in the curriculum or in specific course content.

C. Program Activities and Accomplishments

Progress Toward Goals and Objectives. Progress toward goals and objectives is included in Section C above.
Trainee Theses and Dissertations.

Trainees: The IH Program graduated 4 IH students to date in the current grant period (July '05-June '06). All students are expected to complete a project. By year of graduation (noted after the name), the following received NIOSH support during this training period:

2006: Keith Nicholson (Larson). Mr. Nicholson's was an MPH project. For his MPH project he conducted a statistical comparison of effectiveness of occupational health (OSHA type) programs in controlling illness within the respective States that had OSHA programs that were State managed versus within States that had programs federally managed (USDOL OSHA).

2005: Steven Belnap (Larson). Research titled "Solubility of Beryllium in Simulated Lung Fluid." He also attended the 21st Annual Utah Conference on Safety & Industrial Hygiene, 2004. Mr. Belnap currently lives in Korea and is a teacher for the military.

2005: Lyle VanOrmon (Larson). Research titled "Research and analysis of volatile organic compounds present in smoking versus nonsmoking establishments." He attended 21st Annual Utah Conference on Safety & Industrial Hygiene, 2004, and the AIHC&E in Chicago in 2005. Mr. VanOrmon currently works for the Chevron Corporation located in Houston, Texas as an Industrial Hygiene and Safety Specialist.

2005: Stacy Nisogi (Larson). Thesis research entitled "Research and development of respiratory protection technical information modules for integration into customizable interactive training software". Ms. Nisogi currently works for the "Utah Workers Compensation" organization in Salt Lake City.

She successfully completed the following RMCOEH Continuing Education courses: Safety Cert. Program, Core Concepts in IH March '01, 18th Ann. UT Conf. on Safety & IH Oct. '01, Safety Cert. Program: Core Concepts in S&H Sept. '02, 19th Ann. UT Conf. on Safety & IH Oct. '02, Safety Certificate Program: Safety Program Management Jan. '03, Safety Certificate Program: Enviro. Issues and Regs. May '03, 2nd Ann. NORA April '04, and Chemistry for the Non-Chemist Jul. '04.

New Courses. The new course, *Occupational Safety and Health Solutions*, will be team taught by Drs. Sesek, Collingwood, and Wood. IH, E&S, and OM cores will be represented by both faculty and students. Course faculty (Sesek (E&S), Collingwood (IH), and Wood (OM)) were awarded a University teaching grant for development of the course, which is planned to become the capstone course for all our graduate students, including E&S students. This course will take real world problems presented by businesses interested in having multidisciplinary teams of students under close faculty supervision work to solve those problems. Faculty from the School of Business and Dept. of Economics (Dr. Waitzman) have agreed to participate in this course, with a plan for all RMCOEH trainees, including E&S, to become familiar with quantification of costs and benefits from proposed interventions. Some graduate students from the School of Business will likely enroll in the class and provide additional perspectives on interdisciplinary teams and further those interactions that are so essential to success in today's business environment.

Trainee recruitment. Undergraduate, or graduate students who have either completed an undergraduate degree in industrial hygiene from an accredited undergraduate industrial hygiene degree program, or those who have taken course work in math (preferably calculus), chemistry through organic and preferably including biochemistry, one year of physics, and a year of biological sciences in the course of obtaining their undergraduate degree are considered for entry into the University of Utah Graduate Industrial Hygiene Program. In addition, they must also demonstrate acceptable scores from taking the Graduate Record Exam (GRE), typically a minimum score of 500 in each of the three areas, and successfully pass an interview process. The interview process includes at least one faculty from the Public Health Program and one from the Industrial Hygiene Program. In practice, we seek to have the candidates interviewed by all IH faculty. All interviewers complete interview forms and applicants are discussed with all interviewers. Selections are made based on a meeting of the IH Faculty

D. Program Products

CE Courses and Symposium

The IH Program is active in both academic course work and also has significant involvement in CE courses. These CE course offerings include our very successful "(Industrial Hygiene) Comprehensive (Exam) Review" course, "Industrial Toxicology and Applied Risk Assessment," "Quantitative Risk Assessment," and "Respiratory Protection & Fit Testing." Each of these course is held at least once a year.

Besides the academic and CE courses, the fourth annual Regional (NORA) Young/New Investigators Symposiums was held in 2006. This symposium included significant content relating to industrial hygiene monitoring and exposure control methodology. In addition, a NORA II Town Hall meeting was also held during this funding period. The input has been organized by agenda items, and is being reviewed in more detail to identify additional needs likely to be successful in a CE venue.

E. Future Plans

The RMCOEH IH Program has made major changes over the past years. These changes include addition of a cap-stone course titled "Occupational Health and Safety Solutions" (MEEN 6960). Addition of this courses has resulted a strengthening in our academic program. In addition, changes have been made to strengthen existing IH courses, such as expansion of course content in the Advanced Industrial Hygiene course (FPMD 6751) to include more information on new monitoring equipment and personal protective equipment, combining of the Industrial Toxicology course (FPMD 6752) with the Physiology course to allow better correlation of toxic effects on human organs, and addition of an elective course for IH on Quantitative Risk Assessment (FPMD 6730). Also as noted above, the Occupational Safety and Health Solutions course (MEEN 6960) is now a capstone course for our students, including the both HSAT and IH trainees and should prove highly effective in transitioning from an academic program to the workplace (e.g., R2P).

This is a summary of progress vs. the IH programs' Goals and Objectives for the past funding period.

Program Title: Occupational Injury Prevention Research Training

A. Program Director: Donald S. Bloswick, PhD.

B. Program Description

Description/Background. The RMCOEH OIPRT Program is a unique occupational injury prevention program in the RMCOEH. This program is a combination of two different, but related and well-integrated emphases within one program. In keeping with CDC Program Announcement 01036 (March 13, 2001), one emphasis is "Occupational Safety Engineering" (OSE) and the other is "Occupational Injury Epidemiology" (OIE). The coordination and integration of these programs occurs at the programmatic, teaching, and research levels. This program was initiated as an allied academic program in the RMCOEH in July 2001 for two years, then unfunded. In response to critiques, we then extensively revised the curriculum, including development of the two interdisciplinary emphases, and in July 2005 the revised OIPRT program was again funded by NIOSH as an interdisciplinary effort between the Department of Mechanical Engineering (ME) and the Public Health Program in the Department of Family and Preventive Medicine (DFPM). In May 2004, one student graduated from the OSE program (Phillip Drinkaus; Faculty Advisor: Dr. Bloswick) and another graduated in December 2004 (Mark Warner; Faculty Advisor: Dr. Bloswick). There is presently one student in the OSE emphasis (Andrew Merryweather, Faculty Advisor: Dr. Bloswick) and one in the OIE emphasis (Matthew Thiese; Faculty Advisor: Dr. Hegmann). The interdisciplinary nature of the OIPRT is producing an excellent training program. These two current OIPRT trainees are truly outstanding, e.g., having already begun to assume major roles in our cohort studies that augur very well for the future.

The RMCOEH's OIPRT program meets regional needs by: (1) training doctoral level OIPRT professionals to address the well documented, elevated fatality and injury problems of Region VIII, (2) targeting our academic and CE programs' contents to meet Region VIII needs, (3) active involvement of the OIPRT Program Advisory Committee and the RMCOEH Advisory Board which help identify Regional issues for us to address, and (4) tying future research endeavors to the very successful NORA II Town Hall meeting held in February 2006 (n>150 participants with extensive regional needs developed and posted on our website). Our graduate surveys confirm our success in training our students to meet challenges and underscore the RMCOEH OIPRT Program's ability to continue to meet regional needs.

Graduates of the RMCOEH have become leaders in occupational and environmental health. Our two OIPRT graduates are well placed, one directing Sandia Labs ergonomic initiatives (for the entire 18,000 person complex) as a Senior Safety Engineer and the other embarking on an academic career including research. We anticipate long-term, similar success with the OIPRT program. There was only one OIPRT survey respondent (of 2 graduates to date). He was "Very Satisfied" with the OIPRT Program and indicated that he would "Enthusiastically Recommend" the program. Overall satisfaction with training is highly rated by RMCOEH students with 80.5% of graduates rating their training at '8' or higher (0 = 'Very Dissatisfied' and 10 = 'Very satisfied').

The RMCOEH OIPRT program continues to evolve in response to faculty guidance, ongoing feedback from graduates and students, and in response to professional and community needs. The OIPRT's OIE emphasis also changed modestly in response to our program's responses to new Council on Education for Public Health (CEPH) mandates. These changes are generally resulting in a stronger, more effective training program. The RMCOEH anticipates further growth of the OIPRT program and increased success in its efforts to train highly skilled OIPRT doctorates. Thus, there is strong rationale and need for the Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) Occupational Injury Prevention Research Training (OIPRT) Program. Courses and training materials developed for OIPRT students also strengthen the overall RMCOEH and introduces OIP topics to students in allied fields.

Goals and Objectives. Our greatest areas of development have been in the areas of (1) increases in our research programs, (2) improvements in the OIPRT academic program, and (3) instituting major CE courses. The RMCOEH OIPRT program has markedly expanded its research programs to emphasize NORA, r2p and Work-Life Initiative projects. To date, these efforts have resulted in the successful funding of two prospective cohort studies on musculoskeletal disorders (upper extremities and low back pain) through a consortium with the University of Wisconsin Milwaukee, Texas A&M, and the Medical College of Wisconsin. In addition, OIPRT faculty have a project underway to study back injuries and traumatic injuries in commercial truck drivers. There are also multiple public and industry-funded projects undertaken by the RMCOEH that trainees can elect to participate in. These projects involve work with the mining industry, manufacturing, and minerals processing. Additional research applications are currently pending.

Goal 1. Provide quality OSE and OIE academic programs.

The curriculum is now completely in place. The RMCOEH OIPRT Program provides extensive formal and practical experiences in the development, implementation and execution of research programs.

Goal 2. Accomplish NORA-related OSE and OIE research and translate it into practice (r2p).

The OIPRT program is currently involved in extensive research studies and all trainees present at conferences, usually multiple times in the course of the curriculum. As discussed later, we have made major progress in increasing our rate of publications. Now that the cohort studies baseline databases are largely complete, we anticipate an acceleration of the rate of publications.

Goal 3. Provide Superior Service, Outreach, and Support of Continuing Education.

While the OIPRT Program is relatively young, we have significant OIPRT-related CE activities that have been delivered. We anticipate increasing this rate in the near term as the program matures. These course offerings include our very successful State of the Art Conference on Musculoskeletal Disorders. The OIPRT faculty have extensive Outreach activities.

Goal 4. Accomplish comprehensive interdisciplinary efforts.

The OIPRT program excels in interdisciplinary teaching and has a major course coming on line to cement that concept for the trainees. All major studies, and nearly all remaining research activities are interdisciplinary. Professional and informal activities with students and faculty from other core programs have already been occurring in our OIPRT program on a regular basis and are a testament to the interdisciplinary research and education that is one of our program and Center's trademarks.

Training in Responsible Conduct of Science. For over 3 years, all RMCOEH trainees, faculty and staff have been required to complete HIPAA and IRB training. All students must complete a web based training program in the protection of human research subjects: Human Participant Protections Education for Research Teams (<http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp>). The tutorial satisfies the NIH human subjects training requirement for obtaining Federal Funds and the Institutional Review Board's (IRB's) requirements for training initiatives. Courses, such as Epidemiology, Introduction to Biostatistics, and Social Context of Public Health, also incorporate training in responsible research practices into their curriculum. Ethics are also major topics in Ergonomics, Human Factors Engineering, and Design Implications. The topic of research ethics is also covered extensively in Computer Applications and Research Methods. In addition to direct training on these topics, ethics content is integrated into course materials with lectures on how to present results in an unambiguous manner without "overstating" conclusions and how to interpret the results of other researchers. RMCOEH trainees also attend (beginning 2006) a new mandatory noon lecture series that includes among other topics: conflict of interest, responsible authorship, handling of misconduct, data management, data sharing and animal welfare. Attendance logs are kept to track trainee attendance, and faculty attendance is encouraged. Additional topics include how to write research grant proposals and how to manage research laboratories

Faculty Participation. Dr. Blosswick directs the overall OIPRT grant, as well as the Occupational Safety Engineering (OSE) emphasis. Dr. Hegmann directs the Occupational Injury Epidemiology (OIE) emphasis. Dr.

Bloswick is responsible for all aspects of the OIPRT Program. Drs. Bloswick and Hegmann share responsibility for meeting with students to discuss progress, projects, and concerns. It should be noted that the coordination of these emphases is so close that the students regularly meet with the faculty of the other emphasis. Trainee progress is reviewed on at least a monthly basis, and sometimes weekly depending on the circumstances. Despite some geographic distance across campus, Drs. Bloswick and Hegmann maintain close, weekly, if not daily contact.

In addition to the extensive teaching and advising responsibilities of Drs. Bloswick and Hegmann, support of the OIPRT Program include many other faculty. **Dr. Richard F. Sese** (Research Assistant Professor, Mechanical Engineering, adjunct appointment in Family and Preventive Medicine) shares responsibility for student recruitment and selection in the OIPRT Program. He directs FPMD 6759 (Occupational Safety and Health Field Trips) and teaches ME 6130 (Design Implications in Human-Machine Systems), ME 7105 (Advanced Ergonomics and Occupational Biomechanics Lab), ME 6960-3 (Occupational Safety and Health Solutions), and co-teaches ME 6110 (Industrial Safety) with Dr. Bloswick. Dr. Sese also directs research activities and supervises student research and is a member of the OIPRT Executive Committee. **Dr. Phillip Drinkaus** (Adjunct Research Assistant Professor Mechanical Engineering) teaches ME 7960 (Computer Applications and Research Methods). Dr. Drinkaus specializes in ergonomic epidemiology and modeling and has assisted significantly with field data collection and subsequent laboratory analyses. **Dr. Rodney Larson** (Assistant Professor, Family and Preventive Medicine) directs research activities and supervises student research and is a member of the OIPRT Executive Committee. **Dr. Leon Pahler** (Assistant Professor, Family and Preventive Medicine) co-instructed FPMD 6759 (Occupational Safety and Health Field Trips) with Dr. Sese and Dr. Edwards (OM). **Dr. Scott Collingwood** (Assistant Professor, Family and Preventive Medicine) co-instructs the new course, ME 6960-3 (Occupational Safety and Health Solutions), with Dr. Sese and Dr. Wood (OM). **Dr. Clay Mann** (Associate Professor, Pediatrics) is a staff member at the Intermountain Injury Control Research Center and directs independent study courses for OIPRT students, directs student practicums and research efforts within the IICRC, and lectures in FPMD 6607 (Injury Surveillance) and ME 7960 (Computer Applications and Research Methods). **Dr. Anthony Suruda** (Adjunct Associate Professor, Family and Preventive Medicine) teaches FPMD 6607 (Injury Surveillance) and assists with overall curriculum development and program review, serves on student committees, and advises student research projects. **Dr. Kent Bachus** (Research Associate Professor Orthopedic Surgery and Bioengineering, Adjunct Associate Professor, Mechanical Engineering) is Director of the University of Utah's Orthopedics Research Lab. He and Dr. Bloswick have developed a joint research program to investigate the response of intervertebral discs to repetitive torsion and compressive loading. He also co-directed the research of Mark Warner, an OIPRT trainee who graduated in 2005. **Dr. Robert Tuckett** (Research Associate Professor, Physiology, Adjunct Associate Professor, Mechanical Engineering) assists in OIPRT Program field research efforts involving ergonomic injury surveillance, particularly those involving surveillance for Upper Extremity MSDs, and laboratory research into improved methods of diagnosing and preventing hand/wrist injuries. **Dr. Tom Bernard** (Professor and Chair, Department of Environmental and Occupational Health, University of South Florida, Adjunct Professor, Mechanical Engineering, University of Utah) spent Autumn semester 2002 in the OIPRT Program at the University of Utah as a Visiting Professor, at which time he developed and taught ME 6960-4 (Work Physiology and Occupational Heat Stress). Dr. Bernard returns on an alternate year basis to teach this course (2004, 2006, and beyond). He also serves on graduate committees, and provides guidance in the continued development of the graduate programs in Occupational Injury Prevention. He also co-directed the research and served on the Ph.D. committee of Phillip Drinkaus, an OIPRT trainee who graduated in 2004.

