

Randall A. Locke II, LPG

Curriculum Vitae, October 2023

Contact Information

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Profile links: [University of Illinois](#) - [ResearchGate](#) - [LinkedIn](#) - [ORCID](#)



Profile QR

Education

University of Iowa, 1994, M.S. in Geology

Iowa State University, Summer 1993, Field Methods in Hydrogeology

Illinois State University, 1991, B.S. in Geology with honors

Research Interests and Experience

- ❑ Research Interests: Geological, hydrological, and geochemical investigations including subsurface characterization methods, geological carbon storage, environmental monitoring, natural system dynamics, aqueous geochemistry, geochemical sampling methods; groundwater resource evaluations; and land use impact assessments.
- ❑ Key Experiences: 29 years of applied research including extramural funding; program development, management, leadership, and review; strategic research initiatives; technical expert review; proposal and publication review; facilitation of multi-disciplinary research projects; coordination of extensive field-based efforts; development and review of measurement, monitoring, and verification programs, policy development, state and federal regulatory permit development and compliance; international standards development for carbon storage; and management of large, long-term data sets.

Career History

	Illinois State Geological Survey, Champaign, Illinois
1/2019 to present	Principal Research Scientist
9/2011 to present	Head, Geochemistry Section
8/2010 to 4/2021	Monitoring Program Coordinator, Midwest Geological Sequestration Consortium (MGSC), Environmental Geochemist
1/2009 to 1/2019	Monitoring Program Assistant Coordinator, MGSC
1/2009 to 8/2010	
	Illinois State Water Survey, Champaign, Illinois
9/1999 to 1/2009	Associate Hydrogeologist
1/1994 to 9/1999	Assistant Hydrogeologist
	University of Iowa, Department of Geology, Iowa City, Iowa
8/1991 to 12/1993	Teaching Assistant
	Illinois State Geological Survey, Champaign, Illinois
5/1992 to 8/1992	Quaternary Geology Mapping Intern

Professional Activities and Committee Responsibilities

- ❑ International Technical Expert for the American National Standards Institute appointed to the [International Standards Organization Technical Committee 265 \(Carbon dioxide capture, transportation, and geological storage\)](#):

Working Group 3 (Storage), 2014 to 2017; Technical Panel and clause lead; Clause 9 (Monitoring and Verification). Outcome: Published International Standard - ISO27914: 2017(E).

Working Group 3 (Storage), 2018 to present; Technical Panel member; "Carbon dioxide capture, transportation and geological storage - Injection operations, infrastructure and monitoring" Chapter 8 (Monitoring) and Chapter 9 (Decommissioning). Outcome: Published Technical Report ISO/TR 27923: 2021 (E).

Working Group 4 (Quantification and Verification), 2017 to 2020 Technical Panel co-lead; Clause 7 (Measurement and Monitoring). Outcome: Draft International Standard developed, but not published. Working group disbanded.

Working Group 6 (CO₂-EOR), 2016 to 2019; Technical Panel member; Clause 6 (Containment assurance and monitoring within the EOR complex). Outcome: Published International Standard - ISO27916:2019 (E).

- ❑ University of Illinois, Prairie Research Institute
 - [Coal Ash Response Team \(CART\)](#), Chair, 2019 to present
 - [Natural Gas Working Group \(NGWG\)](#), Chair, 2017 to 2020
 - [Mahomet Aquifer Response Team](#), ad hoc liaison, 2018 to 2020
- ❑ Principal Investigator, Environmental Monitoring for the Illinois Industrial Carbon Capture and Storage Project, Decatur, Illinois, 2021 to present
- ❑ Coordinator of the Midwest Geological Sequestration Consortium's Monitoring, Verification, and Accounting Program, which included extensive air, soil, and groundwater monitoring for research and regulatory compliance efforts totaling over \$9.0M for four research projects, 2010 to 2021
- ❑ US Department of Energy - Regional Carbon Sequestration Partnership; Member of the Monitoring, Verification, and Accounting Working Group (2009-2012) and Water Working Group (2009 to 2015)
- ❑ Technical expert committee member and/or session chair/co-chair, International Greenhouse Gas Technologies Conference (GHGT) 2012-2022
- ❑ Principal Investigator, Illinois Coal Ash Impoundment Assessment, congressionally directed spending administered through the U.S. EPA, anticipated, 2024-2027
- ❑ Principal Investigator, ISGS Scientific Support Program for Illinois Nature Preserves and Other Areas, funded by the Illinois Nature Preserves Commission - Illinois Department of Natural Resources, 1998 to present
- ❑ [Illinois Groundwater Association](#): 2004 Association Chair, Executive Committee Member 1997-2009, Webmaster 1997-2009, and Association Member since 1994
- ❑ [National Ground Water Association](#) Member since 2003

