Curriculum Vitae

February, 2012

I. PERSONAL DATA

Name:	**Terry M. Spear**
Birth Date:	06/23/52
Birthplace:	Butte, Montana
Citizenship:	United States

II. EDUCATION

Baccalaureate Degree (B.A.): **Microbiology**; June 1975; University of Montana**,** Missoula, Montana.

Master of Science (M.S.) **Environmental Health**; December 1980, University of Minnesota.

Doctor of Philosophy (Ph.D.): **Environmental Health**; April 1996, University of Minnesota
Dissertation Title: Assessment of Workers' Exposure to Lead-Containing Aerosol

III. PROFESSIONAL EXPERIENCE

Employment (full-time):

Faculty; Safety, Health and Industrial Hygiene Department: 8/83 to present
Montana Tech of The University of Montana, School of Mines.
Assistant Professor (1983-1988), Associate Professor (1989-96), Full Professor, Tenured (1997- present), Department Head 2002 – present.
Develop and teach courses in academic safety and industrial hygiene programs, and the Montana Tech continuing education program. Involved in all aspects of advising, developing, and directing of student research and academic progress.

Teaching Responsibilities:
Teach industrial hygiene, hazardous materials management, air sampling and analysis, instrumentation for industrial hygiene, welding safety and health, industrial respiratory protection, epidemiology, radiological safety. Also teach a variety of short courses on subjects including hazardous materials handling and response, confined space entry, construction safety, petroleum production safety, welding safety and health, safety administration, safety engineering.

Senior Engineer, 11/80 to 8/83
EG&G Idaho Inc., Idaho National Engineering Laboratory (INEL), Idaho Falls, Idaho. Provided industrial consultation to facility management, including investigation and monitoring of work environments, ventilation evaluations, design and work practice reviews, hazardous materials oversight, and worker education and training.

Employment (part-time):

Affiliate Professor, 9/81 to 5/82
University of Idaho, Idaho Falls, Idaho. Instructor for Mines 433,
Environmental Health I, Industrial Hygiene, and Mines 434, Environmental
Health II, Occupational Stress.

Industrial Hygiene Technician, 8/80 to 11/80
Honeywell Inc., Defense Systems Division, St. Paul, Minnesota. Evaluated, documented and recommended procedures to control worker exposure during processing of depleted uranium.

III. PROFESSIONAL EXPERIENCE (continued)

Employment (part-time) (continued):

Industrial Hygiene Intern, 6/80 to 8/80
Sperry Univac, Defense System Division, St. Paul, Minnesota. Evaluated chemical safety program through monitoring and work practice reviews. Assisted in the development of an occupational exposure database.

Industrial Hygiene Technician, 6/79 to 9/79
Anaconda Mining Company, Anaconda, Montana. Conducted monitoring program and ventilation surveys to determine compliance with OSHA arsenic standard.

Related Professional Experience:

Provide consultation to a variety of general industry and mining companies on program document development, health and safety compliance auditing, regulatory issues, industrial hygiene field sampling, on-site hazard assessments, and training. Over 25 years experience in providing expert witness testimony involving consultation and participation in personal injury and illness liability litigation cases for plaintiffs, defendants, private industry, and insurance companies.

IV. RESEARCH AWARDS

Weatherization protocols in homes containing vermiculite and other asbestos-containing material. U.S. Department of Health and Human Services REACH Grant, December 2006.

Yellowstone Winter Use Personal Air Monitoring, Rocky Mountains Cooperative Ecosystem Studies Unit, Cooperative Agreement Number H1200040001, January 2006. Yellowstone Winter Use Air Monitoring, continuation of UMT 15, *J1580050167,* 2006.

Yellowstone Winter Use Personal Air Monitoring, Rocky Mountains Cooperative Ecosystem Studies Unit, Cooperative Agreement Number H1200040001, January 2005.

Occupational Exposure to Submicron Particle Mass and Number Concentrations from Diesel Emissions In an Underground Mine, Supplemental Research Training Grant, NIOSH, 2002 – 2003.

Lead Exposure Associated with Weatherization Activities in Homes Containing Lead Based Paint, Department of Energy, Spring 2002.

Chemical speciation of two different sources of copper slag, Supplemental Research Training Grant, NIOSH, 2001 – 2002.