Curricula. Graduation from the OSE emphasis requires 51 credits and graduation in the OIE emphasis requires 59 credits. There is both course overlap between the two emphases and distinct courses for each emphasis. Students in the OSE emphasis (working toward a Ph.D. in Mechanical Engineering) take 5 courses (14 credits) in the Department of Family and Preventive Medicine and students in the OIE emphasis (working toward a Ph.D. in Public Health) take 5 courses (12 credits) in the Dept. of Mechanical Engineering. A summary of the program requirements for the OSE Ph.D. in Mechanical Engineering and for the OIE Ph.D. in Public Health is available elsewhere.

C. Program Activities and Accomplishments

Progress Toward Goals and Objectives. Progress toward goals and objectives is included in Section C above.

Trainee Theses and Dissertations.

Andrew Merryweather (Advisor Blowski) ME OSE Ph.D. expected graduation December 2007). Mr. Merryweather has completed his practicum and has six remaining courses. He is expected to sit for his qualifying/comprehensive examination Spring 2007 and graduate December 2007.

Research Project (Dissertation): "An Investigation into slips/falls and ankle/knee stresses while walking on uneven surfaces."

Matthew S. Thiese (Advisor Hegmann) PH OIE Ph.D. expected graduation June 2007). Mr. Thiese has completed his practicum and has five remaining courses. He passed his qualifying/comprehensive examination in May 2005, has formed his committee, and is in the process of collecting data for his dissertation.

Research Project (Dissertation): "Assessing the relationship between physical activity and low back pain in a prospective cohort study"

New Courses. The new course, *Occupational Safety and Health Solutions*, will be team taught by Drs. Sesek, Collingwood, and Wood. IH, E&S, and OM cores will be represented by both faculty and students. Course faculty (Sesek (E&S), Collingwood (IH), and Wood (OM)) were awarded a University teaching grant for development of the course, which is planned to become the capstone course for all our graduate students, including E&S students. This course will take real world problems presented by businesses interested in having multidisciplinary teams of students under close faculty supervision work to solve those problems. Faculty from the School of Business and Dept. of Economics (Dr. Waitzman) have agreed to participate in this course, with a plan for all RMCOEH trainees, including E&S, to become familiar with quantification of costs and benefits from proposed interventions. Some graduate students from the School of Business will likely enroll in the class and provide additional perspectives on interdisciplinary teams and further those interactions that are so essential to success in today's business environment.

Trainee recruitment. Incoming students for the Ph.D. program in Mechanical Engineering are required to have competency in the basic engineering sciences. This competency may be demonstrated through: (1) graduation from an engineering curriculum, (2) completion of the Fundamentals of Engineering exam, (3) record of appropriate course work, or (4) successful completion of appropriate course work while in residence. Trainees are selected on the basis of academic record, GRE scores, industrial experience, and letters of recommendation. Incoming students in the OIPRT Program will also be required to have past academic course work in biostatistics, ergonomics, and industrial safety. Ph.D. students must pass a qualifying exam in three areas selected from the three Divisions in the Mechanical Engineering Department (1) Design, Manufacturing, Controls, and Ergonomics, (2) Thermal, Fluid and Energy Systems, and (3) Mechanics. Incoming students for the Ph.D. program in Public Health are required to have demonstrated capabilities in science including mathematics. This competency is typically demonstrated through: (1) graduation from an appropriate scientific background, (2) high Quantitative scores on the GRE exam, (3) record of appropriate course work, or (4) successful completion of appropriate course work. Trainees are selected on the basis of academic record, GRE scores, experience, and letters of recommendation. Ph.D. students must pass a qualifying examination. For both emphases, preliminary decisions are made on the applicants' probability of successful selection with offers to interview extended based on that preliminary review. All available OIPRT faculty interview all applicants, as well as at least one other RMCOEH faculty member (most often IH, other Public Health or HSAT). All interviewers complete interview forms and applicants are discussed with all interviewers. Selections are made based on a global assessment of all qualifications. The recruitment of trainees under-represented in Occupational Injury Prevention is being given increased emphasis. In September 2002, Dr. Sesek attended a one-day course on recruiting and retaining qualified minority students entitled "Minority Graduate Education at Mountain States Alliance" and "Western States Alliance to Expand Student Opportunities." Emphasis at the course was on recruiting qualified minority doctoral students. In addition, Dr.

Bloswick has coordinated with Anthony Shirley, the American Indian Student Advisor at the University of Utah and has established a \$10,000 American Indian Graduate Mechanical Engineering Fellowship for AY 07/08 (and hopefully beyond). Dr. Bloswick has coordinated with Shawn Newell, Program Coordinator for Native American Recruitment at Northern Arizona University (6th in the nation for Native American engineering graduates), and plans to make recruitment visits to Northern Arizona University, as well as to Montana State University, to recruit mechanical engineering graduate students through this program. During the 06/07 (scheduled for November 2006) AY Derrick Franklin, an African-American trainee recently recruited from Mississippi State University for the E&S Program, will present a seminar at his alma mater in an effort to identify and recruit additional ethnic-minority trainees, including for both the E&S and OIP Programs.

D. Program Products

PUBLICATIONS/PRESENTATIONS

OIPRT faculty were productive with respect to publications and were actively involved in nine publications as well as nine presentations. Additionally, OIPRT students were involved in 4 publications (2 each).

SPONSORED SYMPOSIA

While the OIPRT Program is relatively young, we have significant CE activities. These course offerings include our very successful State of the Art Conference on Musculoskeletal Disorders. This conference targeted one aspect of OIP that was repetitively identified in many of our industry sector-specific roundtables at the SLC NORA II Townhall meeting as a major need. While that course also targeted Health Care Providers and Ergonomists, it contained major course content on injury epidemiology and safety. That course will be repeated this winter. Each of the first four annual Regional (NORA) Young/New Investigators Symposia have included significant content relating to epidemiology and injury prevention. The NORA II Townhall meeting agenda is being reviewed in more detail to identify additional needs likely to be successful in a CE venue.

E. Future Plans

We are in the process of a competitive renewal. In the event of success of this competitive renewal, we plan the following over the next 5 year period: (1) increase the number of OIPRT trainees, (2) further grow our extramural research programs that emphasize NORA (as well as NORA II, r2p, the WorkLife Initiative and build on our regional NORA II Town Hall meeting held in Salt Lake City; (3) recruit additional faculty member(s) after nationwide searches, (4) develop OIPRT-related distance-based education programs, (5) increase the integration of the Statistical and Economic Evaluation Unit with our trainees, (6) critically evaluate our curriculum for potential improvements, and (7) utilize this grant's proposed NORA projects for additional OIPRT trainee research projects. We recognize that this is an ambitious agenda, however, we have made much headway in only 2 years.

Program Title: Occupational Medicine Residency Program

A. Program Director: Edward B. Holmes, MD, MPH

B. Program Description

The Occupational Medicine Residency (OMR) program at the Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) fills a critical need by providing highly trained and skilled OM physicians to a region underserved by OM specialists. Relatively few OM physicians practice in Region VIII (CO, MT, ND, SD, UT, WY) and we are one of only two OMRs in the region. According to the 2005-06 Membership Directory of the American College of Occupational and Environmental Medicine (ACOEM), there are only about 180 ACOEM members in Region VIII out of approximately 5,160 members listed (3.5% of the total). Yet the **occupational fatality rates in Region VIII are 50% higher than the national average** (Bureau of Labor Statistics). The combination of the small numbers of OM physicians, elevated injury and fatality rates and high population growth (both Utah and Colorado are growing at almost twice the national average) provide strong rationale for the need for OMR training at the RMCOEH. The RMCOEH's OMR program meets regional needs by: (1) training OM physicians for the needs of Region VIII, (2) targeting our academic and CE programs' contents to regional needs, (3) obtaining active involvement of the Residency Advisory Committee and the RMCOEH Advisory Board which raise Regional issues for us to address, and (4) tying future research endeavors to the hugely successful NORA II Town Hall meeting held in February 2006 (n>150 participants with extensive regional needs developed and posted on our web, www.rmcoeh.utah.edu). Our graduate surveys confirm our success in training our residents to meet challenges and underscore the RMCOEH OMR Program's ability to continue to meet regional needs.

Not only is there a need for our training program, but we excel at meeting that need. The RMCOEH's OMR program is recognized to be such outstanding quality that, as only one example, in our most recent ACGME accreditation site visit (12/03), we did not receive even one negative comment or citation. Graduates of the RMCOEH have become leaders in occupational and environmental health. In our most recent graduates' survey (6/06), 55% of RMCOEH OM graduates identified themselves as 'Directors' in their work setting. Our residents are highly sought, and it is not unusual for residents to receive job offers during their rotations. Satisfaction with training is highly rated by residents with 82% of graduates from the last five years rating their training at '8' or higher (0= very dissatisfied and 10= very satisfied). **To date, we have graduated 70 OM physicians from our residency program. In the last 5 years, the OM program has maintained between 4 and 7 total residents with 2-4 graduates each year. Three residents graduated in 2006.**

The OM program collaborates extensively with other disciplines in research activities. Currently, all major research conducted through the RMCOEH is interdisciplinary with involvement of at least two core disciplines. For example, the 2 MSD cohort studies involve major efforts by all OM, E&S and OIPRT faculty, as well as every student and resident. The third major prospective cohort study, the National Children's Study (NCS) primarily utilizes expertise of the IH core and HSAT Program, however, the OM core has been involved in that project for several years and has provided assistance to the other programs. Other pending projects involve different mixes of disciplines. The master's thesis committees are generally comprised of at least one member outside the primary discipline (e.g., 2 IH and 1 OM, or 1 E&S, 1 OM and 1 biostatistician). OMRs generally do not complete theses, although that remains an option. Such committees would be interdisciplinary.

We have made major progress in the past year period including: Mentoring junior faculty, expanding research training for residents, developing major, extramurally-funded research programs, particularly in MSDs, assisting in developing the Statistical and Economic Evaluation Unit of the RMCOEH, developing more state funding (Senate Bill 159, 2005 General Utah Legislative Session), further increasing the content and rigor of our curriculum (e.g., increased injury care, Commercial Driver Medical Exams (CDMEs), fitness for duty, consultations), increasing OM-related offerings in Continuing Education (CE), increasing our Outreach, and (10) growing our full-service OM Clinic.

Goals and Objectives: The OMR program has met and surpassed essentially every goal and objective established at the beginning of the current grant period. The two largest areas of growth have been in clinical and research spheres. We also have completely revised the curriculum to markedly improve resident training.

Clinics. In 2003, faculty worked with the University of Utah Community Clinics to found the OccMed clinic at Redwood Health Center, a full time, full service clinic staffed by OM faculty from the RMCOEH. Residents (OM and primary care) and students in this clinic learn mostly primary OM care by managing OM patients under the direct supervision of OM faculty. They also obtain continuity experiences with patients, which teaches critical contingency skills when initial treatment plans fail. Faculty have also dramatically increased the number of OM consultations performed through the RMCOEH. Two new faculty, Drs. Wood and Edwards, have joined the OM program. This expansion of the faculty has allowed the program to focus additional energies on curriculum review and development.

Research. The RMCOEH has markedly expanded its research programs to emphasize NORA, r2p and WorkLife Initiative projects. To date, these efforts have resulted in the successful funding of **two** prospective cohort studies on musculoskeletal disorders (upper extremities and low back pain) through a consortium with the University of Wisconsin, Texas A&M, and the Medical College of Wisconsin. A **third** major prospective cohort study, the National Children's Study (NCS) has been initiated by the University of Utah and others and primarily utilizes expertise of the IH and HSAT programs with some nominal support from the OM core. In addition, OM faculty have a project underway to study back injuries in commercial truck drivers. There are also multiple public and industry-funded projects undertaken by the RMCOEH in which residents can elect to participate. These projects involve work with air pollution, the mining industry, minerals processing, and chemotherapeutics. Additional research applications are currently pending.

The OM program's progress is briefly described as follows in context with the goals and objectives of the program in 2001 (revised 2006 goals and objectives and more detailed description of program activities are provided in section A of the OM Training Program Plan above).

C. Program Activities and Accomplishments

Goal 1. Provide Quality Academic Programs.

Objective 1.a. Maintain ACGME accreditation of the OM residency

Progress: In 2003, the OM residency was awarded the maximum 5 year accreditation by ACGME. There was not one citation or adverse comment. This objective is met.

Objective 1.b. Train and graduate a minimum of two OM residents each year who are qualified to sit for the ABPM examination by equipping them with state of the art knowledge.

Progress: The OM residency has exceeded the goal of graduating at least two residents each year. From 2002 to present, the program graduated 3-4 residents each year. This objective is met.

Objective 1.c. Provide OM residency training at the PGY-3 level (only) for applicants qualified to enter at that level.

Progress: The OM Program has been successful in attracting qualified residents who already have the MPH (or equivalent) degree and require only the practicum year of training. Most years, there is one such resident admitted to the program. Funding typically limits the number of such residents accepted, as there is a substantial pool of applicants in this category who are interested in the RMCOEH OMR Program. This is met.

Objective 1.d. Train individuals who are sponsored by other agencies and are qualified to enter the programs.

