

CURRICULUM VITAE

NAME: MELVIN W. FIRST

ADDRESS: 295 Upland Avenue, Newton Highlands, MA 02161

DATE AND PLACE OF BIRTH: December 23, 1914, Boston, MA

EDUCATION:

Date	Discipline	Degree	Institution
1950	Industrial Hygiene Engineering (Special Field Industrial Ventilation)	Sc.D.	Harvard University
1947	Sanitary Engineering	M.S.	Harvard University Graduate School of Engineering
1936	Biology and Public Health	B.S.	M.I.T.

LICENSURE AND CERTIFICATION:

American Board of Industrial Hygiene, (No. 104)
Comprehensive Practice of Industrial Hygiene, March 27, 1962.
Diplomate Environmental Engineering Intersociety Board, (No. 368)
American Academy of Environmental Engineers, October 18, 1957.
Registered Professional Engineer, (No. 6358),
Commonwealth of Massachusetts, February 27, 1953.

ACADEMIC APPOINTMENTS:

Date	Title	Department	Institution
1985-	Professor of Environmental Health Engineering, Emeritus	Environmental Health	Harvard School of Public Health
1971-1985	Professor of Environmental Health Engineering	Env. Science and Phys. Health Engineering	Harvard School of Public Health
1963-1971	Associate Professor	Env. Health Sciences	Harvard School of Public Health
1961-1963	Sr. Research Associate		Harvard School of Public Health
1950-1953	Research Associate	Industrial Hygiene	Harvard School of Public Health
1947-1949	Research Fellow	U.S. Public Health Service	Harvard School of Public Health

OTHER PROFESSIONAL POSITIONS:

Date	Title	Location
1953-	Consulting Engineer	Newton Highlands, MA
1939-1941	Industrial Hygiene Engineer	Michigan Dept. of Health, Lansing, MI
1937-1939	Industrial Hygiene Engineer	Detroit Dept. of Health, Detroit, MI
1936-1937	Toxicologist	Industrial Health Conservancy Lab., Detroit, MI



PUBLICATIONS:

ORIGINAL REPORTS

1. Bradley, W.R., and M.W. First, "Physiological Response of Pleural Surfaces to Implanted Dusts," J. Lab. and Clin. Med. 24:44, 1938.
2. Silverman, L., H.F. Schulte, and M.W. First, "Further Studies on Sensory Response to Certain Industrial Solvent Vapors," J. Ind. Hyg. and Toxicol. 28:262, 1946.
3. First, M.W., and L. Silverman, "Influence of Calcium Carbonate on Settling Characteristics of Silica Dust," J. Ind. Hyg. and Toxicol. 29:259, 1947.
4. First, M.W., and L. Silverman, "Factors in the Design of Cyclone Dust Collectors," J. Heat. and Vent. Ref. Sect. pp. 80, July 1948.
5. First, M.W., and L. Silverman, "Airfoil Pitometer," Ind. Eng. Chem. 42:301, 1950.
6. First, M.W., "Stack Gas Cleaning," Am. Ind. Hyg. Quarterly 11(4):206, 1950.
7. First, M.W., R. Moschella, L. Silverman, and E. Berty, "Performance of Wet Cell Washers for Aerosols," Ind. Eng. Chem. 43:1363, 1951.
8. Dennis, R., A.G. Johnson, M.W. First, and L. Silverman, "How Dust Collectors Perform," Chem. Eng. 59:196, Feb. 1952.
9. Silverman, L. and M.W. First, "Edge and Variable Compression Filters for Aerosols," Ind. Eng. Chem. 44:2777, 1952.
10. First, M.W., and P. Drinker, "Concentrations of Particles Found in Air," A.M.A. Arch. of Ind. Hyg. and Occ. Med. 5:387, 1952.
11. First, M.W., and L. Silverman, "Air Sampling with Membrane Filters," A.M.A. Arch. of Ind. Hyg. and Occ. Med. 7:1, pp. 1-11, 1953.
12. First, M.W., "Notes on Preparation of Dust Samples for Microscopic Sizing," A.M.A. Arch. of Ind. Hyg. and Occ. Med. 7:58, 1953.
13. First, M.W., and L. Silverman, "Characteristics of Commercial Air Cleaners," J. Heat. and Vent. pp. 78, Jan. 1954.
14. Dennis, R., M.W. First, and L. Silverman, "Dust Collectors Tested in the Field," Chem. Eng. pp. 187-9, May 1954.
15. Berty, E.M., M.W. First, and L. Silverman, "Removal of Soluble Gases (and Particulates) from Air Streams," Air Cleaning Seminar, U.S. Atomic Energy Commission, Washington, pp. 11-23, March 1954.
16. Billings, C., M.W. First, and L. Silverman, "Performance of Reverse-Jet Cloth Filters," Air Cleaning Seminar, U.S. Atomic Energy Commission, Washington, pp. 24-32, March 1954.
17. Dennis, R., M.W. First, and L. Silverman, "Field Studies of Commercial Dust Collector Performance," Air Cleaning Seminar, U.S. Atomic Energy Commission, Washington, pp. 33-4, March 1954.