Licenses and Certifications

- ❑ Illinois Licensed Professional Geologist #196-000933 (active)
- ❑ Previously certified for Hazardous Waste Operations and Emergency Response (HAZWOPER) pursuant to 29 CFR 1910.120 (1997-2007)

Honors and Recognition

- ❑ 2019 - *Outstanding Collaboration by a Team*, Members of the Mahomet Aquifer Response Team and Natural Gas Working Group, Prairie Research Institute
- ❑ 2013 - *Scientific Achievement Award*, Illinois Groundwater Association
- ❑ 2012 - *Outstanding New Staff Member*, Illinois State Geological Survey
- ❑ 2006 - *Award of Recognition*, Illinois Groundwater Association
- ❑ 1993 - *Teaching Excellence Award*, University of Iowa, College of Liberal Arts,
- ❑ 1992 - *Cooperative Summer Internship Scholarship*, United States Geological Survey/National Association of Geology Teachers
- ❑ 1991 - *John Wesley Powell Field Camp Scholarship*, Illinois State University, Department of Geology

Technical and Peer-Reviewed Publications (excluding abstracts)

2023

Iranmanesh, Abbas, **Randall Locke**, Damon Garner, and Bracken Wimmer. Illinois Basin – Decatur Project: Deep Fluid Monitoring Program, Illinois State Geological Survey, Circular 611, 53 p. (in final review)

Shao, H., **R.A. Locke II**, E.T. Plankell, J.L. Monson, L.A. Schafer, A. Iranmanesh, and B.T. Wimmer, 2023, Summary of Long-Term Groundwater Monitoring at Lake in the Hills Fen Nature Preserve, McHenry County, Illinois: Champaign, Illinois State Geological Survey, Circular 609, 90 p. <https://www.ideals.illinois.edu/items/126241>

2022

International Standards Organization (contributor to Chapters 10 and 11). 2022. Carbon dioxide capture, transportation and geological storage — Injection operations, infrastructure and monitoring. Published International Technical Report, ISO/TR 27923:2022. 122p. <https://www.iso.org/standard/67275.html>

Technical and Peer-Reviewed Publications (continued)

2021

Doughty, CA; Oldenburg, CM; and **Locke, RA**. 2021. Shallow Groundwater Modeling Using the TOUGH Codes at the IBDP Site: Phase I Final Report. Project report submitted to the U.S. Department of Energy for the Illinois Basin Decatur Project. 29p and supplementary material (2 excel spreadsheets)

Yiran Dong, Robert A. Sanford, Lynn Connor, Joanne Chee-Sanford, Bracken T. Wimmer, Abbas Iranmanesh, Liang Shi, Ivan G. Krapac, **Randall A. Locke**, Hongbo Shao. Differential structure and functional gene response to geochemistry associated with the suspended and attached shallow aquifer microbiomes from the Illinois Basin, IL, *Water Research*, Volume 202, 2021, 117431, ISSN 0043-1354, <https://doi.org/10.1016/j.watres.2021.117431>

Locke, Randy, Abbas Iranmanesh, Eric Plankell, and Jessica Monson. 2021. Monitoring Report: Bluff Spring Fen Nature Preserve (for data through December 2020). Program Report submitted to the Illinois Nature Preserves Commission. Illinois State Geological Survey, Champaign, Illinois. 55p.