Progress: RMCOEH OM residents have been sponsored by the U.S. Air Force and by the Occupational Physicians' Scholarship Fund. Due to increased credit requirements for the MPH degree, it has recently become essentially impossible to accommodate military residents who need to complete the MPH degree in one year, unless they have prior graduate credit or other extenuating circumstances. Faculty are currently working to facilitate the return of aerospace residents for an alternate degree program (MSOH). This is partially met.

Objective 1.d. Provide a superior academic curriculum

Progress: The OM curriculum has changed significantly in the past few years primarily in response to the experiences of Drs. Holmes and Hegmann who had extensive clinical experiences elsewhere and felt that, in contrast with nearly all OMRs nationally (discussions with other OM Program Directors and Fortune 500 corporate medical directors), we **Must** incorporate sufficient training to transition an OMR into those environments. As well, we have particularly changed the curricular evaluative means in response to new training mandates, degree requirements, and feedback from residents, graduates, and the community. Several courses were modified to bolster the content/quality of instruction and new rotations were established. This objective is met.

Objective 1.e. Respond to the need for residents in other specialties and medical students to acquire OEM-related expertise pertinent to their chosen field(s) of practice.

Progress: We continue to make major progress in this important area. OM faculty have provided didactic instruction to FM, IM, and PMR residents. Primary care residents and medical students have also completed rotations in the OccMed Clinic. The FM residency is developing a Community and Preventive Medicine rotation. All FMRs will be required to spend at least two weeks at the OccMed Clinic prior to graduation. This objective is met.

Objective 1f. Enhance the format of current educational offerings.

Progress: The RMCOEH has instituted electronic and internet based educational platforms and will continue to develop these resources for both its academic and CE offerings. This objective is met.

Goal 2. Accomplish NORA-related Research

Objective 2a. Emphasize NORA-related areas.

Progress: The OM Program has markedly expanded its research programs as noted numerous times above. We emphasize NORA related research as we believe the NORA to be a critical pillar of the future of OHS. We believe so strongly in that pillar, that we worked aggressively to recruit people to come to the NORA II Town Hall meeting to help construct the NORA II. Our recruitment efforts produced by far the largest attendance at any Town Hall Meeting in the US with 150 in attendance. The agenda was so detailed from this meeting that senior NIOSH personnel commented that it was "by far the best Town Hall meeting" and were clamoring to get the electronic version of it immediately after conclusion of the meeting. This objective is met.

Objective 2.b. Augment resident research experience.

Progress: For the past several years, residents have been required to complete a research project and write a paper based on the research. In the Summer of 2007, a new resident research course will be required. While rotating at the OccMed Clinic, residents also participate in monthly follow up of subjects enrolled in the upper extremity and low back cohort studies, thus learning and reinforcing the standardized examinations, collection of data, data entry, and adherence to research protocols. This objective is met.

Goal 3. Provide Superior Service, Outreach, and Support of Continuing Education

Objective 3.a. Expand clinical services on-campus.

Progress: The OM Program opened the OccMed Clinic (2003). OM faculty are currently holding discussions to establish a full service Employee Health OM clinic on campus at the University of Utah. This objective is met.

Objective 3b. Increase faculty commitments to clinical time.

Progress: Faculty time has increased and the OccMed clinic is staffed about three quarters of the time by OM faculty. A PA provides the remaining clinic coverage with service into the evening. This objective is met.

Objective 3.c. Increase continuing education and maintain outreach activities. Conduct at least 6 training programs annually.

Progress: Faculty have increased our CE offerings over the past 5 year period. We have been particularly successful with our CDME courses, our annual State-of-the-Art Conference on Musculoskeletal Disorders and our co-sponsorship of OM Grand Rounds. We are hopeful that our new distance-based Occupational and Public Health Journal Club format will also be successful. Our faculty accomplish extensive Outreach that is detailed in the Administration section of this progress report. This objective is met.

Goal 4. Accomplish Strong Interdisciplinary Efforts

Objective 4.a. Augment current interdisciplinary teaching activities (See also paragraph 6.)

Progress: Several courses at the RMCOEH are now team taught with participation from multiple disciplines. Examples of this team approach include the Introduction to Industrial Toxicology and Physiology (IH, HSAT and OM) and Interdisciplinary Field Trips (E&S, OIPRT, OHN & OM) courses. The RMCOEH has received approval to create the summative course, "Occupational Safety and Health Solutions," MEEN 6960 that is

planned to become the capstone course for all graduate students. This course will take real world problems presented by businesses interested in having multidisciplinary teams of students under close faculty supervision work to solve those problems, as well as quantify the costs and benefits with supervision of School of Business and Dept of Economics professors. This objective is met.

Objective 4.b. Continue to provide IH and E&S students with opportunities to join the OM students in the OM clinic.

Progress: In FPMD 6758 Occupational and Environmental Health Clinic, academic students from all RMCOEH programs attend or review at least one patient encounter that involves a question relevant to that discipline. This objective is met.

Objective 4.c. Foster interdisciplinary research efforts

Progress: Currently, nearly all research conducted through the RMCOEH is interdisciplinary with involvement of at least two core OEH disciplines. The master's thesis committees are also generally comprised of at least one member outside the primary discipline (e.g., 2 IH and 1 OM). This objective is met.

Training in Responsible Conduct of Science. For over 3 years, all RMCOEH trainees, faculty and staff have been required to complete HIPAA and IRB training. All students must complete a web based training program in the protection of human research subjects: Human Participant Protections Education for Research Teams (<http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp>). The tutorial satisfies the NIH human subjects training requirement for obtaining Federal Funds and the Institutional Review Board's (IRB's) requirements for training initiatives. Courses, such as Epidemiology, Introduction to Biostatistics, and Social Context of Public Health, also incorporate training in responsible research practices into their curriculum. Ethics are also major topics in Ergonomics, Human Factors Engineering, and Design Implications. The topic of research ethics is also covered extensively in Computer Applications and Research Methods. In addition to direct training on these topics, ethics content is integrated into course materials with lectures on how to present results in an unambiguous manner without "overstating" conclusions and how to interpret the results of other researchers. RMCOEH trainees also attend (beginning 2006) a new mandatory noon lecture series that includes among other topics: conflict of interest, responsible authorship, handling of misconduct, data management, data sharing and animal welfare. Attendance logs are kept to track trainee attendance, and faculty attendance is encouraged. Additional topics include how to write research grant proposals and how to manage research laboratories

Faculty Participation. Dr. Holmes directs the overall OMR Program. He is supported by several other faculty, including Dr. Hegmann who is the Assistant Residency Program Director, Dr. Wood who is the Associate Residency Program Director. Dr. Moser lends his considerable expertise to help with management of the program and Dr. Edwards is increasingly taking visible tasks such as efforts towards measuring competencies. The program is supported by dozens of affiliated and adjunct faculty.

Progress Toward Goals and Objectives. Progress toward goals and objectives is included in Section D above.

New Courses. The new course, *Occupational Safety and Health Solutions*, will be team taught by Drs. Sesek, Collingwood, and Wood. IH, E&S, and OM cores will be represented by both faculty and students. Course faculty (Sesek (E&S), Collingwood (IH), and Wood (OM)) were awarded a University teaching grant for development of the course, which is planned to become the capstone course for all our graduate students, including E&S students. This course will take real world problems presented by businesses interested in having multidisciplinary teams of students under close faculty supervision work to solve those problems. Faculty from the School of Business and Dept. of Economics (Dr. Waitzman) have agreed to participate in this course, with a plan for all RMCOEH trainees, including E&S, to become familiar with quantification of costs and benefits from proposed interventions. Some graduate students from the School of Business will likely enroll in the class and provide additional perspectives on interdisciplinary teams and further those interactions that are so essential to success in today's business environment.

Trainee recruitment. Incoming residents in the OM residency are required to have completed an MD/DO degree and a PGY-1 training year prior to entering our residency. Applicants come from all over the U.S. as well as internationally. After completion of the extensive application preliminary decisions are made on the

applicants' probability of successful selection with offers to interview extended based on that preliminary review. All available OM faculty interview all applicants, as well as at least one other Public Health faculty member. All interviewers complete interview forms and applicants are discussed with all interviewers. Selections are made based on a global assessment of all qualifications. The recruitment of trainees under-represented in OM is being given increased emphasis.

D. Program Products

PUBLICATIONS/PRESENTATIONS

OM faculty were productive with respect to publications and were actively involved in multiple publications (peer reviewed, proceedings, abstracts) as well as several national and international presentations. Additionally, OM residents were involved in research projects presented at national meetings.

SPONSORED SYMPOSIA

OM faculty have increased both CE and Outreach efforts and will maintain such activities. As one example, OM faculty hosted the first annual State-of-the-Art Conference in 2006 on Musculoskeletal Disorders. This conference was very successful and the 2nd annual conference will be in March 2007. This conference is expected to remain an annual event sponsored by the RMCOEH. Dr. Hegmann has been very active in ACOEM's Commercial Drivers Medical Examination (CDME) course since its inception (1995). Faculty and residents have also participated in the regional NORA conference that has been sponsored by the RMCOEH for the past 4 years. The RMCOEH is a co-sponsor of Intermountain Health Care's (IHC) OM Grand Rounds. We also are increasing our distance-based CE/CME. Dr. Moser provides distance-based instruction in Practical Aspects of Management, approved by ABPM for Maintenance of Certification (MOC) credit. A new distance-based Journal Club has recently been started (summer 2006), also approved for ABPM MOC credit

E. Future Plans

We are currently in a competitive renewal. If successful, we plan over the next 5 years to: (1) increase the number of OMRs, (2) further grow our extramural research programs that emphasize NORA (as well as NORA II, r2p, the Work Life Initiative and build on our regional NORA II Town Hall meeting held in Salt Lake City, (3) recruit additional faculty member(s) after nationwide searches, (4) develop additional OM-related distance-based education programs, (5) increase the integration of the Statistical and Economic Evaluation Unit with our residents and faculty, (6) critically evaluate our curriculum for potential improvements, (7) utilize this grant's proposed NORA projects for additional resident research projects in addition to r2p training aspects, and (8) increase our on-campus clinical activities. We recognize that this is an ambitious agenda, however, we have accomplished much.

Program Title: Continuing Education

A. Program Director: Connie Crandall, MA, MBA

B. Program Description

The Continuing Education (CE) Program at the Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) is a dynamic, interdisciplinary program that has provided CE courses in Occupational Safety and Health (OSH) since 1978. It remains as a primary OSH CE resource in HHS Region VIII. Target audiences have included industrial hygienists, safety professionals, ergonomists, occupational health nurses, occupational medicine physicians, industry managers, and others concerned with OSH. Information to advance the RMCOEH CE Program's offerings have included: (1) formal needs assessments to identify current, priority CE needs among OSH professionals and others concerned with OSH in Region VIII, (2) close, daily contact between all CE staff, CE faculty, and academic faculty for continuous feedback, (3) CE course evaluations, (4) input from Continuing Education Advisory Committee meetings, (5) Center Executive Committee meetings, (6) RMCOEH Advisory Board meetings, and (7) an academic program graduate survey. Over the past year, we have actively used all of these sources of information to make an outstanding CE Program.

Administratively, the CE Program is directed by Connie Crandall, MA, MBA. She is assisted in the operation of her program by a Program Facilitator, a Registration Coordinator, the CE Advisory Committee, the Center Executive Committee, and individual course faculty. She is also supported by Scott Collingwood, Ph.D. and Royce Moser, Jr., M.D., MPH in establishing and implementing distance-based education initiatives. All faculty members are active in providing formal and informal input for program improvements.

The Continuing Education Program at the Rocky Mountain Center for Occupational and Environmental Health is driven by four goals with specific objectives established to achieve the goals. These goals and objectives are:

Goal 1. Offer quality CE programs (courses and conferences) to occupational and environmental health and safety professionals and to others involved in the field.

Objectives: 1) Provide short-term occupational safety and health post-graduate training (a minimum of two per core discipline) on current issues and topics to a minimum of 400 participants/year; 2) Facilitate exchange with other safety and health professionals through course co-sponsorship with other organizations involved in occupational safety and health; 3) Obtain highly-qualified faculty from the private and public sector that bring both theoretical and practical knowledge to the issues presented; and 4) Hold at least one course per year regionally outside of Salt Lake City.

Goal 2. Conduct research to identify CE training needs and impact.

Objective: 1) Research the needs of each state within the Center's designated region by needs assessment surveys and questionnaires.

Goal 3. Provide superior service and outreach that enhances and promotes the field of occupational and environmental safety and health.

Objectives: 1) Increase awareness and understanding of occupational safety and health issues throughout the region and 2) Support activities that serve the needs of the target populations.

Goal 4. Accomplish Extensive Interdisciplinary Collaboration

Objectives: 1) Provide multi-disciplinary courses and conferences to promote interaction among professionals in all fields of occupational safety and health; 2) Identify needs and topics of interest that are interdisciplinary in nature, and 3) Engage in service activities that are applicable across the disciplines.

Target audiences for RMCOEH CE courses include: (1) Industrial Hygienists, (2) Safety Professionals, (3) Ergonomists, (4) Occupational Health Nurses, (5) Occupational Medicine Physicians, (6) Industry and Human Resources Managers, (7) Paraprofessionals, and (8) Technicians, including Labor-Management Health and Safety Personnel.

C. Program Activities and Accomplishments

The following is a summary of progress in accomplishing the overall goals for the Continuing Education (CE) program for the current grant period beginning July 2005 through June 30, 2006.

Goal 1. Offer quality CE programs (courses and conferences) to occupational and environmental health and safety professionals and to others involved in the field.

Objective 1: Provide short-term occupational safety and health post-graduate training (a minimum of two per core discipline) on current issues and topics to a minimum of 400 participants/year: During the period July 1, 2005 through June 30, 2006, 2,310 trainees attended 101 CE courses. We delivered more than two courses per core. The distribution of the course attendees follows:

a. Trainees in Attendance (current budget period)

Most (n= 1,327, 57%) came from industry, 19 percent (n= 434) came from government agencies, and 13 percent (n= 283) were from academic institutions. The remainder of course participants (11%) were from allied occupational safety and health employers and labor representatives, including but not limited to construction and renovation, chemistry, insurance, law, physical therapy, occupational therapy, wellness coordination, and private consulting and contracting.

b. Categories of Participants

During the current grant period (July 1, 2005 – June 30, 2006), attendees were distributed among the four core professions as follows: MD – 13% (n = 301), , NURS – 6% (n = 119), HYG - 20% (n = 445), and SAFETY – 24% (n = 551). Based on regional data procured from the American Association of Occupational Health Nurses, Region VIII has an OHN membership of 153. In view of these low numbers; it is anticipated that representation of occupational health nurses at continuing education courses within the region will be low until additional OHN education programs are implemented. Development of an OHN program is a long-term goal of the RMCOEH.

Distance-Based Education: The CE Program has continued to draw participants to its hard-copy distance-based education courses. The program also directed efforts at distance-based education utilizing technology at the 2006 NORA symposium. At that symposium, the CE program successfully pilot tested an internet-based educational delivery tool (Elluminate Live!TM) that offers a real-time virtual classroom environment designed for distance-based education.