18. Johnson, G.A., S.K. Friedlander, M.W. First, and L. Silverman, "Wet Cleaning Investigations," Air Cleaning Seminar, U.S. Atomic Energy Commission, Washington, pp. 56-65, March 1954.
19. Berly, E.M., M.W. First, and L. Silverman, "Recovery of Soluble Gas and Aerosols from Air Streams," Ind. Eng. Chem. 46:1769-77, Sept. 1954.
20. Johnson, G.A., J.K. Friedlander, R. Dennis, M.W. First, and L. Silverman, "Performance Characteristics of Centrifugal Scrubbers," Chem. Eng. Prog. 51:176, April 1955.
21. First, M.W., "Instrumentation for Particle Sizing," Encyclopedia of Instrumentation for Industrial Hygiene, Univ. of Michigan, Ann Arbor, 1956.
22. First, M.W., and R. Warren, "Field Evaluation of Web Fiber Filters for Treatment of Air Contaminants," J. Air Poll. Control Assoc. 6:30, 1956.
23. First, M.W., "High Temperature Dust Filtration," Ind. Eng. Chem. 48:696, 1956.
24. First, M.W., and J.B. Graham, "High Efficiency Dust Filtration at High Temperature," Ind. Eng. Chem. 50:63A, 1958.
25. First, M.W., "Effectiveness of Odor Counteractants for the Treatment of Stack Gases," J. Air Poll. Control Assoc. 9:28, 1959.
26. First, M.W., "New Techniques in Laboratory Ventilation," Air Engineering 27, Aug. 1959.
27. First, M.W., "Control of Industry-Generated Air Pollutants," Industry 486, Oct. 1959.
28. First, M.W., "Controlling Airborne Bacteria," Air Engineering, 29 and 43, May 1960.
29. First, M.W., H.E. Friedrich, and R.P. Warren, "Reductions of Emissions from a Recovery Boiler," Tappi 43:182A, 1960.
30. First, M.W., J.F. Viles, Jr., "Air Flow Resistance of Flexible Metal Hose," Am. Ind. Hyg. Assoc. J. 21:296, 1960.
31. First, M.W., "Wet Cell Air Humidifiers," Am. Soc. Heat., Refrig., Air Cond. Eng's. 3:71, 1961.
32. First, M.W., and L. Silverman, "Cost and Effectiveness of Air Cleaning Systems," Nuclear Safety 4(1), 1962.
33. First, M.W., and L. Silverman, "Portable Laboratory Scrubber Unit for Perchloric Acid," Am. Ind. Hyg. Assoc. J. 23:463, 1962.
34. First, M.W., L. Silverman, J. Fitzgerald, C.E. Billings, and R. Dennis, "Economic Survey of Air and Gas Cleaning Operations Within the AEC," Proceedings of the Seventh AEC Air Cleaning Conference, TID 7627, HACL 91, pp. 406-15, Oct. 1962.
35. First, M.W., L. Silverman, "Predicting the Performance of Cleanable Industrial Fabric Filters," J. Air Poll. Control Assoc. 13:581-6, 1963.
36. First, M.W., and L. Silverman, "Final Report of Economic Survey of Air and Gas Cleaning," Proceedings of the Eighth Air Cleaning Conference, TID 7677, HACL 99, pp. 145-54, Oct. 1963.