Airborne assessment of abrasive blasting aerosol using copper slag abrasive, Supplemental Research Training Grant, NIOSH, 1999 – 2000.

Assessment of workers' exposure to lead containing aerosols, International Lead and Zinc Research Organization (LZRO), 1994 –1996.

Assessment of workers' exposures to lead-containing aerosols during smelter remediation, Minerals Research Institute, 1993 – 1994.

Fugitive dust emissions and worker exposure during furnace slag processing, Minerals Research Institute, 1991.

Volatile organics released from water sprays, Minerals Research Institute, 1989 – 1990.

V. PEER-REVIEWED PUBLICATIONS

Spear, TM, Julie F. Hart, JF, Spear, TE, Loushin, M, Shaw, N, Elashheb, MI (in press 2012). The presence of asbestos-contaminated vermiculite attic insulation and/or other asbestos containing materials in homes and the potential for living space contamination. *Journal of Environmental Health.*

V. PEER-REVIEWED PUBLICATIONS (continued)

Ward, TJ, Spear, TM, Hart, JF, Webber, JS. Asbestos in Tree Bark A Review of Findings for this Inhalational Exposure Source in Libby, Montana. *Journal of Occupational & Environmental Hygiene*. April, 2012.

Mohamed I. Elashheb, Terry M. Spear, Julie F. Hart, James S. Webber, and Tony J. Ward. "Libby Amphibole Contamination in Tree Bark Surrounding Historical Vermiculite Processing Facilities". *Journal of Environmental Protection*. Vol.2, No. 8, October 2011) . DOI: 10.4236/jep.2011.28122.

V. Balasubramanian, T.M. Spear, J.F. Hart, J.D. Larson: Evaluation of Surface Lead Migration in Pre-1950 Homes: Am On-Site Hand-Held X-Ray Florescence Spectroscopy Study. *Journal of Environmental Health*. Volume 23, Number 10, pp. 14-19, 2011.

Julie F. Hart, Tony J. Ward, Terry M. Spear, Richard J. Rossi, Nicholas N. Holland, and Brodie G. Loushin. "Evaluating the Effectiveness of a Commercial Portable Air Purifier in Homes with Wood Burning Stoves: A Preliminary Study". *Journal of Environmental and Public Health*, Volume (2011), Article ID 324809. Doi:10.1155/2011/324809.

Julie F. Hart, J.F., Spear, T.M., Ward, T.J., Baldwin, C.E., Salo, M.N. and Elashheb, M.I. "An evaluation of potential occupational exposure to asbestiform amphiboles near a former vermiculite mine", *Journal of Environmental and Public Health*, vol. 2009, Article ID 189509. Doi:10.1155/2009/189509.

Ward, T.J., Hart, J.F., Spear, T.M., Meyer, B.J., and Webber, J.S. , "Fate of Libby Amphibole Fibers When Burning Contaminated Firewood" , *Environ. Sci. Technol*. 2009, 43, 2878-2883.

Hart, J.F., Ward T.J., Spear T.M., Crispen, K., Zolnikov, T.R. "Evaluation of asbestos exposures during firewood harvesting simulations in Libby, Montana – Preliminary Data," *Ann. Occup. Hyg.* Volume 51, Number 8, November 2007.

Spear, T.M., Hart, J., Stephenson, D.J., Yellowstone Winter Use Personal Exposure Monitoring, Rocky Mountains Cooperative Ecosystem Studies Unit (RM-CESU), RM-CESU Cooperative Agreement Number: J1580050167**,** June 1, 2006.

Ward, T.J., Spear, T.M., Hart, J.; Noonan, C., Holian,A., Getman, M., Webber, J.S. "Trees as reservoirs for amphibole fibers in Libby, Montana", *Science of The Total Environment*, Vol. 367, Issue 1, August 2006.

Stephenson, D.J., Spear, T.M., Lutte, M.G. "Evaluation of a Direct Reading Sampling Method to Measure Exposure to Diesel Particulate Matter in an Underground Metal Mine," *Mining Engineering*, Vol. 58, No. 8, August 2006.

Spear, T.M., Stephenson, D.J., Yellowstone Winter Use Personal Exposure Monitoring, Rocky Mountains Cooperative Ecosystem Studies Unit (RM-CESU), RM-CESU Cooperative Agreement Number: H1200040001, June 1, 2005.