Minority Populations: The CE Program has made significant strides in capturing data on minorities that attend courses by including an optional question on the registration form which the majority of participants elect to complete. The program has identified the following minority distribution at CE courses from July 1, 2005 through June 30, 2006: Ninety four percent of the attendees identified themselves as white (n = 8625), 4% as Hispanic (n = 293), 1% (n = 48) as Asian or Pacific Islander, 1% (n = 48) as Black and 1% (n = 11) as American Indian or Alaskan Native. The program has attempted to draw minorities to its programs through an initiative sponsored by the Utah Labor Commission, Associated Builders and Contractors, Associated General Contractors, Utah Farm Bureau Federation, Utah Chapter AFL-CIO and the Utah Restaurant Association. This initiative is administered through the Rocky Mountain Center's OSHA Education Center. Subsidized training has been offered to bilingual (Spanish) safety and health practitioners in Utah. Also, within the current project period, the RMCOEH became a member of the Coalition for Multicultural Workers' Safety and Health that is comprised of several other organizations (Mexican Consulate, Pete Suazo Business Center, Utah Department

of Workforce Services, Utah OSHA Consultation Services, Utah Safety Council and Workers' Compensation Fund of Utah) with a significant interest in minority health and safety. This group has met monthly to address meet the safety and health needs of the multicultural workforce. The CE Program has familiarized this group with its programs facilitating expanded promotion to this specialized community.

Objective 2. Facilitate exchange with other safety and health professionals through course co-sponsorship with other organizations involved in occupational safety and health: During the period July 1, 2005 through June 30, 2006, the RMCOEH collaborated and co-sponsored programs with other organizations with a shared interest in promoting occupational safety and health. These organizations include: the local Chapter of the American Society of Safety Engineers (ASSE), the local Section of the American Industrial Hygiene Association (AIHA), and the Utah Safety Council. We have, collectively, planned and conducted the Utah Conference on Industrial Hygiene and Safety every year. We have also collaborated with the Utah Chapter of the American Association of Occupational Health Nurses (UAOHN) to develop and promote courses for nurses including a spring and fall seminar each year. We co-sponsored the Practical Aspects of Management course with the University of Utah's Continuing Medical Education Office (previously co-sponsored with the American College of Occupational and Environmental Medicine) course. The CE Program has also collaborated with the Utah Council on Worksite Health Promotion to develop, market, and implement an annual Worksite Health Promotion conference. We also helped plan and conduct the Second Symposium on Beryllium Particulates and Their Detection with the Beryllium Health and Safety Committee, the Department of Energy, NIOSH, Savannah River National Laboratory, and Eichrom in 2005. In 2006, RMCOEH faculty helped plan and lectured in the 2nd Annual IAIABC Workers' Compensation Medical Institute with the American Academy of Disability Evaluating Physicians and the California Commission on Health and Safety Workers' Compensation.

3) Obtain highly-qualified faculty from the private and public sector that bring both theoretical and practical knowledge to the issues presented: The CE Program has offered quality programming with the support of highly-qualified and, often, credentialed faculty. It is fortunate to be surrounded with a cadre of qualified individuals, both within and outside the Center that supports its programs. All RMCOEH faculty members have participated in the CE program. In addition to RMCOEH faculty participation in CE courses, the CE Program enjoys faculty support from numerous, highly qualified individuals outside the RMCOEH representing both the private and public sector. Many of these faculty members have departmental adjunct faculty appointments.

4) Hold at least one course per year regionally outside of Salt Lake City: The CE program offered a number of courses in surrounding areas to enhance regional coverage. Asbestos courses were held in Moab, Utah, Pocatello, Idaho, and Casper, Wyoming. A training seminar for Conoco was held in Park City, Utah. The co-sponsored 2nd annual IAIABC Workers' Compensation Medical Institute was held in San Diego, California. Finally, a Pulmonary Function Testing course was held in, Billings, Montana.

Goal 2. Conduct research to identify CE training needs and impact.

The sole objective of this goal was to research the needs of each state within the Center's designated region by needs assessment surveys and questionnaires. The CE Program implemented an extensive needs assessment program utilizing a variety of sources. Needs information was collected from standard needs assessment surveys as well as from course evaluation forms placed in participants' course packets. Training effectiveness was measured through both post-course surveys. All instruments were used to identify new topics as well as evaluate interest in established courses. The CE Program also utilized the needs assessment data collected from the CE network that exhibits at national conferences. An electronic survey on the RMCOEH web site has produced lower-than-desired results. Surveys administered to RMCOEH graduates included questions targeting continuing education needs. Finally, input from the Center Executive Committee and the RMCOEH Advisory Board with the affiliated CE Advisory Committee was an integral part of the strategy that used to evaluate the program's offerings. Reliance on these diverse strategies resulted in the development of a number of new courses over the course of the project period. The new courses for the period were: 2nd Symposium on Beryllium Particulates and Their Detection, AOHC ABPM Update Session, AOHCV: Shoulder Disorders: Advanced in Knowledge, ASP/CSP Comprehensive Review courses,

Compensable Disability Forum: Ethical Management of Cultural Diversity in Workers Comp, Developing a Wellness Program, Ethics in the Workplace, IAQ: Mold Control in HVAC Systems, Time-Based Management: an Improvement Tool for Health & Safety Correspondence course, Non-Ionizing Radiation and Instrumentation, OSHA 10-hour for the Construction Industry, OSHA 10-Hour for General Industry, OSHA 2264: Permit-Required Confined Space Entry, OSHA 503: Update for General Industry Outreach Trainers, OSHA 7000: OSHA's Ergonomics Guidelines Training for the Long-Term Care Industry, OSHA 2225: Respiratory Protection, Tips, Tricks & Hints for More Effective EHS Training, Update and Case Studies in Commercial Driver Medical Fitness, and VPPPA Application Workshop.

Goal 3. Provide superior service and outreach that enhances and promotes the field of occupational and environmental safety and health.

Objective 1) Increase awareness and understanding of occupational safety and health issues throughout the region: The CE Program has promoted, provided registration support, and issued certificates for the Paul S. Richards Memorial Lectureship which has founded a keynote address for the annual NORA symposium. This was a free public service that was supported through an endowment. The presenter in 2005-2006 was Thomas E. Bernard, Ph.D., University of South Florida.

The Center has also promoted awareness of the field by exhibiting at national and regional professional association meetings as funds have permitted including the AIHCE and the Utah Conference on Safety and Industrial Hygiene. It also exhibited at a function sponsored by the Utah Chamber of Commerce for the Hispanic community.

Finally, capitalizing on electronic delivery systems, the CE Program distributed monthly course notifications to an electronic mailing list that it has steadily built over the last ten years. It also listed its courses in the semi-annual RMCOEH newsletter.

2) Support activities that serve the needs of the target populations: Activities that support the needs of the target population include courses that help practitioners prepare for professional certification. These included programs such as the Comprehensive Review of Industrial Hygiene and the ASP/CSP Review courses. Courses were also designed to maintain professional certifications and help meet practitioners meet licensure requirements. Continuing education credits are a major need of the target populations and the CE Program has long provided appropriate specialty credit as well as Continuing Education Credits to meet this need. American Board of Industrial Hygiene, AMA Category 1 CME credit and American Academy of Family Practice prescribed credit for occupational medicine courses have been obtained through course co-sponsorship with both the American College of Occupational and Environmental Medicine (ACOEM) and the American Academy of Family Physicians (AAFP). American Board of Preventive Medicine MOC credits were also obtained for the State-of-the-Art Musculoskeletal Disorders Conference. The Practical Aspects of Management hard-copy distance-based education course was approved as a recertification module by the American Board of Preventive Medicine for specialists in occupational medicine, aerospace medicine, and general preventive medicine/public health. It was also awarded MOC credit. Insurance, legal, and case manager credits have also been procured as applicable. The CE Program also obtained Utah Nursing Association (UNA) credits for the Compensable Disability Forum to assist nurses who are not occupational health nurses with licensure. The American Association of Occupational Health Nurses accepts the traditional Continuing Education Unit, making additional credits from it unnecessary.

In addition, the CE Program has identified an alternative way to meet the needs of the target populations by developing and offering intensive short-term certificate programs. The Safety Certificate Program was developed years ago and continues to be successfully attended. Courses are offered at night, one night per week over an 8-week period to accommodate the need to attend at night. Also, an Industrial Hygiene Certificate Program was implemented within the last year. Courses are held during the day to avoid interfering with the Safety Certificate program held in the evenings.

The Center has also worked with other ERCs and other OSHA Training Centers to meet participants' needs. Attendees have been referred to other Centers if their training needs could not be met by our program. In addition, the ERC Continuing Education Directors have met annually and have openly shared ideas about the development, marketing and presentation of programs.

As noted previously, the RMCOEH has annually co-sponsored seminars with the Utah Association of Occupational Health Nurses (UAOHN). RMCOEH donates its share of the proceeds from the event to support the ongoing activities of the UAOHN.

When sufficient requests have been received by either phone or through a formal needs assessment, the RMCOEH has made every effort to accommodate the request. Requests for additional asbestos courses, PFT courses and OSHA courses and asbestos courses have been offered in response to such needs.

Finally, as a service to RMCOEH academic students, they have been able to attend all CE courses at cost. This is an added benefit to the student and reflects the commitment of the CE program to the efforts of the academic cores.

Goal 4. Accomplish Extensive Interdisciplinary Collaboration

Objective 1. Provide multi-disciplinary courses and conferences to promote interaction among professionals in all fields of occupational safety and health: Interdisciplinary in nature, continuing education courses attracted attendees that crossed all core disciplines. This effort was facilitated by organizing efforts that bring different disciplines together. For example, the Annual Utah Conference on Safety and Industrial Hygiene united industrial hygiene and safety associations who assisted in organizing the conference. Many nurses attended occupational medicine courses such as the State-of-the-Art Conference on Musculoskeletal Disorders, and safety professionals supported the Workers Compensation conference, an effort primarily directed to insurance adjusters and risk managers.

Objective 2:. Identify needs and topics of interest that are interdisciplinary in nature: The RMCOEH researched interdisciplinary training needs through its needs assessments and evaluation activities. Overlap between interests was identified in each core discipline.

Objective 3. Engage in service activities that are applicable across the disciplines: The "Richards Lectureship" and exhibiting at national meetings are prime examples of interdisciplinary efforts. As appropriate, certification maintenance credits have also been awarded across the disciplines.

D. Program Products

Courses by specialty are detailed in Statistical Report Tables 12a and 12b.

E. Future Plans

Over the next budget period, we will emphasize: (1) development of distance-based education programs, (2) continuous needs assessment, (3) new course development, and (4) training program impact evaluation.

Program Title: Hazardous Substances Training

A. Program Director: Connie Crandall, MA, MBA

B. Program Description

The NIOSH-training target audience includes professionals in state and local government agencies, as well as other professionals engaged in the handling of hazardous substances or the management of facilities engaged in hazardous substances-related activities. Therefore, our courses also target individuals that include emergency response personnel, engineers, and consultants who may be required to periodically access hazardous waste sites or be involved in responding to chemical incidents and, thus, potentially be exposed to health and safety hazards. The HST programs for health and environmental professionals are administered through the CE program, and consist of short courses and other activities ranging from ½ day to 5 days in length. During 2005-2006, its offerings included 22 courses on a variety of HST-related topics as identified in the original request for application and as identified by needs assessments.

The HST Program Director is Ms. Connie Crandall, MA, MBA. She is assisted in the administration of the program by a Program Coordinator and Registration Coordinator. She coordinates technical aspects of the program with Mr. Mark Dumas, MSPH, Principal Faculty and Dr. Rod Larson. These individuals are also instrumental in developing, implementing, and evaluating the program. These efforts are augmented by input from the Hazardous Substances Advisory Committee, the Center Executive Committee and the RMCOEH Advisory Board.

The faculty for the HST effort is comprised of individuals from both Center core faculty members as well as from the private sector, academic institutions, and government agencies. Most faculty members enjoy recognition for their expertise in this specialty area. In addition to overall expertise, the faculty is also recognized for their professional qualifications with many carrying Masters of Science in Public Health degrees. Some also hold the Certified Hazardous Materials Manager (CHMM) and Certified Industrial Hygienist (CIH) designations.

HST Program goals and objectives, in support of the overall goals of the Center, are as follows:

Goal 1. Continue to offer continuing education courses to professionals involved in the hazardous substances field.

Objectives: 1) To provide short-term hazardous substance post-graduate training on current issues and topics; 2) To facilitate exchange with other safety and health professionals through coordination with agencies. 3) To involve the representatives of the target audience in planning and implementing programs through an advisory committee, 4) To obtain highly-qualified faculty from the private and public sector who bring both theoretical and practical knowledge to the issues presented; and 5) To develop and implement a comprehensive marketing program.

Goal 2. Conduct research to identify training needs and training effectiveness.

Objectives: 1) To periodically estimate the need for hazardous substances training of each state within the Center's designated region by extensive questionnaires and needs assessment surveys; and 2) To annually evaluate training effectiveness through post-course questionnaires.

Goal 3. Engage in service activities that enhance and promote the field of hazardous substances.

Objective: 1) Support activities that serve the needs of the target audience

C. Program Activities and Accomplishments

The following is a summary of progress in accomplishing the overall goals for the Hazardous Substances Training (HST) program for the current grant period beginning July 2005 through June 30, 2006.

GOAL 1: Continue to offer education programs (courses and conferences) to professionals involved in the hazardous substances field.

Objective 1. Provide short-term hazardous substance post-graduate training on current issues and topics

In the current grant period (July 2005-June 2006), the HST program conducted twenty-two hazardous substances training courses. The breakdown of attendees for the July 2005 – June 2006 period is as follows:

1. Trainees in Attendance

During the period July 1, 2005 through June 30, 2006, 303 trainees attended 22 HST CE courses. About 44% (n = 133) were public sector personnel from government agencies, 6% (n = 16) came from academic institutions, and 47% percent (n = 140) from private industry.

2. Categories of Participants

During the period July 1, 2005 through June 30, 2006, attendees by profession were distributed among the following: IH – 23 (8%); OHN – 6 (2%); and E&S – 75 (25%). Sixty-five percent (n = 199) of the attendees were categorized as “Other” and include chemical safety officers, environmental compliance officers, environmental engineers, environmental health scientists, firefighters, public works directors and site superintendents.

3. Race of Participants

The HST course brochures include an optional question on the registration form to determine the race of course attendees. During the period July 1, 2005 through June 30, 2006, the participants identified themselves as follows: Ninety-four percent (n = 289) of the attendees were categorized as White, 4% (n = 10) were categorized as Hispanic, 1% (n = 5) were categorized as Asian or Pacific Islander and 1% were categorized as Black.