37. Laurenzi, G.A., L. Berman, M.W. First, and E.H. Cass, "A Quantitative Study in the Deposition and Clearance of Bacteria in the Murine Lung," *J. Clinical Investigation* 43:759, 1964.
38. First, M.W., F.J. Viles, Jr., and S. Levin, "Potential Toxic and Explosive Hazards in Buildings Erected on Landfills," *Public Health Reports* 81(5):49, May 1966.
39. First, M.W., "Possibilities of Removal of Sources of Lead Contamination in the Environment," delivered at the Symposium on Environmental Lead Contamination - sponsored by the Public Health Service, Dec. 13-25, 1965, Washington, DC, WAPHS Publ. #1440, Dept. of Documents, Washington, DC, 1966.
40. First, M.W., "Control of Haze and Odours from Curing of Plastics," *Proceedings of International Clean Air Congress, London*, 1:188-191, October 4-7, 1966.
41. Reist, P.C., M.W. First, and L. Silverman, "Development of the 'Diffusion Board' Concept in Reactor Containment," *AEC NYO-841-6*, Sept. 1966.
42. First, M.W., "Environmental Hazards: Urban Solid-Waste Management," *N.E.J. of Med.* 275:1478-85, Dec. 1966.
43. First, M.W., P. Zilles, and J. Walkley, "Disposal of Low Level Radioactive Waste in Commercial Incinerators," *Proceedings of Ninth Air Cleaning Conference*, CONF-660904, NTIS, 1:570-85, 1967.
44. First, M.W., L. Silverman, D. Pender, and S. Dawson, "Floating Roof Containment Vessel," *Proceedings of the Ninth Air Cleaning Conference*, CONF-660904, NTIS, 1:371-88, 1967.
45. Himot, P., J.J. Viles, Jr., J. Sullivan, and M.W. First, "Sodium Aerosol and Its Filtration," *Proceedings of the Ninth Air Cleaning Conference*, CONF-660902, NTIS, 2:877-904, 1967.
46. Reist, P.C., W.A. Burgess, and M.W. First, "Current Aerosol Research at the Harvard School of Public Health," *J. Air Poll. Control Assoc.* 17:608, Sept. 1967.
47. First, M.W., and J.A. Curran, "Fifty Years of Industrial Hygiene at Harvard University," *Harvard Public Health Alumni Bulletin*, 23(2), July 1968.
48. Viles, F.J., Jr., E. Bulba, J.J. Lynch, and M.W. First, "Reactants for the Removal of Iodine and Methyl Iodide and Their Application in Foams," Treatment of Airborne Radioactive Wastes, *Proceedings of a Symposium*, New York, 26-30 August 1968, International Atomic Energy Agency, Vienna, 1968.
49. First, M.W. "Filters, Prefilters, High Capacity Filters, and High Efficiency Filters, Review and Projection," *Proceedings of the Tenth USAEC Air Cleaning Conference*, CONF-680821, NTIS, pp. 65-78, 1968.
50. First, M.W., "Sampling and Measurements," *Environmental Research* 2(2):88, Feb. 1969.
51. First, M.W., "Safe Practices for Cleaning and Servicing Solvent Vapor Degreasers," *J. of the A.S.S.E* 14(11):12-5, Nov. 1969.
52. First, M.W., "Contamination Control of Sodium Fires from Liquid-Metal-Cooled Reactors," *Proceedings of the Eighteenth Conference on Remote Systems Technology*, *Am. Nuclear Society* 69, Nov. 1970.
53. First, M.W., and L.H. Murphy, Jr., "Carbon Monoxide Exposures from Snow Melting Machines," *Am. Ind. Hyg. Assoc. J.* 31:754-7, Nov.-Dec. 1970.

