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Wood Treatment Expertise

Member: ACS, AFPA, ANSI,
ASTM, AWPA, CWPA, FPS,
ICC, IRGWP, SWST

CRAIG R. McINTYRE, Ph.D.

Curriculum Vitae

PROFESSIONAL SUMMARY

Over 40 years of diversified research and development and plant management experience predominantly in the forest products industry with major international chemical and wood product organizations. Expertise includes biocides (pressure/non-pressure), fire retardants, formulation development, wood treatment processes, wood chemistry, standardized testing, basic research, wood adhesives, code and regulatory issues, building systems, distribution and transmission poles, quality control (SPC, TQM) with numerous publications, presentations and patents in these areas. In 2007, Craig was honored with the AWPA Award of Merit, their most prestigious honor.

EMPLOYMENT HISTORY

McIntyre Associates, LLC, Dayton, MT 2012-Present
President

McIntyre Associates, Inc., Walls, MS 1993-2012
President

ISK Biosciences, Inc., Memphis, TN 1994-1998
Kodiak™ Development Manager

Hickson Corp. (former Div. of Koppers Co.), Atlanta, GA 1989-1992
Manager, Research and Development

Koppers Co., Inc., Pittsburgh, PA, 1975-1989
Manager, Special Projects
Manager, Wolman Product Development
Manager, Forest Products Group Product Development
Manager, Laminated Beam Plant (Magnolia, AR)
Research Scientist

Craig R. McIntyre, Ph.D.

Curriculum Vitae

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EDUCATION

Post-Doctoral Assoc., Chemistry, Iowa State U., Ames, IA, 1975

Ph.D., Wood Chemistry, U. of Montana, Missoula, MT, 1975
NDEA Fellow

B.Sc., Chemistry, U. of Oregon, Eugene, OR, 1969
ACS Degree

ASSOCIATIONS and HONORS

American Chemical Society (ACS) (1969-Present)

American Forest and Paper Association (AFPA)
(formerly National Forest Products Association (NFPA))
Technical Advisory Committee (2000-2009, 1988-91)
Subcommittee on Fire (2000-2009, 1988-91)
Recognition of Excellence Award, 1990

American National Standards Institute (ANSI) Committee O5.1, Utility Poles, (2003-Present)

American Society of Testing and Materials (ASTM) (1981-Present)
First Vice-chairman: Committee E-5, Fire Standards (1986-1992)
Chairman: Subcommittee, E-5.14, External Fire Exposure Tests (2007-2013)
Chairman: Subcommittee, E-5.21, Smoke and Combustion Products (1984-1986)
Active member: F-14, Fences (2005-Present)
Active member: D-7, Wood (1981-Present)
Award of Appreciation, 1988, 2013

American Wood Protection Association (AWPA) (1978-Present)
Vice-Chairman: Subcommittee P-9, Nonbiocidal Wood Protection, 2009-2013
Executive Committee (2002-2005)
Chairman: Subcommittee T-2, Lumber and Timber (2000-2001)
Chairman: Subcommittee P-7, Fire Retardants (1991-1998)
Secretary: Subcommittee T-4, Poles (1999)
Award of Merit, 2007
Award of Appreciation, 2005
Award of Special Recognition, 2002
Award of Special Recognition, 2000

ASSOCIATIONS and HONORS (Continued)

Canadian Wood Preservation Association (CWPA) (1991-Present)

Forest Products Society (FPS) (1992-Present)
Wood Protection 2006 Organizing Committee, 2006

International Research Group on Wood Preservation (IRG) (1990-Present)
IRG 24 Organizing Committee, 1993

International Code Council (ICC) (2004-Present)

U.S. Department of Commerce NVLAP Wood Based Products Program (1992-1995)
Technical Assessor

Society of Wood Science and Technology (1998-Present)

PATENTS

E.A. Pasek and C.R. McIntyre, U.S. Patent 5,492,681, "Method for Producing Copper Oxide," Feb. 20, 1996. (Corresponding patents worldwide).