The RMCOEH has employed a number of needs assessment mechanisms to drive its training schedule: Needs assessments, post-course evaluations, regulatory requirements, and both RMCOEH Advisory Board and HST Advisory Committee input. As a result, several new courses were added during the year: Decontamination Specialist, Emergency Plans & Emergency Response Workshop, Managing Hazardous Materials in the Workplace and Hazardous Materials: The Language of Chemistry.

At the Annual Utah Conference on Safety and Industrial Hygiene (a conference that is newly developed each year), hazardous substances lectures and short courses were included. Topics include Bioterrorism, and Disaster Site Worker Programs, and Managing Hazardous Materials in the Workplace.

Objective 2. Facilitate exchange with other safety and health professionals through coordination with agencies.

Because the primary audience for the NIOSH-funded HST courses includes federal, state and local health and environmental agency personnel, the RMCOEH has maintained close coordination with those agencies which include the Utah State Division of Risk Management, the Utah Division of Solid and Hazardous Waste, the Utah Division of Air Quality, the Salt Lake Valley Health Department, and the Salt Lake County Emergency Management Bureau.

Objective 3. Involve the representatives of the target audience in planning and implementing programs through an advisory committee

The agency coordination process is formalized under the HST Program Advisory Committee that is comprised, in part, of representatives of the target audience. Committee members were specifically selected on the basis of background and involvement in hazardous substances activities. Representatives from these agencies are connected to other affiliated agencies so that the coordination with agencies has been widespread. The rest of the committee is comprised of industry and academic representatives. The Advisory Committee met and Input from these members was used to evaluate the hazardous substances program schedule and course content.

At their annual meeting, the HST Project Directors discussed programmatic issues related to the HST Program. At this meeting which is sponsored by NIOSH, NIEHS and EPA provided update presentations directly related to this training program's initiatives. Their inclusion has provided excellent opportunities for federal agency coordination. The RMCOEH has also worked with the EPA office in Region VIII to identify regional and local health department contacts for further program promotion. In addition, Dr. Moser has worked closely with the Utah State Department of Health, providing lectures on bioterrorism and response to other mass casualty events. He has also spent considerable time facilitating planning meetings and developed the Utah Medical Surge Plan for Terrorism (especially CBRNE) and other Mass Casualty Events. This plan as served as a model for other states.

During this project period, the RMCOEH formed a strategic partnership with the Salt Lake Community College. Mr. Dumas, Principal Faculty, has served as the liaison between the two institutions. This partnership has involved significant collaboration between the two programs to conduct 8- and 40-hour HAZWOPER training courses. The partnership was established to avoid duplication of effort and more effectively reach similar target populations.

Objective 4. Obtain highly-qualified faculty from the private and public sector who bring both theoretical and practical knowledge to the issues presented.

During the project period, the RMCOEH continued to successfully draw quality faculty from a wealth of occupational and environmental safety and health professionals in the immediate area. Mark Dumas, Principal Faculty, has provided technical oversight of the program. His input has been complemented by outside faculty, all of them individuals who are respected and current in the field.

Objective 5. Develop and implement a comprehensive marketing program.

An active marketing program and multi-faceted marketing plan was utilized to recruit prospective HST students. The program relied on a marketing mix that included a dedicated web site, direct mail and email campaigns, targeted advertising in trade association journals, and trade show exhibiting. HST programs were actively promoted at the AIHCE meetings in early 2006 as well as at the local Annual Utah Conference on Safety and Industrial Hygiene in October 2005. It most recently exhibited (June 2006) at an event sponsored by the Workers' Compensation Fund of Utah and the Utah Chamber of Commerce.

The RMCOEH's web site has individual pages for each core area including continuing education. All hazardous substances courses have been listed on the continuing education portion of the site with downloadable brochures available for more extensive dissemination of information.

In support of the direct mail campaign, the HST program brochures were distributed to both in-house (3500 names) and leased lists that specifically target the program audience. Each course was promoted through this direct mail approach. Each course brochure also listed other upcoming programs so that additional coverage was provided in numerous mailings. The CE program published its annual calendar which included the hazardous substances programs.

In addition, program ads were placed in key journals such as *Environmental Health & Safety*, *Facility Safety Management*, *Occupational Health and Safety*, *Occupational Hazards*, and *The Synergist*.

As an enhancement to the direct mail marketing activities, the program also utilized email notification. An electronic list of several thousand names was used to distribute monthly course notifications. Other electronics lists were also utilized including the safety list maintained at the University of Vermont and the asbestos list maintained at Utah State University. Course notifications have also been sent monthly to the local chapters of the American Industrial Hygiene Association, American Society of Safety Engineers, Utah Manufacturers Association and Associated General Contractors for distribution to their membership. Electronic course notification has also been used to spotlight individual courses to spur enrollments as enrollment deadlines near.

GOAL 2: Conduct research to identify training needs and training effectiveness.

Objective 1. Periodically estimate the need for hazardous substances training of each state within the Center's designated region by extensive questionnaires and needs assessment surveys.

A regional needs assessment was not distributed in 2005-2006; they are distributed every other year. Impact evaluations are also distributed on an every-other-year basis; they will be distributed in October 2006.

Objective 2. Annually evaluate training effectiveness through post-course questionnaires.

A needs assessment survey was distributed to every course participant as part of their course packets. Also, consultations with HST Advisory Committee members, RMCOEH Advisory Board members, and internal and external faculty have also been utilized to obtain reliable needs information. The HST Advisory Committee has been particularly important as it includes representatives of the target audience. HST Program issues have also been discussed at the RMCOEH Advisory Board meetings and with course faculty to provide an even wider perspective from agencies outside the Center.

GOAL 3: Engage in service activities that enhance and promote the field of hazardous substances.

Objective 1. Support activities that serve the needs of the target audience.

Curriculum design and training approach have been significant considerations in meeting course participants' needs. For example, the skills-based courses like the 8- and 40- hour hazardous waste operations and emergency response courses have included practical activities to prepare participants for the actual types of procedures they will encounter on the job.

In addition, course faculty members have queried course participants to assess skills and knowledge levels so that the needs of all participants can be addressed. The program has also relied on experienced trainers who incorporate a mix of activities to accommodate differing learning styles. Finally, courses have been reviewed and revised as needed to keep course content timely with current and relevant information.

The Certified Hazardous Materials Manager (CHMM) Review course has been offered to meet the participant's need for professional certification.

In addition to preparing practitioners for professional certifications, all RMCOEH continuing education courses, including HST courses, are designed to maintain professional certifications. Since CE credits are a major need of the target populations in order to maintain certification, the credits have been obtained from appropriate professional associations. In addition to the traditional Continuing Education Unit (CEU), credits from the American Board of Industrial Hygiene have also been requested and awarded for HST courses.

Additionally, attractive tuition fees have been offered primarily to state and local government attendees. These attendees have been charged at a rate of 50% of non-government participants with some attendees also being considered for full scholarships. Over the July 1, 2005 – June 2006 project period, 98 partial and, in some instances, full fee waivers were awarded. This facilitated attendance by those agencies or groups that would otherwise have been unable to attend because of limited funding resources.

Finally, multi-disciplinary experiences have been an integral part of HST courses as well as hazardous substances-related sessions at the Annual Utah Conference on Safety and Industrial Hygiene. Many different types of occupational safety and environmental health professionals including industrial hygiene and safety professionals with an ancillary interest in hazardous substances intermixed in industrial hygiene, safety, and HST courses.

D. Program Products

Courses offered during July 1, 2005 through June 30, 2006 are detailed in Statistical Report Tables 12a and 12b.

E. Future Plans

Over the next budget period, we will emphasize: (1) development of distance-based education programs, (2) continuous needs assessment, (3) new course development, and (4) training program impact evaluation.

Ph.D.
Ergonomics & Safety

Ph.D. in Mechanical Engineering**Prerequisites:****M.S. Degree (Engineering)** including the following (or equal)

Course No.	Course Name	Credits
ESS 6560	Experimental Design and Analysis	3
ME 6100	Ergonomics	3
ME 6110	Introduction to Industrial Safety	3
ME 6120	Human Factors Engineering	3
ME 6960-4	Work Physiology and Occupational Heat Stress	3
FPMD 6750	Fundamentals of Industrial Hygiene	2
FPMD 6759	Occupational Safety & Health Field Trips	1
Subtotal program prerequisite credits		18

Program Requirements:

Course No.	Course Name	Credits	
ME 6130	Design Implications for Human Machine Systems	3	
ME 7100	Advanced Ergonomics Occupational Biomechanics	3	
ME 7105	Advanced Ergonomics Occupational Biomechanics LAB	1	
ME 7110	Systems Safety	3	
ME 6XXX	Technical Elective	3	
ME 7XXX	Technical Elective	3	
ME 7960	Computer Applications and Research Methods in Health and Safety	3	
ME 7120	Musculoskeletal Functional Anatomy for Engineers	3	
BIOEN 6210	Biomechanics (BIOEN)	3	
PHYSL 5100	Carpal Tunnel Syndrome	2	
FPMD 6300 <u>or</u>	Epidemiology I	3	
ED PSYCH 7010	Quantitative Methods I, Inferential Statistics	3	Or equal
ED PSYCH 7020	Quantitative Methods II, ANOVA and Multiple Regression	3	Or equal
STATISTICS	Statistics (elective)	3	
Subtotal Course Hours		39	
ME 7970	Dissertation (Ph.D.)	14	
Total Semester Hours		53	

**Master of Science
Ergonomics & Safety**

Course No.	<u>MS/ME in Mechanical Engineering</u> Course Name	<u>MS</u> Credits
ME 6100	Ergonomics	3
ME 6110	Introduction to Industrial Safety	3
ME 6030 <u>or</u> ME 6040 <u>or</u> ME 6960	Reliability <u>or</u> Quality Assurance <u>or</u> Independent Study (1 to 3)	3
ME 6120	Human Factors Engineering	3
ME 6960-3	Occupational Safety and Health Solutions	3
ME 6960-4	Work Physiology and Occupational Heat Stress	2
ME 7XXX	Technical Elective (ME 7110, Systems Safety required unless waived based on past education/experience)	3
ME 7XXX	Technical Elective	3
FPMD 6750	Fundamentals of Industrial Hygiene	2
FPMD 6100 <u>or</u> ESS 6560	Biostatistics I <u>or</u> Experimental Design and Analysis	3
FPMD 6754 <u>or</u> FPMD 6753	Noise and Other Physical Agents <u>or</u> Industrial Ventilation	2
FPMD 6759	Occupational Safety & Health Field Trips	1
	Subtotal Course Hours	31
ME 6975	Thesis	9
	Total Semester Hours	40

Hazardous Substance Academic Training (HSAT)

is the science dealing with not only the anticipation, recognition, evaluation, and control of occupational and environmental health hazards, but the management and controls associated with hazardous substances. Like industrial hygienists, individuals in this profession work closely with occupational health physicians, nurses, safety experts, and others in the health field to develop methods and procedures to prevent adverse health effects that may be associated with handling of hazardous materials.

The student entering graduate training in Industrial Hygiene must have an acceptable background in organic chemistry, inorganic chemistry, and mathematics (e.g. through calculus). In-depth undergraduate training in other physical and biological sciences is desirable. Applicants must have a bachelor's degree, with a minimum of 180 quarter hours or 120 semester hours (102 or more quarter hours or 68 semester hours of technical courses). Students with extensive applicable experience or in management type positions related to hazardous substance handling may be approved for the MPH degree. Students with limited applicable experience must seek the MSPH program.

Coursework requirements:

A candidate for the MPH degree in industrial hygiene must complete at least 45 credit hours of coursework. Of these, 37 credit hours are for required courses, 2 credit hours are for electives, and 6 credit hours for the required practicum.

A candidate for the MSPH degree in industrial hygiene must complete at least 55 credit hours of coursework. Of these, 35 credit hours are for required courses, 4 credit hours are for electives, and 6 credit hours for the required practicum, and 10 credit hours for a masters project or thesis.

Specifically, courses required for the MPH, industrial hygiene emphasis are:

Course #	Course Title	Credit Hours	Semester Offered
FPMD 6100	Introduction to Biostatistics	3	Fall & Spring
FPMD 6300	Introduction to Epidemiology	3	Fall
FPMD 6500	Introduction to Public Health	3	Fall
FPMD 6600	Social Context of Medicine and Public Health	3	Fall & Spring
FPMD 6700	Environmental Health Problems (Env. Health Sciences)	3	Spring
HEDU 6790	Health Services Administration	3	Spring
FPMD 6960	Public Health Practicum	6	Fall, Spring & Summer

- **Core Credits: 24**

Course #	REQUIRED IH COURSES	Credit Hours	Semester Offered
FPMD 6750	Fundamentals of Industrial Hygiene	2	Fall

Principal Investigator/Program Director (Last, First, Middle): Hegmann, Kurt T., M.D., M.P.H.

FPMD 6751	Advanced Industrial Hygiene	2	Spring
FPMD 6752	Introduction to Industrial Toxicology and Physiology	3	Fall
FPMD 6730	Quantitative Risk Assessment	3	Spring
FPMD 6756	Hazardous Substances	3	Fall
FPMD 6758	Occupational Environmental Health Clinic	1	Fall, Spring, & Summer
ME 6960	Occupational Health and Safety Solutions	3	Spring
To be Numb.	Publishable Project added to Cse	2	Any Term

Core Credits: 19

Electives Students Choice (see below) **2**

MPH-IH Total Credit Hours: 45

IH Electives:

Course #	Course Title	Credit Hours	Semester Offered
FPMD 6754	Noise and Other Physical Agents	2	Spring (Even Years)
FPMD 6753	Industrial Ventilation	2	Spring (Odd Years)
ME 6100	Ergonomics	3	Spring
ME 6110	Safety	3	Spring

MSPH - Industrial Hygiene Emphasis

Take Above Credits for MPH Plus Either Project or Thesis Hours:

Course #	Course Title	Credit Hours	Semester Offered
FPMD 6975	Project Research - MSPH	10	Fall, Spring & Summer
FPMD 6977	Thesis Research - MSPH	10	Fall, Spring & Summer
Total Credit Hours:		MPH: 45 / MSPH: 55	

Note: Not taking 2 cr for MPH publication, **4 cr hr** for electives in MSPH prgrm.

Industrial Hygiene

is the science dealing with the anticipation, recognition, evaluation, and control of occupational and environmental health hazards. Individuals in this profession work closely with occupational health physicians, nurses, safety experts, and others in the health field to discover the etiologic agents responsible for work and/or environment-related disease, and to develop methods and procedures to prevent adverse health effects.