Wilson, T.B., . Douglass, R.J., Spear, T.M., Hart, J.F., and Norman, J.B. "Evaluation of protective clothing for handling small mammals potentially infected with aerosol-borne zoonotic agents," *Intermountain Journal of Sciences*, Vol. 8(1), 2002.

Spear, T.M. , Stephenson, D. , Seymour, M., "Characterization of aerosol generated during abrasive blasting with copper slag," Presented at Inhaled Particles IX, Robinson College, Cambridge, UK and published in *Annals of Occupational Hygiene*, Vol. 46, Supplement, pp. 296-299, 2002.

Stephenson, D. , Spear, T.M. , Seymour, M , and Cashell, L., " Airborne Exposure to Heavy Metals and Total Particulate During Abrasive Blasting Using Copper Slag Abrasive," *Appl. Occup. Environ. Hyg.*, Volume 17(6): 437-443, 2002.

Spear, T.M., Cannell, C.E., "Mixmaster exposure to dust during mixing of wildland fire retardant chemicals," *International Journal of Wildland Fire*, Volume 11(1), pp. 65-73, 2002.

Spear, T.M., DuMond, J.W., Lloyd, C.J. and Vincent, J.H., "An Effective Protection Factor Study of Primary Lead Smelter Workers," *Appl. Occup. Environ. Hyg.*, Volume 15(2): 235-244 (2000).

V. PEER-REVIEWED PUBLICATIONS (continued)

Spear, T.M., Hardgrove, R., Norman, J.B., Wulf, D.T., and Rossi, R.J. "The Effects of Strapped Spectacles on the Fit Factors of Three Manufactured Brands of Full Facepiece Negative Pressure Respirators," *Ann. Occup. Hyg.*, Vol. 43 (3): 193-199 (1999).

Spear, T.M., Svee, W., Vincent, J.H., Stanisich, N. "Chemical Speciation of Lead Dust Associated With Primary Lead Smelting," *Environmental Health Perspectives*. Vol. 106(9): 565-571 (1998).

Spear, T.M., Werner, M.A., Bootland, J.H., Murray, E.P., Gurumurthy, R. and Vincent, J.H. "Assessment of Particle Size Distributions of Health-Relevant Exposures of Primary Lead Smelter Workers," *Ann Occup. Hyg.*, Vol. 42, No. 2, pp. 73-80 (1998).

Vincent, J.H., Brosseau, L.M., Ramachandran, G., Tsai, P.J., Spear, T.M., Werner, M.A., McCullough, N.V. "Current issues in exposure assessment for workplace aerosols." In: Inhaled Particles VII (ed. Ogden TL), *Ann Occup. Hyg., 41 (Suppl. 1)*, 607-614 (1997).

Spear, T.M., Werner, M.A., Bootland, J., Harbour, A., Murray, E.P., Rossi, R. and Vincent, J.H., "Comparison of Sampling Methods for Personal Sampling of Inhalable and 'Total' Lead and Cadmium Containing-Aerosols in a Primary Lead Smelter," *Am. Ind. Hyg. Ass. J.*, 58:893-899 (1997).

Vincent, J.H., Werner, M.A., Tsai, P.-J. And Spear, T.M. (1996). "Studies of occupational aerosol exposures and the impact of introducing new criteria for standards." In: *Occupational Hygiene Solutions* (ed. G.S. Hewson), proceedings of the 15th Annual Conference of the Australian Institute of Occupational Hygienists, Tullamarine, Victoria, Australia, pp 33-41.

M.A. Werner, T.M. Spear and J.H. Vincent. "Investigation Into The Impact of Introducing Workplace Aerosol Standards Based On The Inhalable Fraction." Presented at the Second International Symposium on Modern Principles of Air Monitoring (Sälen, Sweden, February, 1996) and published in *The Analyst*, Vol 21 (1207-14), 1996.

VI. PROFESSIONAL PRESENTATIONS

"Evaluating the Impact of weatherization measures in homes that contain vermiculite insulation and/or other asbestos containing materials". Northwest Occupational Health Conference, Pasco, WA. October 2011.

"Weatherization of houses containing vermiculite or other ACM". Spear, T.M. and Hart, J.F., ASTM Johnson Conference on Asbestos. July 25-29, 2011.