C.R. McIntyre and E.A. Pasek, U.S. Patent 4,950,329, "Wood Preservative Composition and Method of Treating Wood with Same," Aug. 21, 1990. (Corresponding patents worldwide).

C.R. McIntyre and D.A. Eakin, U.S. Patent 4,466,998, "Wood Impregnation," Aug. 21, 1984.

R.H. Moulton and C.R. McIntyre, U.S. Patent 4,326,669, "Laminated Wooden Railroad Crosstie Having Exposed End-Grain Forming Part of the Load Bearing Surface," Apr. 27, 1982.

M.A. Lake, C.R. McIntyre and P.L. Robinson, U.S. Patent 9,327,423, "Wood Preservatives and Methods for Treating Wood," May 3, 2016.

PUBLICATIONS

McIntyre, C.R., 2016, "Review of Testing Methodology for Micronized Copper Preservative Systems", Proceedings American Wood Protection Association, 112: (In Press).

McIntyre, C.R., 2015, "Variability and Conformance Derived from Treated Wood Industry Data", Proceedings American Wood Protection Association, 111:183-194.

Freeman, M.H. and C.R. McIntyre, 2015, "A Seven-State Retail Survey on the Preservative Retention Conformance Rate of an AWWA/ALSC Treated Wood Product", Proceedings American Wood Protection Association, 111: 175-182.

Winandy, J.E., H.M. Barnes, P.D. Jones and C.R. McIntyre and, 2014, "Laboratory and Field Exposures of FRT Plywood: Part 3—Modeling Exposure Relationships", Wood and Fiber Science, 46:1-10

McIntyre, C.R., 2013, "ICC-ES Listing: The Alternate Path for Building Code Recognition" in *Deterioration and Protection of Sustainable Biomaterials*, Eds.: Nicholas, D.D., Goodell, B. and Schultz, T., American Chemical Society Books, Washington, DC, pp 331-339.

Freeman, M.H. and C.R. McIntyre, 2013, "Micronized Copper Wood Preservatives: Strong Indications of the Reservoir Effect", International Research Group on Wood Preservation, IRG/WP/13-30609.

Barnes, H.M., M.G. Sanders, G.B Lindsey and C.R. McIntyre, 2013, "Evaluation of Barrier Wrap Systems after 71 Months of Exposure", International Research Group on Wood Preservation, IRG/WP/13-40631.

Freeman, M.H. and C.R. McIntyre, 2013, "Barrier Wrap Technology: A Review and Technology Update to the AWWA", Proceedings American Wood Protection Association, 109: 170-179.

Barnes, H.M., M.G. Sanders, G.B Lindsey and C.R. McIntyre, 2013, "Barrier Systems Redux", Proceedings American Wood Protection Association, 109:52-60.

McIntyre, C.R., M.H. Freeman, R.F. Fox and J. Zhang, 2012, "Addressing the Need for Service Life Estimates for Newer Preservatives" Proceedings American Wood Protection Association, 108: 187-199.

PUBLICATIONS (Continued)

McIntyre, C.R. and M. A. Lake, 2012, "Seven-year Full Size Field Tests of Fixed Borate Systems" Proceedings American Wood Protection Association, 108:58-63.

McIntyre, C.R. and M.H. Freeman, 2012, "'AWPA or ICC-ES Listing: Which Way Do I Go?" Proceedings American Wood Protection Association, 108:32-39.

McIntyre, C.R. and M.H. Freeman, 2011, "Standardized Field Trials with Micronized Copper," International Research Group on Wood Preservation, IRG/WP/11-30564.

McIntyre, C.R. and M. A. Lake, 2011, "Fixed Borates, Anyone?," International Research Group on Wood Preservation, IRG/WP/11-30563.

McIntyre, C.R. and M.H. Freeman, 2011, "Update on Standardized Field Trials with Micronized Copper, Proceedings American Wood Protection Association, 107: 245-266.