The student entering graduate training in Industrial Hygiene must have an acceptable background in organic chemistry, inorganic chemistry, and mathematics (preferably through calculus). In-depth undergraduate training in other physical and biological sciences is desirable. Applicants must have a bachelor's degree, with a minimum of 180 quarter hours or 120 semester hours that include 102 or more quarter hours or 68 semester hours of technical courses. Students with extensive applicable experience or in supervisory positions in IH may be approved for the MPH degree. Students with limited applicable experience must seek the MSPH program

Coursework requirements:

A candidate for the MPH degree in industrial hygiene must complete at least 45 credit hours of coursework. Of these, 35 credit hours are for required courses, 4 credit hours are for electives, and 6 credit hours for the required practicum.

A candidate for the MSPH degree in industrial hygiene must complete at least 55 credit hours of coursework. Of these, 33 credit hours are for required courses, 6 credit hours are for electives, and 6 credit hours for the required practicum, and 10 credit hours for a masters project or thesis.

Specifically, courses required for the MPH, industrial hygiene emphasis are:

Course #	Course Title	Credit Hours	Semester Offered
FPMD 6100	Introduction to Biostatistics	3	Fall & Spring
FPMD 6300	Introduction to Epidemiology	3	Fall
FPMD 6500	Introduction to Public Health	3	Fall
FPMD 6600	Social Context of Medicine and Public Health	3	Fall & Spring
FPMD 6700	Environmental Health Problems (Env. Health Sciences)	3	Spring
HEDU 6790	Health Services Administration	3	Spring
FPMD 6960	Public Health Practicum	6	Fall, Spring & Summer

Core Credits: 24

Principal Investigator/Program Director (Last, First, Middle): Hegmann, Kurt T., M.D., M.P.H.

Course #	REQUIRED IH COURSES	Credit Hours	Semester Offered
FPMD 6750	Fundamentals of Industrial Hygiene	2	Fall
FPMD 6751	Advanced Industrial Hygiene	2	Spring
FPMD 6752	Introduction to Industrial Toxicology and Physiology	3	Fall
FPMD 6753	Industrial Ventilation	2	Spring (Odd Years)
FPMD 6754	Noise and Other Physical Agents	2	Spring (Even Years)
FPMD 6758	Occupational Environmental Health Clinic	1	Fall, Spring, & Summer
ME 6960	Occupational Health and Safety Solutions	3	Spring

To be Numb. Publishable Project added to Cse **2** Any Term

Core Credits: 17

Electives Students Choice (see below) **4**

MPH-IH Total Credit Hours: 45

IH Electives:

Course #	Course Title	Credit Hours	Semester Offered
FPMD 6756	Hazardous Substances	3	Fall
FPMD 6730	Quantitative Risk Assessment	3	Spring
ME 6100	Ergonomics	3	Spring
ME 6110	Safety	3	Spring

MSPH - Industrial Hygiene Emphasis

Take Above Credits for MPH Plus Either Project or Thesis Hours:

Course #	Course Title	Credit Hours	Semester Offered
FPMD 6975	Project Research - MSPH	10	Fall, Spring & Summer
FPMD 6977	Thesis Research - MSPH	10	Fall, Spring & Summer
Total Credit Hours:		MPH: 45 / MSPH: 55	

Note: Not taking 2 cr for MPH publication, **6 cr hr** for electives in MSPH prgm.

Occupational Safety Engineering Emphasis (OSE)**Ph.D. in Mechanical Engineering****Prerequisites:**

M.S. Degree (Engineering) including the following (or equal). (May be taken as part of PhD program.)

Course No.	Course Name	Credits	Instructor
ME 6100	Ergonomics	3	Bloswick
ME 6110	Introduction to Industrial Safety	3	Bloswick/ Sesek
FPMD 6100	Biostatistics I	3	Alder
FPMD 6300	Epidemiology I	3	Lyon
OIP Program prerequisite credits		12	

Program Requirements:

Course No.	Course Name	Credits	Instructor
FPMD 6101	Introduction to SAS Programming	3	Staff
FPMD 6607	Injury Surveillance	2	Suruda
FPMD 6703	Occupational Injuries and Diseases	3	Hegmann
FPMD 7300	Epidemiology II	3	Staff
FPMD 7720	Occupational and Injury Epidemiology	3	Hegmann
ESS 6560	Experimental Design and Analysis	3	Schultz
ME 6040	Quality Assurance	3	Hoepfner
ME 7100	Advanced Ergonomics and Occupational Biomechanics	3	Bloswick
ME 7110	System Safety	3	Bloswick
ME 6130	Design Implications for Human Machine Systems	3	Sesek
ME 6960-3	Occupational Safety and Health Solutions	3	Sesek, Collingwood Wood
ME 6960-4	Work Physiology and Occupational Heat Stress	2	Bernard
ME 7960	Computer Applications & Research Methods	3	Drinkaus
ME 6960-6	Interdisciplinary Seminar in Occupational Injury Prevention	0	Bloswick
TOTAL COURSE CREDITS		37	

Research Practicum and Dissertation:

Course No.	Course Name	Credits	Instructor
ME 6960-7	Research Practicum in OIP	0	
ME 7970	Dissertation Hours	14	
Total degree required credits		51	

Occupational Injury Epidemiology Emphasis (OIE)**Ph.D. in Public Health****Prerequisites:**

Undergraduate degree including the following (or equal). (May be taken as part of PhD program.)

Course No.	Course Name	Credits	Instructor
FPMD 6100	Biostatistics I	3	Alder
FPMD 6300	Epidemiology I	3	Lyon
FPMD 6311	Research Design	3	Alder
FPMD 6600	Social Context of Medicine	3	Byrd
OIP Program prerequisite credits		12	

Core Public Health PhD Program Requirements:

Course No.	Course Name	Credits	Instructor
FPMD 6101	Introduction to SAS Programming	3	Staff
FPMD 6340	Infectious Disease Epidemiology	3	Alder
FPMD 7100	Biostatistics II	3	Holubkov
FPMD 7300	Epidemiology II	3	Staff
FPMD 7310	Advanced Research Design	3	Alder
FPMD 7530	Design Implementation and Eval of Public Hlth Prog	3	White
FPMD 7640	Advanced Social Context of Medicine	3	Byrd
Subtotal core program credits		21	

OIP Emphasis Courses:

Course No.	Course Name	Credits	Instructor
FPMD 6607	Injury Surveillance	2	Suruda
FPMD 6703	Occupational Injuries and Diseases	3	Hegmann
FPMD 7720	Occupational and Injury Epidemiology	3	Hegmann
ME 6100	Ergonomics	3	Bloswick
ME 6110	Introduction to Industrial Safety	3	Bloswick/ Sesek
ME 7960	Computer Applications & Research Methods in Occupational Injury Prevention	3	Drinkaus
ME 6960-3	Occupational Safety & Health Solutions	3	Sesek, Collingwod, Wood
ME 6960-6	Interdisciplinary Seminar in Occupational Injury Prev	0	Bloswick
FPMD 7140	Applied Multivariate Data Analysis	3	Holubkov
Subtotal OIP emphasis credits		23	
TOTAL COURSE CREDITS		44	

Principal Investigator/Program Director (Last, First, Middle): Hegmann, Kurt T., M.D., M.P.H.

Research/Teaching Practicum and Dissertation:

Course No.	Course Name	Credits	Instructor
FPMD 7965	Research Practicum in OIP	0	
FPMD 7900	Dissertation Hours	15	
	Total degree required credits	59	

Occupational & Environmental Medicine Required Courses

August 2006

Total of 45 credit hours

<http://uuhsc.utah.edu/dfpm/phgroups/>

Fall

Course	Title	Credits
FPMD 6100	Introduction to Biostatistics	3
	Biostatistics Laboratory	
FPMD 6300	Introduction to Epidemiology	3
	Epidemiology Laboratory	
FPMD 6703	Occupational Injuries and Diseases	3
FPMD 6750	Fundamentals of Industrial Hygiene	2
MEEN 6100	Ergonomics	3
	Ergonomics Laboratory	
TOTAL		14

* Attend Advanced Topics throughout the year but sign up only in summer semester.

Spring

Course	Title	Credits
FPMD 6400	Health Care Administration in OEH	3
	(or HEDU 6790 Health Admin)	
FPMD 6504	Clinical Prevention	3
FPMD 6600	Social Context of Medicine & Public Health	3
FPMD 6700	Environmental Health Problems	3
FPMD 6752	Introduction to Toxicology and Physiology	3
MEEN 6960	Occupational Safety and Health Solutions	3
TOTAL		18

* Attend Advanced Topics throughout the year but sign up only in summer semester.

Summer

Course	Title	Credits
FPMD 6702	Advanced Topics in OEH	3
FPMD 6960	Practicum (UT OSHA)	6
FPMD 6710	Individual Research in Occupational Medicine	4
TOTAL		13

RMCOEH OCCUPATIONAL MEDICINE RESIDENCY REQUIREMENTS UNIVERSITY OF UTAH SCHOOL OF MEDICINE

ACADEMIC PHASE: PGY-2

- \$ Required and elective course work to complete the MPH or MSPH degree programs
- \$ Occupational Medicine Clinic (UU Hospitals & Clinics) - approximately 8 weeks, varies
- \$ Clinical Rotation (e.g. UUMC or VAH) - as scheduled
- \$ Practicum (for MPH or MSPH degree) - 3 weeks

PRACTICUM PHASE: PGY-3

Clinical Rotations -The only mandatory clinical rotations are the University of Utah Occupational & Environmental Medicine clinic and rotations at the Salt Lake VA Hospital. The number of weeks of VA rotations will be determined for each academic year and may vary.

All other clinical rotations are elective and are to be selected based on the resident's prior experience, assessment of clinical skills, and career goals in consultation with the Program Director.

Industrial Preceptorships

All PGY-3 residents must complete 14 weeks of industrial time. Of this time, a minimum of 8 weeks traditional industrial rotations (exclusive of vacation) is required. If desired, resident may select to complete the 14 week requirement with 6 weeks of other population-based rotations. A list of approved current industrial rotations is available from the program coordinator. Rotations at a particular site should be of at least 3 weeks duration. At least one out of state rotation is strongly recommended to help achieve more diversification of educational experiences.

The Boeing Company (expecting agreement renewal)	Seattle, Washington
Chevron Corporation	Houston, TX
Hill Air Force Base	Ogden, Utah
Hanford Environmental Health Foundation (pending agreement)	Richland, Washington
Toxicology (includes site visits to Intel, Inc. and other companies)	Albuquerque, NM
Los Alamos	Los Alamos, NM
NASA Kennedy Space Center	Florida
Occupational & Preventive Medicine Inc.	Columbus, OH
Puget Sound Naval Shipyard	Bremerton, Washington
Workers Compensation Fund	Salt Lake City, Utah

Population-based Preceptorships (elective)*

Agency for Toxic Substance Disease Registry (ATSDR)	Atlanta, GA
National Institute for Occupational Safety & Health (NIOSH)	(Anchorage, AK, Morgantown, WV, Cincinnati, OH)
Utah OSHA/Utah Labor Commission (two weeks recommended)	Salt Lake City, UT
Utah Dept. of Health	Salt Lake City, UT
Utah Dept. of Environmental Quality	Salt Lake City, UT

Principal Investigator/Program Director (Last, First, Middle): Hegmann, Kurt T., M.D., M.P.H.

Utah Disability Determination for Social Security
U.S. Dept. of Labor/OSHA (minimum two months)

Salt Lake City, UT
Washington D.C.

**Some of these may contain time that may be credited towards the Industrial Preceptorship time requirement based on content of that experience.*
updated 2/14/07

Journal Club Participation and Attendance

Journal Club is designed to give the resident practical experience in critiquing new articles. An Additional goal is to afford the resident an improved ability toward decision making skills regarding whether to integrate this new article=s information into clinical practice.

General Format: 2 articles critiqued per session
1 session every other week

Participation: All residents are expected to present at least 3 article per year. Articles are selected by the presenter, but if desired, faculty members will assist.

Attendance: When a resident is in town (i.e., immediate Salt Lake City area), attendance is expected to be at least 50%. Attendance is not possible for out of state rotations, distant Bin-state rotations (e.g., ATK) and may be difficult for moderately distant rotations (e.g., Hill AFB) therefore none of those sites will count towards the attendance requirements.

If attendance is less than 50% over a 3 month period (excluding distant rotations as noted above), then the residents will be required to present 2 additional articles that year.

Occupational Medicine Grand Rounds

OM Grand Rounds is held at LDS Hospital and co-sponsored by RMCOEH. It is held in the first week of every month. Topics are generally applied, practical and clinical. You must attend 3 per year and attendance is taken. **Again, sign the attendance logs as we will check those to verify attendance!**

Occupational Health Nursing Sessions

To facilitate your learning of OHN principles, you must attend the OHN Sessions scheduled at noon about every month during the school year. This is particularly important as we do not have an OHN program at RMCOEH.

Other Departments= Sessions

Purposes: there are many other conferences available on campus every day. Some of them may be of interest to some residents and other topics may be attractive to others (usually somewhat dependent on the residents= areas of interest or potential subspecialty practice area (s).

Examples: Internal Medicine Grand Rounds
Family Practice Grand Rounds
Toxicology Rounds
Orthopedics rounds

Participation/Attendance: Provided you complete your regular residency requirements, in a timely manner, you may attend these as you like. If there is something that is regular/recurring and of special interest to you, please be sure to communicate that the OM Residency faculty; we would like to share in your enthusiasm.

- NOTE:
1. Residents must develop a yearly schedule and maintain a weekly log to ensure objectives are met.
 2. Other duties, including first response to emergency and telephone queries and participation in special projects, are also required and will be scheduled in conjunction with the Program Director.
 3. Residents need to be in contact with chief resident at least every other week.
 4. Residents need to be aggressive and ASK during a rotation to see the patients who would be good for their Occupational Medicine training. In pulmonary, learn how to read spiromograms. Do NOT expect attendings to know what an Occupational Medicine physician does. It is incumbent on you to read all rotation objectives BEFORE starting the rotation, as well as DURING the rotation to be sure you achieve those specific learner centered objectives!
 5. Residents have a research requirement. PGY-3 residents must turn in a copy of their research for their files. Failure to complete this requirement will mean failure to successfully complete the residency. There are many opportunities available to you to so this should not be difficult and should be rewarding. It is possible to take a few weeks of research elective if desired.
 6. Be sure to ALWAYS read the learner centered objectives (LCOs) PRIOR to starting a rotation and again frequently during the rotation to be sure you are achieving the goals of the rotation!! These LCOs were developed by Dr. Hegmann after 10 years of experience observing deficits in OM physician and resident knowledge bases that should not be deficits at all. Please insure that you do not contribute to ongoing knowledge deficits in our professional community by failing to actively pursue these LCOs.