54. First, M.W., and H. Yusa, "Heat Transfer of Sodium Compounds Deposited on Surfaces from Aerosols," Proceedings of the Eleventh USAEC Air Cleaning Conference, CONF-700816, NTIS, 1:413-24, Dec. 1970.
55. Goldin, A.S., H. Trindade, S.H. Lee, and M.W. First, "Behavior of Iodine in Sodium Systems," Proceedings of the Eleventh USAEC Air Cleaning Conference, CONF-700816, NTIS, 1:356-71, Dec. 1970.
56. First, M.W., and T. Baldwin, "Sodium Aerosol Filtration Studies," Proceedings of the Eleventh USAEC Air Cleaning Conference, CONF-700816, NTIS, 1:445-56, Dec. 1970.
57. First, M.W., "A Model Odor Control Ordinance," Proceedings of the Second International Clean Air Congress, Washington, DC, Englund, H.M. and W.T. Beery, Eds., Dec. 1970.
58. First, M.W., F.J. Viles, Jr., "Cleaning of Stack Gases Containing High Concentrations of Nitrogen Oxide," J. Air Poll. Control Assoc. 21(3):122-7, March 1971.
59. First, M.W., "Contamination Control of Sodium Releases from Liquid-Metal-Cooled Fast Breeder Reactors," Nuclear Safety 13 (1):37-46, Jan.-Feb. 1972.
60. First, M.W., "Aerosols in Nature," Arch. Intern. Med. 131:24-32, Jan. 1973.
61. First, M.W., E. Jochem, T.W. Baldwin, and R. Hall, "Particle Deposition and Re-entrainment of FFTF H&V Components Following a Sodium Spill," Proceedings of the Twelfth USAEC Air Cleaning Conference, CONF-720823, NTIS, 2:159-78, Jan. 1973.
62. First, M.W., "Performance of Absolute Filters at Temperatures from Ambient to 1,000°F," Proceedings of the Twelfth AEC Air Cleaning Conference, CONF-720823, NTIS, 2:677-700, Jan. 1973.
63. Moeller, D.W., and M.W. First, "The Twelfth AEC Air Cleaning Conference," Nuclear Safety 14(2):111-9, March-April 1973.
64. Ferris, B.G., Jr., J.R. Mahoney, R.M. Patterson, and M.W. First, "Air Quality, Berlin, New Hampshire, March 1966-December 1967," Am. Review of Respir. Dis., 108:77-84, 1973.
65. First, M.W., W. Schilling, J.H. Govan, and A.H. Quinby, "Control of Odors and Aerosols from Spent Grain Dryers," Proceedings of the Control Technology for Agricultural Air Pollutants Specialty Conference, pp. 133-46, March 1974.
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67. First, M.W., "New Kinds of Fabric Filtration Devices," J. Air Poll. Control Assoc. 24(12):1192-4, Dec. 1974.
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69. Moeller, D.W., D.W. Underhill, and M.W. First, "The Thirteenth AEC Air Cleaning Conference," Nuclear Safety 16(2):190-203, March-April 1975.
70. Hinds, W.C., and M.W. First, "Concentrations of Nicotine and Tobacco Smoke in Public Places," N.E.J. of Med. 292(16):844-5, April 1975.

71. Leith, D.H., and M.W. First, "Particle Collection by a Pulse-Jet Fabric Filter," 68th Annual Meeting of the Air Pollution Control Association, Paper No. 75-57.1, June 1975.
72. Hinds, W.C., and M.W. First, "Smoke and Heat," (Reply to Letters to the Editor) N.E.J. of Med. 293:1, July 1975.
73. Leith, D.H., S.N. Rudnick, and M.W. First, "High-Velocity, High Efficiency Aerosol Filtration," NTIS Publication EPA-600/2-76-020, Jan. 1976.
74. First, M.W., and W.C. Hinds, "High Velocity Filtration of Submicrometer Particles," J. Air Poll. Control Assoc. 26(2):119, Feb. 1976.
75. Leith, D.H., and M.W. First, "Filter Cake Redeposition in a Pulse-Jet Fabric Filter," 69th Annual Meeting of the Air Pollution Control Association, Paper No. 76-31.4, June 1976.
76. Leith, D.H., and M.W. First, "Uncertainty in Particle Counting and Sizing Procedures," Am. Ind. Hyg. Assoc. J. 37(2):103-8, 1976.
77. First, M.W., "High Efficiency Filtration of Liquid Metal Generated Aerosols," Seminar on High Efficiency Aerosol Filtration in the Nuclear Industry, Palais des Congress, Aix-en-Provence, Nov. 22-25, 1976.
78. First, M.W., "Training and Certification of Personnel Who Perform In-Place Filter Tests at Nuclear Facilities," Seminar on High Efficiency Aerosol Filtration in the Nuclear Industry, Palais des Congress, Aix-en-Provence, Nov. 1976.
79. First, M.W., and W.C. Hinds, "Ambient Tobacco Smoke Measurement," Am. Ind. Hyg. Assoc. J. 37(11):655-6, Nov. 1976.
80. Rudnick, S.N., D.H. Leith, and M.W. First, "Particulate Collection in the Low Level Radioactive Waste Incinerator," Proceedings of the Fourteenth ERDA Air Cleaning Conference, CONF-760822, NTIS, 1:80-101, Feb. 1977.
81. First, M.W., and D.H. Leith, "Entrainment Separator Performance," Proceedings of the Fourteenth ERDA Air Cleaning Conference, CONF-760822, NTIS, 2:694-710, Feb. 1977.
82. Hinds, W.C., E.F. Mallove, and M.W. First, "Evaluation of In-Vessel Emergency Air Cleaning Systems for an LMFBR," Proceedings of the Fourteenth ERDA Air Cleaning Conference, CONF-760822, NTIS, 2:927-44, Feb. 1977.
83. Leith, D.H., and M.W. First, "Filter Cake Redeposition in a Pulse-Jet Filter," NTIS Publication EPA-600/7-77-022, March 1977.
84. Moeller, D.W., D.W. Underhill, and M.W. First, "The Fourteenth ERDA Air Cleaning Conference," Nuclear Safety 18(2):174-88, March-April 1977.
85. Leith, D.H., and M.W. First, "Performance of a Pulse-Jet Filter at High Filtration Velocity - I. Particle Collection," J. Air Poll. Control Assoc. 27(6):534-9, 1977.
86. Leith, D.H., and M.W. First, "Performance of a Pulse-Jet Filter at High Filtration Velocity - II. Filter Cake Redeposition," J. Air Poll. Control Assoc. 27(7):636-42, 1977.
87. Leith, D.H., and M.W. First, "Dust Penetration Mechanisms in a High Velocity Pulse-Jet Filter," 70th Annual Meeting of the Air Pollution Control Association, Paper No. 77-32.1, June, 1977.