Smith, S.T. and C.R. McIntyre, 2011, "Life Cycle Assessment Comparison of Treated Wood to Alternate Materials – Overview, Results and Lessons, International Research Group on Wood Preservation, IRG/WP/11-50282.

McIntyre, C.R. 2010, "Comparison of Micronized Copper Particle Sizes and Treatment of Refractory Species," Proceedings American Wood Protection Association, 106:91-98

Freeman, M.H. and C.R. McIntyre, 2010, "Product Certification for 'Green' Treated Wood Products," Forest Products Society 64th Annual Meeting, Madison, WI, available at <http://www.forestprod.org/ic64/presentations.html>

Dhyani, S., D.P. Kamdem, S.R. Shukla, M.H. Freeman, C.R. McIntyre and E. Jackson, 2010, "Stability of Biodiesel/Diesel Blends as Solvent/Carrier for Wood Preservatives," Proceedings American Wood Protection Association, 106:43-57

Freeman, M.H., J.A. Brient and C. R. McIntyre, 2010, "Investigation into Copper Indicators for Treated Wood (Title Only)," Proceedings American Wood Protection Association, 106:66

Ragon, K., M. Voitier, T.F. Shupe, Q. Wu, M.H. Freeman and C.R. McIntyre, 2010, "Copper Based Wood Preservative Systems – Are Used Treating Solutions as Efficacious as Virgin Solutions?," Proceedings American Wood Protection Association, 106:99-106

PUBLICATIONS (Continued)

McIntyre, C.R. 2010, "Comparison of Micronized Copper Particle Sizes," International Research Group on Wood Preservation, IRG/WP/10-30538.

Shupe, T.F., K. Ragon, Q. Wu, M.H. Freeman and C.R. McIntyre, 2010, "Copper Preservative Systems: A Rapid Investigation into Effects of Co-biocides and Used Treating Solutions," Internat. Res. Group on Wood Preservation, IRG/WP/10-30541.

Freeman, M.H. and McIntyre, C.R., 2010, "Copper Naphthenate and Copper Naphthenate Treated Wood – A Review and Update," Proceedings of 2010 Southeast Pole Conference, Memphis, TN

McIntyre, C.R. and M.H. Freeman, 2010, "Pole Specifications: What Do They Mean?" Proceedings of 2010 Southeast Pole Conference, Memphis, TN, pp. 117-119.

Barnes, H.M., J.E. Winandy, C.R. McIntyre and P.D. Jones, 2010, "Laboratory and Field Exposures of FRT Plywood: Part 2—Mechanical Properties", Wood and Fiber Science, 42:30-45

McIntyre, C.R. and M.H. Freeman, 2009, "Use of Non-standard Tests for Evaluating Wood Preservatives," Forest Products Society 63rd Annual Meeting, Boise, ID, available at <http://www.forestprod.org/ic63/presentations.html>

McIntyre, C.R. and M.H. Freeman, 2009, "Micronized Copper", Proceedings American Wood Protection Association, 105:114-127

McIntyre, C.R., M.H. Freeman, T.F. Shupe, Q. Wu and D.P. Kamdem 2009, "The Form of Copper: Does It Really Matter?" International Research Group on Wood Preservation, IRG/WP/09-30513.

Overturf, B., S.M. Cline and C.R. McIntyre, 2009, "Acetylated Wood Performance Features," Proceedings American Wood Protection Association, 105:153-161

McIntyre, C.R. and P. Thompson, 2009, "FR Coatings for Structural Use" Proceedings American Wood Protection Association, 105:191-193.

Cline, S.M. and C.R. McIntyre, 2009, "Evaluation of Acetylated Wood for International Code Council-Evaluation Services Listing," Proceedings 4th European Conference on Wood Modification

PUBLICATIONS (Continued)

Freeman, M.H., C.R. McIntyre and R.E. Jackson, 2009, "A Critical and Comprehensive Review of Boron in Wood Preservation," Proceedings American Wood Protection Association, 105:279-294.