"The Abundance of Libby Amphibole in Vermiculite Insulation in Homes". Spear, T.M. Pacific Northwest International Section (PNWIS) of the Air & Waste Management Association (A&WMA). Nov 3-5, 2010.

"Evaluating potential asbestos pathways from vermiculite attic insulation and asbestos containing materials in Western Montana homes- Baseline Results". Spear, T.M. Northwest Occupational Health Conference, Vancouver, B.C., October 2009.

"Evaluation of Asbestos Exposures during Firewood Harvesting Simulations in Libby, Montana". Ward, T. J., Spear, T., and Hart, J. 2008 ASTM Johnson Conference, Burlington, VT, July 15, 2008 (poster).

"Trees as Reservoirs for Amphibole Fibers in Libby, Montana". Presented at the Mine Design, Operations & Closure Conference, April 2007.

"Winter use air monitoring in Yellowstone National Park". Presented at the Pacific Northwest American Industrial Hygiene Conference, October 2006.

VI. PROFESSIONAL PRESENTATIONS (continued)

"Occupational exposure to Snowmobile emissions in Yellowstone National Park," Presented at the American Industrial Hygiene Conference and Exposition, May 2005.

"Occupational Exposure to Submicron Particle Mass and Number Concentrations from Diesel Emissions In an Underground Mine," Presented at the American Industrial Hygiene Conference and Exposition, May 2003.

"Demonstrating an association between exposure and risk of disease," Montana Trial Lawyers Association Scientific Evidence Seminar, April 25, 2003.

"Worker exposure to dust and heavy metals during abrasive blasting using copper slag." Presented at the Pacific Northwest American Industrial Hygiene Conference, October 2001.

"Characterization of aerosol generated during abrasive blasting with copper slag." Presented at the Inhaled Particles IX Symposium in Cambridge, UK, September 2001.

"Comparison of Methods for Personal Sampling of Inhalable and Total Abrasive Blasting Aerosol." Presented at the American Industrial Hygiene Conference and Exposition, May 2001.

"Airborne Exposure Assessment of Abrasive Blasting Aerosol Using Copper Slag Abrasive." Presented at the American Industrial Hygiene Conference and Exposition, May 2000.

"Respirator protection factors." Presented at the 19th Annual Lead Occupational Health Conference, Chicago, IL. October, 1997.

"An effective protection factor study at a primary lead smelter." Presented at and published in the abstracts of the American Industrial Hygiene Conference and Exposition, May 1996.

"The impact of introducing workplace standards based on the inhalable fraction." Presented at the Montana Safety and Health Conference, April 1996.

"Characterization of lead aerosol size distribution in a primary lead smelter." Presented at the Montana Academy of Sciences, April 1994.

"Inhalable Fungal Aerosol Exposure in a Wood Pellet Plant." Presented at the American Industrial Hygiene Conference and Exposition, May, 1993.

VII. HONORS

NIOSH Scholarship, 1978, Montana Tech.
NIOSH Scholarship, 1979, University of Minnesota
NIOSH Fellowship, 1994 –1995, University of Minnesota

VIII. ADMINISTRATIVE EXPERIENCE

Head: Safety, Health & Industrial Hygiene Department, Montana Tech of The University of Montana
Director: Industrial Hygiene Graduate Program, Montana Tech of The University of Montana
Planning Committee: Big Sky Section American Society of Safety Engineers (on-going)
AIHA and ASSE Student Section: Faculty Representative, (on-going)

Principal Investigator, Six funded research grants
Coordinate and direct graduate student research

IX. PROFESSIONAL/COMMUNITY/UIVERSITY ACTIVITIES

Technical Advisor to the Libby Area Technical Advisory Committee. Jan. 09 to Jan, 2012.

Member, Expert panel on "Potential Environmental Impacts of Dust Suppressants: Avoiding Another Times Beach". Sponsored by U.S. Environmental Protection Agency and the University of Nevada Las Vegas.
Faculty Representative, AIHA and ASSE Student Section (on-going).

Member, Curriculum Review Committee, Montana Tech of The University of Montana
Member, Chancellor's Advisory Committee, Montana Tech of The University of Montana

X. PROFESSIONAL SOCIETIES

American Industrial Hygiene Association
Americas Section, International Society for Respiratory Protection