Shao, Hongbo, **Randall A. Locke II**, Eric T. Plankell, Jessica L. Monson, Lindsey A. Schafer, Abbas Iranmanesh, Bracken T. Wimmer. 2021. Summary of Long-Term Groundwater Monitoring at Lake in the Hills Fen Nature Preserve, McHenry County, Illinois. Program Report. Illinois State Geological Survey, Champaign, Illinois. 85p

2020

Locke, R., Keefer, L., Barker, T., Elrick, S., Hemrich, V., Huber, A., Kelly, W., Rajagopalan, K., Stodola, A., Winkel, R., & Yacucci, M. (2020). Coal Ash Response Team final report. (PRI Response Team Report). Prairie Research Institute. 61p. <https://www.ideals.illinois.edu/handle/2142/108384>

Shao, Hongbo, Jared T Freiburg, Peter M Berger, Alexander H Taylor, Hanna F Cohen, **Randall A Locke II**. Mobilization of Trace Metals from Caprock and Formation Rocks at The Illinois Basin - Decatur Project Demonstration Site under Geological Carbon Dioxide Sequestration Conditions, *Chemical Geology* 2020, 550. <https://doi.org/10.1016/j.chemgeo.2020.119758>

2019

Carman, C.H., C.S. Blakley, C.P. Korose, and **R.A. Locke II**, 2019, Illinois Basin – Decatur Project: Soil carbon dioxide flux monitoring: Illinois State Geological Survey, Circular 599, 27 p. <http://library.isgs.illinois.edu/Pubs/pdfs/circulars/c599.pdf>

Technical and Peer-Reviewed Publications (continued)

Shao, Hongbo, David A.N. Ussiri, Christopher G. Patterson, **Randall A. Locke**, Hong Wang, Alexander H. Taylor, Hanna F. Cohen. Soil gas monitoring at the Illinois Basin – Decatur Project carbon sequestration site, *International Journal of Greenhouse Gas Control*, Volume 86, 2019, Pages 112-124, ISSN 1750-5836, <https://doi.org/10.1016/j.ijggc.2019.04.012>

Prairie Research Institute Coal Ash Response Team, Internal Interim Report; Authored by response team members: **Randy Locke (chair)**, Laura Keefer (vice chair), Trish Barker, Scott Elrick, Veronica Hemrich, Anne Huber, Walt Kelly, Kishore Rajagopalan, Alison Stodola, Rick Winkel, Mark Yacucci. December 20, 2019. 51 p.

2018

Locke, R.A., A. Iranmanesh, B. Wimmer, J. Kirksey, N. Malkewicz, and S. Greenberg. Verification Well #1: How a deep monitoring well was used and adapted to meet the evolving monitoring needs and challenges at the Illinois Basin – Decatur Project, 14th Greenhouse Gas Control Technologies Conference, Melbourne, 21-26 October 2018 (GHGT-14). <https://ssrn.com/abstract=3366031>

Mito, S., Z. Xue, B. Wimmer, A. Iranmanesh, H. Shao, **R. Locke**, and S. Greenberg. Gas-tight pH measurements to assess an effect of CO₂ on groundwater. 14th Greenhouse Gas Control Technologies Conference, Melbourne, 21-26 October 2018 (GHGT-14). <https://ssrn.com/abstract=3366313>

Duguid, A., J. Kirksey, D. Riestenberg, G. Koperna, C. Holley, M. Loizzo, **R. Locke**. CO₂ well construction: Lessons learned from United States Department of Energy sponsored projects. 14th Greenhouse Gas Control Technologies Conference Melbourne, 21-26 October 2018 (GHGT-14). <https://ssrn.com/abstract=3365869>

Locke, R., Roadcap, G., Stumpf, A., Leetaru, H., Kelly, W., & Winkel, R. (2018). An Introductory Guide to the Mahomet Aquifer and Natural Gas Storage in East-Central Illinois. Prairie Research Institute, Champaign, IL, 18 p. (<https://www.ideals.illinois.edu/handle/2142/99145>)