ERC Applicant Institution: University of Utah
 Program Director: Donald Blosswick
 Discipline: Ergonomics & Safety

**Table 4a
 Academic Training Report
 Previous Budget Period: July 1, 2005 to June 30, 2006**

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled¹	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses²	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
MS	MS in Mechanical Engineering	5	5	6	0	37	6
ME	ME in Mechanical Engineering	0	0	1	0	0	1
MPH/MSH	Master of Public Health, Master of Science in Public Health	0	0	0	0	4	0
Doctorate degree							
PhD	Ph.D. in Mechanical Engineering	2	2	0	0	6	0
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.³)							
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 8.

¹ Trainee counts include all students in the approved programs.

² Does not include trainees counted in any of the full-time or part-time categories

³ In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: Rocky Mountain Center for Occupational & Environmental Health - U of U
 Program Director: Rod Larson, PhD, CIH
 Discipline: HSAT

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled¹	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses²	# Trainees Graduated
Master's degree							
MSPH	Masters of Science in Public Health emphasis in Industrial Hygiene	2	2	0	0	7	2
MPH	Masters of Public Health emphasis in Industrial Hygiene	0	0	1	1	N/A	0

Refer to: Supplemental Instructions, page 8.

¹ Trainee counts include all students in the approved programs.

² Does not include trainees counted in any of the full-time or part-time categories

³ In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: Rocky Mountain Center for Occupational & Environmental Health - U of U
 Program Director: Rod Larson, PhD, CIH
 Discipline: Industrial Hygiene

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled¹	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses²	# Trainees Graduated
Master's degree							
MSPH	Masters of Science in Public Health emphasis in Industrial Hygiene	3	3	3	0	2	1
MPH	Masters of Public Health emphasis in Industrial Hygiene	0	0	3	2	3	0

Refer to: Supplemental Instructions, page 8.

¹ Trainee counts include all students in the approved programs.

² Does not include trainees counted in any of the full-time or part-time categories

³ In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: Rocky Mountain Center for Occupational & Environmental Health - U of U
 Program Director: Rod Larson, PhD, CIH
 Discipline: Industrial Hygiene/HSAT

**Table 13
 Minority Recruitment Data¹
 Since Beginning of Current Project Period**

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
Year 1: July 1, 2002 to June 30, 2003						
1	0	0				
Year 2: July 1, 2003 to June 30, 2004						
2	2	1	1	Graduated	NIOSH	Industrial Hygienist, WCF
Year 3: July 1, 2004 to June 30, 2005						
1	0	0				
Year 4: July 1, 2005 to June 30, 2006						
1	0	0				

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Refer to: Supplemental Instructions, page 11.

¹ First three columns are a group total; last four columns refer to individual trainees.

ERC Applicant Institution: University of Utah
 Program Director: Donald Blosswick
 Discipline: Occupational Injury Prevention Training

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled¹	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses²	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
Doctorate degree							
PhD	Ph.D. in Mechanical Engineering (a)	1	1	0	0	10	0
PhD	Ph.D. in Public Health (b)	1	0	1	0	8	0
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)³							
Other (specify, e.g., undergraduate Certificate program trainees)							

Page

Refer to: Supplemental Instructions, page 8.

¹ Trainee counts include all students in the approved programs.

² Does not include trainees counted in any of the full-time or part-time categories

³ In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

a = Occupational Safety Engineering Emphasis (OSE)

b = Occupational Injury Epidemiology Emphasis (OIE)

ERC Applicant Institution: Rocky Mountain Center for Occupational & Environmental Health - U of U
 Program Director: Edward Holmes, MD, MPH
 Discipline: Occupational Medicine

**Table 4a
 Academic Training Report
 Previous Budget Period: July 1, 2005 to June 30, 2006**

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled¹	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses²	# Trainees Graduated
alaureate/associate degree		N/A	N/A	N/A	N/A	N/A	N/A
Master's degree	Masters of Public Health	1	1	0	0	1	1 with MPH
Doctorate degree	All already have MDs	N/A	N/A	N/A	N/A	N/A	N/A
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.) ³							
Certificate	Certificate of Residency in Occupational Medicine	3	3	0	0	N/A	3 with Certificate of Residency in Occupational Medicine
Other (specify, e.g., undergraduate Certificate program trainees)		N/A	N/A	N/A	N/A	N/A	N/A

Refer to: Supplemental Instructions, page 8.

¹ Trainee counts include all students in the approved programs.

² Does not include trainees counted in any of the full-time or part-time categories

³ In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: Rocky Mountain Center for Occupational & Environmental Health - U of U
 Program Director: Edward Holmes, MD, MPH
 Discipline: Occupational Medicine

Table 13
Minority Recruitment Data¹
Previous Budget Period: July 1, 2005 to June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
Year: July 1, 2006 to June 30, 2007						
0	0	0	N/A	N/A	N/A	N/A

Refer to: Supplemental Instructions, page 11.

¹ First three columns are a group total; last four columns refer to individual trainees.

ERC Applicant Institution: Rocky Mountain Center for Occupational & Environmental Health - U of U
 Program Director: Connie Crandall, MA, MBA

Table 12a
CE Course Offerings by Program Area
Current Budget Period: July 1, 2005 to June 30, 2006

Course/Seminar Title ¹	Program Area	Total Trainees	Length of Course	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Asbestos Contractor/Supervisor Refresher - 8/4/05	Asbestos	25	1	25	0	0	3	1	21	17	1	1	0	0	6	0
Asbestos Inspector/Management Planner Refresher - 8/5/05	Asbestos	20	1	20	0	0	6	1	13	10	3	0	2	0	5	0
Asbestos Project Designer Refresher - 9/7/05	Asbestos	18	1	18	0	0	4	2	12	13	0	1	0	0	4	0
Asbestos Contractor/Supervisor Refresher - 9/8/05	Asbestos	35	1	35	0	0	4	2	29	28	0	1	0	0	6	0
Asbestos Inspector/Management Planner Refresher - 09/09/05	Asbestos	36	1	36	0	0	4	2	30	26	0	1	0	0	9	0
Asbestos Contractor/Supervisor Refresher (Pocatello, ID) - 9/15/05	Asbestos	15	1	15	0	0	1	1	13	11	0	0	0	0	2	2
Asbestos Inspector/Management Planner Refresher (Pocatello, ID) - 9/16/05	Asbestos	14	1	14	0	0	1	0	13	10	0	0	0	0	3	1
Asbestos Contractor/Supervisor Training - 10/24-28/05	Asbestos	16	5	80	0	0	1	2	13	9	0	1	1	0	0	5
Asbestos Inspector/Management Planner Refresher - 11/30/05	Asbestos	29	1	29	0	0	12	1	16	13	1	4	3	0	7	1
Asbestos Contractor/Supervisor Refresher - 12/1/05	Asbestos	47	1	47	0	0	14	1	32	29	3	6	1	0	8	0
Asbestos Inspector Refresher - 12/2/05	Asbestos	28	1	28	0	0	10	0	18	15	5	2	1	0	5	0
Asbestos Inspector Training - 12/19-21/05	Asbestos	26	3	78	0	0	6	4	16	12	2	2	3	0	5	2
Asbestos Project Designer Refresher - 1/4/06	Asbestos	22	1	22	0	0	7	1	14	13	1	1	0	0	6	1
Asbestos Contractor/Supervisor Refresher - 1/5/06	Asbestos	25	1	0	0	0	2	2	21	12	4	0	0	0	5	4
Asbestos Inspector/Management Planner Refresher - 1/6/06	Asbestos	32	1	32	0	0	5	6	21	12	4	3	0	0	10	3
Asbestos Contractor/Supervisor Refresher - 3/23/06	Asbestos	40	1	40	0	0	3	4	33	25	1	1	0	0	12	1
Asbestos Inspector/Management Planner Refresher - 3/24/06	Asbestos	30	1	30	0	0	4	2	24	14	1	2	3	0	10	0
Asbestos Contractor/Supervisor Refresher (Moab, UT) - 4/6/06	Asbestos	10	1	10	0	0	0	1	9	7	0	1	0	0	2	0

Asbestos Inspector/Management Planner Refresher (Moab, UT) - 4/7/06	Asbestos	4	1	4	0	0	0	0	4	3	0	0	0	0	1	0
Asbestos Contractor/Supervisor Training - 4/24-28/06	Asbestos	18	5	90	0	0	0	4	14	13	0	1	0	0	2	2
Asbestos Inspector Refresher (Green River, WY) - 5/30/06	Asbestos	6	0.5	3	0	0	1	2	3	6	0	0	0	0	0	0
Asbestos Inspector Refresher - 5/30/06	Asbestos	20	0.5	10	0	0	2	4	14	8	0	1	8	0	3	0
Asbestos Project Designer Refresher - 5/31/06	Asbestos	16	1	16	0	0	3	2	11	9	0	1	1	0	5	0
Asbestos Contractor/Supervisor Refresher - 6/1/06	Asbestos	38	1	38	0	0	5	4	29	27	2	1	1	0	7	0
Asbestos Inspector/Management Planner Refresher - 6/2/06	Asbestos	41	1	41	0	0	5	10	26	24	3	0	0	0	13	1
Asbestos Inspector/Management Planner Training - 6/5-9/06	Asbestos	19	5	95	0	0	3	1	15	12	2	1	0	0	4	0
Lead Supervisor/Contractor Refresher - 8/10/05	Lead	14	1	14	0	0	2	1	11	6	1	3	2	0	1	1
Lead Inspector Refresher - 8/11/05	Lead	9	1	9	0	0	2	1	6	2	0	2	5	0	0	0
Lead Risk Assessor Refresher - 8/12/05	Lead	8	1	8	0	0	2	1	5	1	0	2	5	0	0	0
Lead Inspector Refresher - 3/16/06	Lead	30	1	30	0	0	4	1	25	3	3	3	21	0	0	0
Lead Risk Assessor Refresher - 3/17/06	Lead	12	1	12	0	0	2	0	10	2	1	2	7	0	0	0
Lead Inspector/Risk Assessor Training - 4/3-7/06	Lead	11	5	55	0	0	0	8	3	7	1	0	2	0	0	1
18th Annual Compensable Disability Forum: Update 2006 - 2/10/06	Insurance	126	1	126	3	6	1	4	112	22	0	10	3	0	0	91
Subtotal OTHER CATEGORY		840	50	1,110	3	6	119	76	636	421	39	54	69	0	141	116
CONOCO Training Seminar - 7/18-22/05	IH	121	4.5	544.5	0	0	61	60	0	121	0	0	0	0	0	0
Comprehensive Review of Industrial Hygiene - 8/15-19/05	IH	41	5	205	0	0	26	11	4	24	10	3	2	4	1	1
Correspondence Course on: Fundamentals of Industrial Hygiene - 7/05	IH	1	5	5	0	0	0	1	0	1	0	0	0	0	0	0
IAQ: Mold Control in HVAC Systems Short Course- 10/5/05	IH	12	0.5	6	0	0	9	1	2	4	4	0	0	0	2	2
Ethics in the Workplace Short Course - 10/5/05	IH	8	0.5	4	0	0	1	5	2	1	1	1	1	0	1	3
Non-Ionizing Radiation and Instrumentation Short Course - 10/5/05	IH	6	0.5	3	0	0	5	1	0	2	0	1	0	0	1	2
22nd Annual Utah Conference on Safety and Industrial Hygiene - 10/6-7/05	IH	111	1	111	2	1	41	55	12	52	8	21	2	0	15	13
2nd Symposium on Beryllium Particulates and Their Detection - 11/8-9/05	IH	102	2	204	0	1	58	6	37	35	58	3	0	6	3	3
Industrial Hygiene Certificate Program: Fundamentals of Industrial Hygiene - 1/11-13/06	IH	9	3	27	0	0	4	5	0	3	3	2	0	0	0	1

Comprehensive Review of Industrial Hygiene - 3/6-10/06	IH	25	5	125	0	0	18	7	0	18	6	0	0	0	1	0
Introduction to Industrial Hygiene: Professional Practice & Ethics - 3/8-4/26/06	IH	10	3	30	0	3	0	3	4	3	1	0	0	0	2	4
Indoor Mold Contamination: Inspecting and Assessing the Risk & Choosing and Supervising the Proper Remediation 3/30-31/06	IH	13	2	26	0	0	2	3	8	6	3	2	1	0	0	1
Subtotal IH		459	32	1,291	2	5	225	158	69	270	94	33	6	10	26	30
OSHA 501: Trainer Course in Occupational Safety and Health Standards for General Industry - 7/11-14/05	OS	17	4	68	0	0	1	13	3	14	0	0	1	0	1	1
OSHA 2264: Permit-Required Confined Space Entry - 7/18-20/05	OS	7	3	21	0	0	0	7	0	3	3	0	0	0	1	0
OSHA 2225: Respiratory Protection - 8/29-31/05	OS	6	3	18	0	1	0	2	3	4	2	0	0	0	0	0
Safety Certificate Program: Core Concepts in Safety and Health - 9/21-11/9/05	OS	19	8	152	0	7	0	8	4	13	1	0	0	0	0	5
Environmental Management in the 21st Century Correspondence Course - 10/05	OS	2	3	6	0	0	1	1	0	2	0	0	0	1	0	0
Total Quality Management for Health & Safety Professionals Correspondence Course - 10/05	OS	2	5	10	0	0	0	1	1	2	0	0	0	1	0	0
OSHA 10-Hour for the Construction Industry Short Course - 10/5/05	OS	8	1	8	0	0	2	6	0	8	0	0	0	0	0	0
OSHA 10-Hour for General Industry Short Course - 10/5/05	OS	13	1	13	0	0	0	11	2	12	0	0	1	0	0	0
Voluntary Protection Program Participants' Association Application Workshop Short Course - 10/5/05	OS	13	1	13	0	1	1	11	0	13	0	0	0	0	0	0
Tips, Tricks, and Hints for More Effective Environmental Health and Safety Training - 10/5/05	OS	16	1	16	0	0	2	12	2	10	1	1	1	0	2	1
22nd Annual Utah Conference on Safety and Industrial Hygiene - 10/6-7/05	OS	111	2	222	2	1	41	55	12	52	8	20	2	0	15	14
ASP/CSP Comprehensive Review Courses - 10/17-21/05	OS	7	5	35	0	0	4	3	0	4	1	1	0	0	1	0
Behavior-Based Safety Correspondence Course - 12/05	OS	1	2	2	0	0	0	1	0	1	0	0	0	1	0	0
Safety Certificate Program: Safety Program Management - 1/4-2/22/06	OS	12	8	96	0	3	0	6	3	4	2	0	0	0	2	4
Fundamentals of Industrial Hygiene Correspondence Course - 02/06	OS	1	5	5	0	0	1	0	0	0	0	0	0	0	0	1