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89. Leith, D.H., and M.W. First, "Pressure Drop in a Pulse-Jet Fabric Filter," *Filtration and Separation* 14, Sept. 1977.
90. Leith, D.H., D.D. Gibson, and M.W. First, "Performance of a Pulse-Jet Fabric Filter with Top and Bottom Inlet," *J. Air Poll. Control Assoc.* 28, June 1978.
91. Rudnick, S.N., and M.W. First, "Specific Resistance of Filter Dust Cakes: Comparison of Theory and Experiments," Third Symposium on Fabric Filters for Particulate Collection, EPA-600/7-78-087, NTIS, pp. 251-88. 1978.
92. Leith, D.H., M.W. First, and D.D. Gibson, "Effect of Modified Cleaning Pulses on Pulse-Jet Filter Performance," Harvard School of Public Health, EPA-600/7-78-087, NTIS, pp. 205-27, June 1978.
93. Leith, D.H., M.W. First, and D.D. Gibson, "Performance of a High Velocity Pulse-Jet Filter," Harvard School of Public Health, EPA-600/7-78-131, NTIS, pp. 1-56, July 1978.
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95. Leith, D.H., M.W. First, and D.D. Gibson, "Effect of Modified Cleaning Pulses on Pulse-Jet Filter Performance," *Filtration and Separation*, pp. 400-6, Sept.-Oct. 1978.
96. Bellamy, R.R., D.W. Moeller, D.W. Underhill, and M.W. First, "The Fifteenth DOE Air Cleaning Conference," *Nuclear Safety* 20:1, Jan.-Feb. 1979.
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98. First, M.W., and D.H. Leith, "Performance of 1,000 and 1,800 CFM HEPA Filters on Long Exposure to Low Atmospheric Dust Loadings," Proceedings of the 15th DOE Nuclear Air Cleaning Conference, CONF-780819, NTIS, 2:1185-90, 1979.
99. Leith, D.H., M.W. First, M.J. Ellenbecker, and D.D. Gibson, "Performance of a Pulse-Jet at High Filtration Velocities," Symposium on the Transfer and Utilization of Particulate Control Technology, EPA-600/7-79-0446, NTIS, 2:11-25, Feb. 1979.
100. First, M.W., R.I. Gross, L.J. DiBerardinis, S.N. Rudnick, and D.F. Liberman, "Biohazard Safety Equipment Certification: Personnel Training and Qualification," paper #169 presented at the 19th Annual American Industrial Hygiene Conference, 1979.
101. First, M.W., and S.N. Rudnick, "Performance of 1,000 and 1,800 CFM HEPA Filters on Long Exposure to Low Atmospheric Dust Loadings," The Second World Filtration Congress, London, 1979, pp. 83-289.
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103. Huber, G.L., and M.W. First, "Perspectives: Pulmonary Host Defenses, the Host, and the Development of Lung Disease," *Seminars in Respiratory Medicine* 1 3:187-96, Jan. 1980.