Mahomet Aquifer Protection Task Force: Findings and Recommendations; Authored by Task Force members Carol Ammons, Eric Ballenger, Teresa Barnett, Scott Bennett, Alec Davis, Deborah Frank-Feinen (chair), Keith Gleason, Donovan Griffith, Charles Hostetler, Lynn Karner, Chris Koos, Claudia Lennhoff, Diane Marlin, Alec Messina, Bill Mitchell, Julie Moore-Wolfe, Andrew Rehn, Jim Risley, George Roadcap, Chapin Rose, Charles Smith, Larry Stoner, Steve Turner, Todd Zalucha, and David Zimmerman with additional support from Rick Cobb, Illinois EPA; **Randy Locke**, Illinois State Geological Survey; and Walt Kelly, Illinois State Water Survey. December 21, 2018. (<https://epa.illinois.gov/topics/community-relations/sites/mahomet-aquifer-task-force.html>)

2017

Bacon, D. H., **Locke II, R. A.**, Keating, E., Carroll, S., Iranmanesh, A., Mansoor, K., Wimmer, B., Zheng, L., Shao, H. and Greenberg, S. E. (2017), Application of the Aquifer Impact Model to support decisions at a CO₂ sequestration site. *Greenhouse Gas Sci Technol*, 7: 1020–1034. (<http://dx.doi.org/10.1002/ghg.1730>)

Technical and Peer-Reviewed Publications (continued)

- Giunta, T., Devauchelle, O., Ader, M., **Locke, R.**, Louvat, P., Bonifacie, M., Métivier, F., Agrinier, P. (2017) The *gravitas* of gravitational isotope fractionation revealed in an isolated aquifer. *Geochem. Persp. Let.* 4, 53-58. (<http://dx.doi.org/10.7185/geochemlet.1736>)
- Greenberg, Sallie, Robert Bauer, Robert Will, **Randall Locke II**, Michael Carney, Hannes Leetaru, John Medler, Geologic Carbon Storage at a One Million Tonne Demonstration Project: Lessons Learned from the Illinois Basin – Decatur Project, *Energy Procedia*, Volume 114, 2017, Pages 5529-5539, ISSN 1876-6102, (<http://dx.doi.org/10.1016/j.egypro.2017.03.1913>)
- Locke, R.A.**, S.E. Greenberg, P. Jagucki, I.G. Krapac, H. Shao, Regulatory Uncertainty and its Effects on Monitoring Activities of a Major Demonstration Project: The Illinois Basin – Decatur Project Case, *Energy Procedia*, Volume 114, 2017, Pages 5570-5579, ISSN 1876-6102, (<http://dx.doi.org/10.1016/j.egypro.2017.03.1697>)
- O'Brien, Kevin, Yongqi Lu, Vinod Patel, Sallie Greenberg, **Randall Locke**, Michael Larson, Krish R. Krishnamurthy, Makini Byron, Joseph Naumovitz, David S. Guth, Stephen J. Bennett, Creating Markets for Captured Carbon: Retrofit of Abbott Power Plant and Future Utilization of Captured CO₂, *Energy Procedia*, Volume 114, 2017, Pages 1263-1272, ISSN 1876-6102, (<http://dx.doi.org/10.1016/j.egypro.2017.03.1380>)

2016

- Dong, Yiran, R. Sanford, M Boyanov, K. Kemner, T. Flynn, E. O'Loughlin, Y-J Chang, **R. Locke II**, J. Weber, S Egan, R. Mackie, I. Cann, and B. Fouke. 2016. *Orenia metallireducens* sp. Nov. strain Z6, a Novel Metal-reducing Firmicute from the Deep Subsurface. *Appl. Environ. Microbiol.* v 82. n. 21, p 6440-6453. November 2016. (<http://dx.doi.org/10.1128/AEM.02382-16>)
- Dong, Yiran, R. Sanford, M Boyanov, K. Kemner, T. Flynn, E. O'Loughlin, **R. Locke II**, J. Weber, S Egan, and B. Fouke. 2016. *Tepidibacillus decaturensis* sp. nov.: a microaerophilic, moderately thermophilic iron-reducing bacterium isolated from a depth of 1.7 km in the Illinois Basin, USA. *Int J Syst Evol Microbiol.* 2016 Oct;66(10):3964-3971. (<http://dx.doi.org/10.1099/ijsem.0.001295>)
- Labotka, Dana M. , Samuel V. Panno, **Randall A. Locke II**. 2016. A sulfate conundrum: dissolved sulfates of deep-saline brines and carbonate associated sulfates. *Geochimica et Cosmochimica Acta*, v.190, p. 53-71. (<http://dx.doi.org/10.1016/j.gca.2016.06.033>)