Barnes, H.M., M. Sanders, B. Lindsey, J.E. Winandy and C.R. McIntyre, 2009, "Bending Properties from Laboratory and Field Exposures of FRT Plywood," Proceedings American Wood Protection Association, 105:272-276.

Barnes, H.M., G.B. Lindsey, T. Johnson, J. Hill and C.R. McIntyre, 2009, "Barrier Wrap Performance in Hazard Zone 4," Proceedings American Wood Protection Association, 105:59-65

Freeman, M.H. and C.R. McIntyre, 2008, "A Comprehensive Review of Copper Based Wood Preservatives with a Focus on New Micronized or Dispersed Copper Systems," Forest Products J., 58(11): 6-27.

Barnes, H.M., J.E. Winandy and C.R. McIntyre, 2008, "Laboratory and Field Exposures of FRT Plywood: Part 1—Physical Test Data," International Research Group on Wood Preservation, IRG/WP/08-40426.

McIntyre, C.R. and M.H. Freeman, 2008, "Biological Efficacy of Micronized Copper Systems," International Research Group on Wood Preservation, IRG/WP/08-30485.

M.H. Freeman and C.R. McIntyre, 2008, "A Comprehensive Review of Copper Based Wood Preservatives with a Focus on Micronized Copper," International Research Group on Wood Preservation, IRG/WP/08-30486.

Freeman, M.H. and C.R. McIntyre, 2008, "The Wood Preservative Fungicide Cyproconazole: A Critical Review and Update," Proceedings American Wood Protection Association, 104:65-80.

Schultz, T.P., D.D. Nicholas and C.R. McIntyre, 2008, "Recent Patents and Developments in Biocidal Wood Protection Systems for Exterior Applications," Recent Patents Material Sci., 1(2): 128-134.

McIntyre, C.R. 2008. "American Wood-Preservers' Association and Building Code Procedures for New Preservative Systems". in Schultz *et al.*, eds. "Development of Commercial Wood Preservatives", ACS Symposium Series 982, American Chemical Society, Washington, DC, pp. 524-536.

PUBLICATIONS (Continued)

McIntyre, C.R. and M.H. Freeman 2007 “Copper-Polymeric Betaine Wood Preservative Systems” Appendix D of AC326, International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. and M.H. Freeman 2007 “Developing a New Wood Preservative and Potential Fire Retardant” Proceedings American Wood Protection Association, 103:128-130.

McIntyre, C.R. M.H. Freeman and H.M. Barnes, 2007, “What’s New? Pros and Cons of Future Preservative Systems,” Proc. 2007 Southeastern Utility Pole Conference, Forest Products Society, Madison, WI, pp. 153-158

Barnes, H.M., C.R. McIntyre, D.W. Bullock, M.H. Freeman and G. B. Lindsey, 2007, “Penta Analysis: Is XRF Good Enough?” Proc. 2007 Southeastern Utility Pole Conference, Forest Products Society, Madison, WI, p. 230.

McIntyre, C.R. and M.H. Freeman 2006 “AC329 Acceptance Criteria for Waterborne Copper Oxide, Boric Acid and HDO Wood Preservative Systems” International Code Council-Evaluation Service, available at www.icc-es.org.

Freeman, M.H., C. R. McIntyre and J. Makuvek. 2006. “The use of Postsaver Barrier Wraps to Increase Service Life of Wood in Ground Contact” Proceedings American Wood-Preservers’ Association, 102:112-115.

M.A. Lake and C.R. McIntyre, 2006. “Formosan Termite Response to Weathered Borate-Treated Wood,” in “Wood Protection 2006”, Forest Products Society, Madison, WI.

McIntyre, C.R. 2005 “AC326 Acceptance Criteria for Proprietary Wood Preservative Systems—Common Requirements for Treatment Process, Test Methods and Performance” International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R., H.M. Barnes and M.H. Freeman, 2005, “40-Year Assays Of Penta-treated Posts in DeQueen, Arkansas,” Proceedings American Wood-Preservers’ Association, 101:181-186.