104. First, M.W., "Trends in the Design and Operation of off-Gas Cleaning Systems in Nuclear Facilities," Proceedings of the Symposium on Management of Gaseous Wastes from Nuclear Facilities, IAEA-SM-245/62, International Atomic Energy Agency, Vienna 1980.
105. Rudnick, S.N, and M.W. First, "High-Efficiency Filtration in a Concurrent Moving Granular Bed," paper #80-30.5 presented at the 73rd Annual Meeting of the Air Pollution Control Association, July 1980.
106. Grubner, O., M.W. First, and G.L. Huber, "Gas Chromatographic Determination of Nicotine in Gases and Liquids with Suppression of Adsorption Effects," Analytical Chem. 52 11:1755-58, 1980.
107. Hinds, W.C., J.M. Macher, and M.W. First, "Size Distribution of Aerosols Produced from Substitute Materials by the Laskin Cold DOP Aerosol Generator," Proceedings of the 16th DOE Nuclear Air Cleaning Conference, CONF-801038, NTIS, 1:125-38, 1981.
108. Ellenbecker, M.J., J.M. Price, D.H. Leith, and M.W. First, "High Velocity Fibrous Filtration," Second Symposium on the Transfer and Utilization of Particulate Control Technology EPA-600/9-80-039c, NTIS, 3:171-88, 1980.
109. First, M.W., and H. Gilbert, "Aerosol Filtration," Proceedings of the 16th DOE Nuclear Air Cleaning Conference, CONF-801038, NTIS, 2:638-63, 1981.
110. First, M.W., and S.N. Rudnick, "Granular Bed Filtration," Proceedings of the U.S.-Japan Seminar: Measurement and Control of Particulate Generated from Human Activities, EPRI SC-2145-SR, Electric Power Research Institute, Palo Alto, CA, pp.3-67 to 3-81, 1981.
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112. Rudnick, S.N., M.W. First, and J.M. Price, "Influence of Thermophoresis on Particle Removal in a Moving Granular Bed Filter and Heat Exchanger," Proceedings of the 16th DOE Nuclear Air Cleaning Conference, CONF-801038, NTIS, 2:772-80, 1981.
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115. Hinds, W.C., S.N. Rudnick, E.F. Maher, and M.W. First, "Control of Indoor Radon Decay Products by Air Treatment Devices," paper #82-48.7 presented at the 75th Annual Meeting of the Air Pollution Control Association, July 1982.
116. Rudnick, S.N., E.F. Maher, W.C. Hinds, and M.W. First, "Surface Deposition of Radon Decay Products with and Without Enhanced Air Motion," Proceedings of the 17th DOE Nuclear Air Cleaning Conference, CONF-820833, NTIS, 1:151-71, 1982.
117. First, M.W., and J.M. Price, "Performance of 1,000- and 1,800- CFM HEPA Filters on Long Exposure to Low Atmospheric Dust Loadings, III," Proceedings of the 17th DOE Nuclear Air Cleaning Conference, CONF-820833, NTIS, 2:909-18, 1982.
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119. First, M.W., and D. Love, "Engineering Control of Asbestos," Am. Ind. Hyg. Assoc. 43(9):634-9, Sept. 1982.
120. Bellamy, R.R., D.W. Moeller, and M.W. First, "Seventeenth DOE Nuclear Air Cleaning Conference," Nuclear Safety, 24(1), Jan.-Feb. 1983.
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123. Macher, J.M., and M.W. First, "Reuter Centrifugal Air Sampler: Measurement of Effective Air Flow Rate and Collection Efficiency," Applied & Envir. Microb. 45(6):1960-2, June 1983.
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126. Hinds, W.C., M.W. First, G.L. Huber, and J.W. Shea, "A Method for Measuring Respiratory Deposition on Cigarette Smoke During Smoking," Am. Ind. Hyg. Assoc. J. 44(2):113-8, 1983.
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