Table 12a

Successful Safety, Health & Environmental Project Management Correspondence Course - 02/06	OS	1	2.5	2.5	0	0	1	0	0	1	0	0	0	0	0	0
Time-Based Management: An Improvement Tool for Health & Safety Professionals Correspondence Course - 02/06	OS	1	3	3	0	0	1	0	0	0	1	0	0	0	0	0
Personality Types & Injuries: Data & Effective Strategies - 2/3/06	OS	32	1	32	0	2	2	14	14	17	0	10	1	0	0	4
OSHA 511: Occupational Safety and Health Standards for General Industry - 10/18-21/05	OS	8	4	32	0	0	0	7	1	6	0	0	0	0	1	1
OSHA 501: Trainer Course in Occupational Safety and Health Standards for General Industry - 11/1-4/05	OS	7	4	28	0	0	0	7	0	6	0	0	0	0	0	1
OSHA 510: Occupational Safety and Health Standards for the Construction Industry - 11/15-18/05	OS	12	4	48	0	0	0	7	5	10	1	0	0	0	0	1
OSHA 500: Trainer Course in Occupational Safety and Health Standards for the Construction Industry - 12/6-9/05	OS	10	4	40	0	0	0	8	2	7	1	0	0	1	0	2
OSHA 511: Occupational Safety and Health Standards for General Industry - 1/10-13/06	OS	8	4	32	0	0	0	7	1	6	1	0	1	0	0	0
OSHA 6000: Collateral Duty Course for Other Federal Agencies - 1/23-26/06	OS	8	3	24	0	0	0	3	5	0	8	0	0	0	0	0
OSHA 501: Trainer Course in Occupational Safety and Health Standards for General Industry - 1/24-27/06	OS	6	4	24	0	0	0	6	0	4	1	0	0	0	1	0
OSHA 510: Occupational Safety and Health Standards for the Construction Industry - 2/14-17/06	OS	6	4	24	0	0	0	5	1	5	0	0	0	0	1	0
OSHA 500: Trainer Course in Occupational Safety and Health Standards for the Construction Industry - 2/28-3/3/06	OS	4	4	16	0	0	1	2	1	3	0	0	0	0	1	0
OSHA 3095: Electrical Standards - 3/20-22/06	OS	5	3	15	0	0	0	2	3	2	2	1	0	0	0	0
4th Annual Regional NORA Young/New Investigators Symposium - 4/20-21/06	OS	55	1.5	82.5	10	1	23	12	9	7	3	1	0	0	42	2
Accident Investigation, Analysis and Prevention Correspondence Course - 04/06	OS	1	3	3	0	0	1	0	0	1	0	0	0	0	0	0

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Fundamentals of Industrial Hygiene Correspondence Course - 04/06	OS	2	5	10	0	0	0	2	0	1	0	1	0	0	0	0
OSHA 510: Occupational Safety and Health Standards for the Construction Industry - 5/1-4/06	OS	14	4	56	0	0	0	11	3	10	3	0	0	0	1	0
OSHA 500: Trainer Course in Occupational Safety and Health Standards for the Construction Industry - 5/15-18/06	OS	6	4	24	0	0	0	6	0	5	0	0	0	0	0	1
OSHA 511: Occupational Safety and Health Standards for General Industry - 6/12-15/06	OS	10	4	40	0	0	0	7	3	8	2	0	0	0	0	0
OSHA 501: Trainer Course in Occupational Safety and Health Standards for General Industry - 6/26-29/06	OS	7	4	28	0	0	0	6	1	5	0	1	0	0	0	1
Subtotal OS		438	122	1,249	12	16	82	249	79	246	41	36	7	4	69	39
Pulmonary Function Testing - 9/12-13/05	OHN	21	2	42	0	5	3	3	10	15	3	0	0	0	0	3
CAOHC - Approved Occupational Hearing Conservation - 9/14-16/05	OHN	15	2.5	37.5	0	4	3	1	7	13	1	0	1	0	0	0
CAOHC - Approved Occupational Hearing Conservation Refresher - 9/15/05	OHN	16	1	16	0	8	0	4	4	10	0	0	0	0	0	6
Developing a Wellness Program Short Course - 10/5/05	OHN	19	0.5	9.5	0	1	6	8	4	12	0	1	0	0	0	6
Utah Council on Worksite Wellness Conference - 10/13/05	OHN	114	1	114	0	30	1	29	54	55	0	11	13	0	17	18
UAOHN Fall Seminar: Disaster Planning - 11/18/05	OHN	13	1	13	0	12	0	1	0	10	0	0	0	0	3	0
Pulmonary Function Testing - 1/30-31/06	OHN	20	2	40	0	8	0	1	11	6	6	0	0	0	3	5
CAOHC - Approved Occupational Hearing Conservation - 2/1-3/06	OHN	17	2.5	42.5	0	7	0	4	6	5	4	4	0	0	1	3
CAOHC - Approved Occupational Hearing Conservation Refresher - 2/2/06	OHN	5	1	5	1	3	0	0	1	2	2	0	0	0	0	1
Pulmonary Function Testing (Billings, MT) - 4/27-28/06	OHN	8	2	16	0	8	0	0	0	0	0	0	0	0	0	8
Subtotal OHN		248	16	336	1	86	13	51	97	128	16	16	14	0	24	50
WorkMed Grand Rounds: Update on Sleep Apnea - 9/6/05	OM	14	0.1	1.4	14	0	0	0	0	14	0	0	0	0	0	0
WorkMed Grand Rounds: Burn Update 2005 - 10/11/05	OM	14	0.1	1.4	14	0	0	0	0	14	0	0	0	0	0	0
Commercial Driver Medical Examiner Course - 10/05	OM	126	1	126	126	0	0	0	0	126	0	0	0	0	0	0
WorkMed Grand Rounds: Evaluation and Management of Head Injuries - 11/15/05	OM	16	0.1	1.6	16	0	0	0	0	16	0	0	0	0	0	0

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Correspondence Course on: Practical Aspects of Health & Safety Management - 1/06	OM	1	5	5	0	0	0	1	0	0	0	0	0	0	0	1
WorkMed Grand Rounds: Appropriate Pre Work Cardiovascular Screening in the Occupational Health Clinic - 01/06	OM	12	0.1	1.2	12	0	0	0	0	12	0	0	0	0	0	0
WorkMed Grand Rounds: Dementia Screening in Commercial Drivers at the Occupational Health Clinic - 02/06	OM	12	0.1	1.2	12	0	0	0	0	12	0	0	0	0	0	0
State-of-the-Art Conference on Musculoskeletal Disorders - 2/23-24/06	OM	92	2	184	51	6	6	16	13	30	5	4	0	0	23	30
Workmed Grand Rounds: Practical Aspects of Screening for Sleep Disorders at the Occupational Health Clinic - 03/06	OM	14	0.1	1.4	14	0	0	0	0	14	0	0	0	0	0	0
Workmed Grand Rounds: Care Process Models, Practice Guidelines, and Medical Malpractice Concerns - 04/06	OM	9	0.1	0.9	9	0	0	0	0	9	0	0	0	0	0	0
Commercial Driver Medical Examiner Update Course - 05/06	OM	210	0.15	31.5	198	12	0	0	0	198	0	0	0	0	12	0
Workmed Grand Rounds: Care for Common and Uncommon Wounds - 06/06	OM	15	0.1	1.5	15	0	0	0	0	15	0	0	0	0	0	0
2nd Annual International Association of Industrial Accident Boards and Commissions Workers' Compensation Medical Institute - 03/10-11/06	OM	58	2	116	36	2	0	0	20	3	0	2	0	9	3	50
Subtotal OM		593	11	473	517	20	6	17	33	463	5	6	0	9	38	81

counted 16 sessions with 997 participants in the OM Program that other ERCs might

GRAND TOTALS (All Program Areas)		2,578	230	4,458	535	133	445	551	914	1,528	195	145	96	23	298	316
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ERC Applicant Institution: RMCOEH/University of Utah
 Program Director: Connie Crandall

Table 12b
Summary of CE Course Offerings by Program Area
Current Budget Period: July 1, 2005 to June 30, 2006

Course/Seminar Title ¹	Program Area	Total Trainees	Total # of Courses	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Subtotal IH	IH	459	12	1,291	2	5	225	158	69	270	94	33	6	10	26	30
Subtotal OHN	OHN	248	16	336	1	86	13	51	97	128	16	16	14	0	24	50
Subtotal OMR	OMR	593	11	473	517	20	6	17	33	463	5	6	0	9	38	81
Subtotal OS	OS	438	35	1,249	12	16	82	249	79	246	41	36	7	4	69	39
Subtotal HST	HST															
Subtotal Ag S&H	Ag S&H															
Subtotal Other Category	OT	840	33	1,110	3	6	119	76	636	421	39	54	69	0	141	116
GRAND TOTALS (All Program Areas)		2,578	107	4,458	535	133	445	551	914	1528	195	145	96	23	298	316

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Refer to: Supplemental Instructions, page 10.

¹ Group together by Program Area and provide sub-totals for each Program Area.

ERC Applicant Institution: RMCOEH/University of Utah
 Program Director: Connie Crandall

Table 12c
CE Course Offerings - Summary by Program Area
Since Beginning of Current Project Period: July 1, 2002 - June 30, 2006

Program Area	Total # of Trainees	Number of Courses	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
				MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Industrial Hygiene (IH)	1325	40	3556	7	10	592	531	185	700	223	137	41	18	136	88
Occupational Health Nursing (OHN)	1,010	35	1,539	6	263	28	119	594	573	68	37	78	0	94	160
Occupational Medicine (OM)	1,904	58	1,620	1,791	22	9	33	49	1,751	7	6	0	84	55	85
Occupational Safety (OS)	1,774	135	4,143	26	39	350	1,056	303	939	149	203	40	8	282	161
Hazardous Substance Training (HST)															
Agricultural Safety and Health (Ag S&H)															
Other OS&H, e.g. Tox, Epi, Ergo, Biostat (OT)	3,220	129	4,538	12	46	466	265	2,431	1,671	211	202	226	0	562	348
TOTAL	9233	397	15,396	1842	380	1445	2004	3,562	5634	658	585	385	110	1129	842

ERC Applicant Institution: RMCOEH/University of Utah
 Program Director: Connie Crandall

Table 12a
HST Course Offerings by Program Area
Current Budget Period: July 1, 2005 to June 30, 2006

Course/Seminar Title ¹	Program Area	Total Trainees	Length of Course	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Chemistry for the Non-Chemist - 7/26/05	HST	5	1	5	0	0	0	2	3	1	0	3	1	0	0	0
DOT Hazardous Materials Transportation Certification 7/27-29/05	HST	7	2	14	0	0	0	3	4	6	0	0	0	0	1	0
DOT Hazardous Materials Transportation Refresher - 8/1/05	HST	6	1	6	0	0	0	0	6	5	0	0	1	0	0	0
Emergency Plans & Emergency Response Workshop (Salt Lake City, UT) - 9/16/05	HST	5	1	5	0	0	0	4	1	1	0	1	0	0	0	3
Respiratory Protection Program Administrator Short Course (Salt Lake City, UT) - 10/5/05	HST	14	1	14	0	2	4	8	0	6	3	1	4	0	0	0
Managing Hazardous Materials in the Workplace Short Course (Salt Lake City, UT) - 10/5/05	HST	25	0.5	12.5	0	0	10	14	1	14	4	1	0	0	2	4
8-Hour Hazardous Waste Refresher (Salt Lake City, UT) - 11/4/05	HST	24	1	24	0	0	0	8	16	21	0	0	2	0	1	0
40-Hour Hazardous Waste Operations (HAZWOPER) (Salt Lake City, UT) - 11/14-18/05	HST	33	5	165	0	1	0	0	32	6	20	0	6	2	1	0
Respiratory Protection and Fit Testing (Salt Lake City, UT) - 2/6-7/06	HST	6	2	12	0	2	0	3	1	4	1	0	0	0	0	1
Chemistry of Hazardous Materials: Level 1 - The Language of Chemistry (Salt Lake City, UT) - 2/13-15/06	HST	6	3	18	0	0	0	2	4	5	0	0	1	0	0	0
8-Hour Hazardous Waste Refresher (Salt Lake City, UT) - 2/17/06	HST	14	1	14	0	0	4	2	8	8	0	0	4	0	0	2
40-Hour Hazardous Waste Operations (HAZWOPER) (Salt Lake City, UT) - 3/27-31/06	HST	16	5	80	0	0	1	3	12	12	0	2	1	0	1	0
8-Hour Hazardous Waste Refresher (Salt Lake City, UT) - 4/4/06	HST	18	1	18	0	0	1	4	13	9	0	1	2	0	4	2
8-Hour Hazardous Waste Refresher (Salt Lake City, UT) - 4/5/06	HST	25	1	25	0	0	0	0	25	0	0	25	0	0	0	0
Decontamination Specialist Training Review Course - 4/7/06	HST	8	1	8	0	0	0	0	8	2	0	1	5	0	0	0
8-Hour Hazardous Waste Refresher (Salt Lake City, UT) - 4/18/06	HST	30	1	30	0	0	0	0	30	0	0	30	0	0	0	0
Certified Hazardous Materials Manager Review Course/Exam (Salt Lake City, UT) - 5/2-5/06	HST	12	2.5	30	0	0	1	5	6	4	0	1	2	0	5	0
Environmental Issues & Regulations (Salt Lake City, UT) - 5/10-6/28/06	HST	11	3	33	0	1	1	5	4	6	2	0	0	0	1	2

Hazardous Waste Management Simplified (Salt Lake City, UT) - 5/23-25/06	HST	7	3	21	0	0	0	4	3	6	1	0	0	0	0	0
IATA Training (Northrop Grumman, Salt Lake City UT) - 5/30-31 & 6/1,2&6/06	HST	4	3	12	0	0	0	4	0	4	0	0	0	0	0	0
8-Hour Hazardous Waste Refresher (Salt Lake City, UT) - 6/13/06	HST	16	1	16	0	0	1	4	11	9	1	0	6	0	0	0
40-Hour Hazardous Waste Operations (HAZWOPER) (Salt Lake City, UT) - 06/22-24 & 06/26-28, 2006	HST	11	5	55	0	0	0	0	11	11	0	0	0	0	0	0
Subtotal HST		303	45	618	0	6	23	75	199	140	32	66	35	2	16	14

ERC Applicant Institution: RMCOEH/University of Utah

Program Director: Connie Crandall

Table 12b

**Summary of HST Course Offerings by Program Area
Current Budget Period: July 1, 2005 to June 30, 2006**

Course/Seminar Title ¹	Program Area	Total Trainees	Total # of Courses	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Subtotal IH	IH															
Subtotal OHN	OHN															
Subtotal OMR	OMR															
Subtotal OS	OS															
Subtotal HST	HST	303	22	618	0	6	23	75	199	140	32	66	35	2	16	14
Subtotal Ag S&H	Ag S&H															
Subtotal Other Category	OT															
GRAND TOTALS (All Program Areas)		303	22	618	0	6	23	75	199	140	32	66	35	2	16	14

Refer to: Supplemental Instructions, page 10.

¹ Group together by Program Area and provide sub-totals for each Program Area.

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