Freeman, M.H., C. R. McIntyre and J. Makuvek. 2005. “The use of Barrier Wraps to Increase Service Life of Treated and Untreated Wood in Ground Contact” Proceedings American Wood-Preservers’ Association, 101: 85-88.

PUBLICATIONS (Continued)

McIntyre, C.R. and D.D. Nicholas, 2005, "Reaffirmation of DCOI in AWP A P8 by P3", American Wood-Preservers' Association Fall Meeting

Robinson, P.L., J.E. Blasser, M.A. Lake and C.R. McIntyre, 2005. "Leaching Tests of 'Controlled' Borate Systems," Proceedings American Wood-Preservers' Association., 101: 75-83.

McIntyre, C.R. 2005 "AC314 Acceptance Criteria for DCOIT Preservative Systems" International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. and M.H. Freeman 2005 "AC313 Acceptance Criteria for Barrier Systems for Protection of Wood Posts Against Decay and Termites" International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. 2005 "AC297 Acceptance Criteria for Acetylated Wood Preservative Systems" International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. 2004. "Chilean Radiata Pine Poles: Treatment and Strength Studies," Proceedings American Wood-Preservers' Association, 100:34-40.

McIntyre, C.R. 2004 "AC268 Acceptance Criteria for Organic Wood Preservative Systems" International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. and M.H. Freeman. 2004 "AC254 Acceptance Criteria for PXTS Wood Preservative" International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R., 2003. "A New Pole Species, Chilean Radiata Pine, in North American Standards," Proc. 2003 Utility Pole Structures Conference, Reno, NV, November.

McIntyre, C.R., 2003. "Fire—Committee D07 Answers the Alarm," ASTM Standardization News, June, pp. 36-9.

Brient, J.A., M.H. Freeman and C.R McIntyre, 2003. "Copper Naphthenate Update," Proceedings American Wood-Preservers' Association, 99: 258-273.

McIntyre, C.R., 2004. "Protection of Wood from Fire" in Encyclopedia of Forest Science, eds. J. Burley, J. Evans and J. Youngquist, , Academic Press, San Diego, CA

PUBLICATIONS (Continued)

McIntyre, C.R. and M.H. Freeman, 2002. "Copper Naphthenate—An Update On New Trends And Changes In The Last Decade," Proc. Northeast Pole Conference, Binghamton, NY, October.

McIntyre, C.R. 2002. "Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber. ASTM D 6841-02. ASTM International, Conshohocken, PA

McIntyre, C.R. 2001. "Subcommittee T2 Lumber and Timber Annual Report," Proceedings American Wood-Preservers' Association, 98:181-186

McIntyre, C.R. 2001. "Subcommittee T2 Lumber and Timber Annual Report," Proceedings American Wood-Preservers' Association, 97:141-147.

McIntyre, C.R. 2000. "Copper Naphthenate Performance: A New Way to Look at Old Data," Internat. Res. Group on Wood Pres., IRG/WP 00-30215

McIntyre, C.R. 2000. "The Performance of Copper Naphthenate," Proc. Sixth International Conference on Utility Line Structures, Fort Collins, CO, March

McIntyre, C.R. 2000. "Subcommittee T4 Poles Annual Report," Proceedings American Wood-Preservers' Association, 96: 140-155.

McIntyre, C.R. 1999. "Why the AWPA Needs SPC (Title Only.)," Proceedings American Wood-Preservers' Association, 95: 51.

McIntyre, C.R. 1999. "Subcommittee P7 Fire Retardant Systems Annual Report," Proceedings American Wood-Preservers' Association, 95: 148-9.

Kamdern, D.P. and C. R. McIntyre. 1999. "Laboratory Evaluation of CDDC as a Wood Preservative for Red Oak (*Quercus rubra*) and Red Maple (*Acer rubrum*)," Holz als Roh- und Werkstoff, 57: 69-72.

McIntyre, C.R. 1998. "An Update on CDDC," Proceedings American Wood-Preservers' Association, 94:148-164.

McIntyre, C.R. 1998. "Standard Practice for Calculating Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof Sheathing. ASTM D 6305-98. ASTM International, Conshohocken, PA

PUBLICATIONS (Continued)

McIntyre, C.R. 1998. "Subcommittee P7 Fire Retardant Systems Annual Report," Proceedings American Wood-Preservers' Association, 94:84-85.

Kamdern, D.P., M. H. Freeman, C.R. McIntyre and T.L. Woods. 1998. "The Chemistry of Cu-Naphthenate Treated SYP: Effect of Post-Steamng," Proceedings American Wood-Preservers' Association, 94:15-29.

Kamdern, D.P. and C. R. McIntyre. 1998. "Chemical Investigation of 23-Year Old CDDC Treated Southern Yellow Pine," Wood and Fiber Science, 31(1), 64-71.

Cookson, L.J., C.R. McIntyre and D.K. Scown. 1998. "Laboratory Aquaria Evaluation of CDDC Against Marine Borers," International Research Group on Wood Preservation, IRG/WP/98-10262.

Craciun, R., D.P. Kamdem and C.R. McIntyre. 1997. "Characterization of Copper Dimethyldithiocarbamate (CDDC) Treated Wood with ESEM and other Spectroscopic Techniques," *Holzforschung*, 51:519-525.

McIntyre, C.R. 1997. "Subcommittee P7 Fire Retardant Systems Annual Report," Proceedings American Wood-Preservers' Association, 93:134-135.

Kamdern, D.P. and C. R. McIntyre. 1997. "Chemical Investigation of 23-Year Old CDDC Treated Southern Yellow Pine," International Research Group on Wood Preservation, IRG/WP/97-30141.

McIntyre, C.R. 1996. "Subcommittee P7 Fire Retardant Systems Annual Report," Proceedings American Wood-Preservers' Association, 92:175-177.

Gallacher, A.C., C.R. McIntyre, M.H. Freeman, D.K. Stokes and W.B. Smith. 1995. "A Comparison of Analytical Techniques" International Research Group on Wood Preservation, IRG/WP/95-20061.

McIntyre, C.R. 1995. "Subcommittee P7 Fire Retardant Systems Annual Report," Proceedings American Wood-Preservers' Association, 91:259-261.

Gallacher, A.C., C.R. McIntyre, M.H. Freeman, D.K. Stokes and W.B. Smith. 1995. "Standard and New Analytical Techniques for CDDC Preserved Wood Analysis," Proceedings American Wood-Preservers' Association, 91:194-207.

PUBLICATIONS (Continued)

McIntyre, C.R. 1994. "Subcommittee P7 Fire Retardant Systems Annual Report," Proceedings American Wood-Preservers' Association, 90:285-286.

Pasek, E.A. and C.R. McIntyre. 1993. "Treatment and Recycle of CCA Hazardous Waste," International Research Group on Wood Preservation, IRG/WP/93-50007

McIntyre, C.R. 1994. "Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to Elevated Temperatures". ASTM D5516-04. ASTM International, Conshohocken, PA

McIntyre, C.R. 1993. "Subcommittee P7 Fire Retardant Systems Annual Report," Proceedings American Wood-Preservers' Association, 89:415-417.

McIntyre, C.R. and R.F. Fox. 1992. "CCA/OIL for Northern Species," Proc. Canadian Wood Preservation Association. 13:138-154.

McIntyre, C.R. 1992. "Subcommittee P7 Fire Retardant Systems Annual Report," Proceedings American Wood-Preservers' Association, 88:392-395.

Pasek, E.A. and C.R. McIntyre. 1992. "Burning of CCA Treated Wood with Minimal Metals Loss," AWPI Symposium on Treated Wood Life-Cycle Management, Chicago, IL.

Winandy, J.E., S.L. Levan, R.J. Ross, S.P. Hoffman and C.R. McIntyre. 1991. "Thermal Degradation of Fire-Retardant-Treated Plywood: Development and Evaluation of a Test Protocol," Res. Pap. FPL-RP-501, U.S. Dept. of Agriculture, Forest Service, Forest Products Laboratory, 21 p.

Pasek, E.A. and C.R. McIntyre. 1990. "Heat Effects on Fire Retardant-Treated Wood, J. Fire Science, 8(6):405-20.

McIntyre, C.R. and R.F. Fox. 1990. "Update on Wolman ET, A New CCA/OIL Treating System," Proceedings American Wood-Preservers' Association, 86:63-77.

Courville, G.E., A.O. Desjarlais, R.P. Tye and C.R. McIntyre. 1990. "A Comparison of Two Independent Techniques for the Determination of *In Situ* Thermal Performance," Insulation Materials, Testing and Applications, ASTM STP 1030, D.L. McElroy and J.F. Kimpflen, Eds., ASTM, Philadelphia, pp. 496-509.

PUBLICATIONS (Continued)

McIntyre, C.R. 1989. "Update on Wolman ET, A New CCA/OIL Treating System," International Conference on Wood Poles and Piles, Fort Collins, CO, October 27, 1989

Lai, Y.Z., F. Shafizadeh and C.R. McIntyre. 1977. "Pyrolysis of Cellulose after Chlorination or Addition of Zinc Chloride," in J.C. Arthur, Jr., Ed., "Cellulose Chemistry and Technology, ACS Symposium Series, 48, pp. 256-272.

Shafizadeh, F., R.A. Susott and C.R. McIntyre. 1975. "Solid-state Transition and Thermodynamic Properties of Crystalline Thiolevoglucosan," *Carbohydr. Res.*, 41: 351-4.

PRESENTATIONS

American Wood Protection Assoc. Annual Meeting May 2016

American Wood Protection Assoc. Annual Meeting April 2015

American Wood Protection Assoc. Annual Meeting May 2013

IRG Annual Meeting, May 2013

American Wood Protection Assoc. Annual Meeting May 2012

American Wood Protection Assoc. Annual Meeting May 2011

IRG Annual Meeting, May 2011

Forest Products Soc. Annual Meeting, June 2010

American Wood Protection Assoc. Annual Meeting May 2010

IRG Annual Meeting, May 2010

SE Pole Conference, Memphis, TN, February 2010

Forest Products Soc. Annual Meeting, June 2009

American Wood Protection Assoc. Annual Meeting, April 2009

IRG Annual Meeting, May 2009

European Conference on Wood Modification 2009

IRG Americas Meeting, 2008

American Wood Protection Assoc. Annual Meeting May 2008

IRG Annual Meeting, May 2007

American Wood Pres. Assoc. Annual Meeting May 2007

2007 Southeastern Utility Pole Conference, February, 2007

PRESENTATIONS (Continued)

Society of Wood Science and Technology Annual Meeting, June 2006

Green Chemistry and Engineering Conference, June 2006

Wood Protection 2006, March 2006

American Wood Pres. Assoc. Annual Meeting May 2006

American Wood Pres. Assoc. Annual Meeting May 2005

American Chemical Society Symposium, March 2005

American Wood Pres. Assoc. Annual Meeting May 2004

Utility Pole Structures Conference, November 2003

American Wood Pres. Assoc. Annual Meeting May 2003

Verizon Regional Meeting, April 2003

Northeast Pole Conference, October 2002

IRG Annual Meeting, May 2000

International Conference on Utility Line Structures, March 2000

American Wood Pres. Assoc. Annual Meeting, May 1999

American Wood Pres. Assoc. Annual Meeting, May 1998

Forest Products Soc. Annual Meeting, June 1995

IRG Annual Meeting, May 1995

Can. Wood Pres. Assoc. Annual Meeting, November 1992

American Wood Pres. Assoc. Annual Meeting, April 1990

Fire Retardant Chemicals Assoc. Fall Conference, October 1990

PRESENTATIONS (Continued)

Forest Products Res. Soc. Annual Meeting, June 1990

International Pole Conference, July 1990

Can. Wood Pres. Assoc. Annual Meeting, November 1989

International Pole Conference, July 1989