2015

- Labotka, Dana, S. V. Panno, **R.A. Locke II**. 2015. Isotopic and geochemical characterization of fossil brines of the Cambrian Mt. Simon Sandstone and Ironton-Galesville Formation from the Illinois Basin, USA, *Geochimica et Cosmochimica Acta*, v.165, p. 342-360. (<http://dx.doi.org/10.1016/j.gca.2015.06.013>)
- Locke, R.A. II** (with contributions by I. Krapac and A. Iranmanesh). 2015. Illinois Basin –Decatur Project: Budget Period 5 Monitoring Plan (aka IBDP Post-Injection Site Care Monitoring Plan). Project report to U.S. Department of Energy for project DE-FC26-05NT42588. Illinois State Geological Survey, Champaign, Illinois. 138 p.

Technical and Peer-Reviewed Publications (continued)

2014

- Carman, C.H., **R.A. Locke II**, and C.S. Blakley, 2014, Update on soil CO₂ flux monitoring at the Illinois Basin–Decatur Project, USA: *Energy Procedia*, v. 63, p. 3869-3880. (<http://dx.doi.org/10.1016/j.egypro.2014.11.417>)
- Iranmanesh, A., **R.A. Locke II**, and B.T. Wimmer, 2014, Multivariate statistical evaluation of groundwater compliance data from the Illinois Basin–Decatur Project: *Energy Procedia*, v. 63, p. 3182-3194. (<http://dx.doi.org/10.1016/j.egypro.2014.11.343>)
- Couëslan, Marcia, Robert Butsch, Robert Will, and **Randall A. Locke II**, 2014, Integrated reservoir monitoring at the Illinois Basin – Decatur Project: *Energy Procedia*, v. 63, p. 2836-2847. (<http://dx.doi.org/10.1016/j.egypro.2014.11.306>)
- Korose, C.P., **R.A. Locke II**, C.S. Blakley, and C.H. Carman, 2014, Integration of near-surface monitoring information using ArcGIS at the Illinois Basin–Decatur Project, USA: *Energy Procedia*, v. 63, p. 3945-3955. (<http://dx.doi.org/10.1016/j.egypro.2014.11.424>)
- Zimmerman, J.W., **R.A. Locke II**, C.S. Blakley, M.B. Frish, M.C. Laderer, and R.T. Wainner, 2014, Tunable diode laser absorption spectrometers for CO₂ wellhead and pipeline leakage monitoring: Experience from prototype testing at the Illinois Basin–Decatur Project, USA: *Energy Procedia*, v. 63, p. 4083-4094. (<http://dx.doi.org/10.1016/j.egypro.2014.11.440>)
- Dong, Yiran, Robert A. Sanford, **Randall A. Locke II**, Isaac K. Cann, Roderick I. Mackie, and Bruce W. Fouke, September 2014, Fe-oxide grain coatings within quartz arenite sandstone reservoirs of the 1.72 and 2.02 kilometer horizons in the Illinois Basin (USA): evidence for active bacterial iron-reducing metabolisms, *Frontiers in Microbiology*, v.5: 511, p. 1-16 (<http://dx.doi.org/10.3389/fmicb.2014.00511>)
- Zimmerman, J., Blakley, C., **Locke, R.A. II**, Frish, M. 2014. Final report of TDLAS CO₂ Sensor Field Testing at the Illinois Basin – Decatur Project. Contract report to Physical Sciences Incorporated in Andover, Massachusetts, for SBIR project DE-SC0001575 (Networked Sensors for Sequestration MVA). Illinois State Geological Survey, Champaign, Illinois. 24 p.
- Monson, J.L.B., J.J. Miner, and **R. Locke II**. 2014. Selected Scientific and Technical Information about Cranberry Slough Nature Preserve. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 14 p.

2013

- Panno, S.V., K.C. Hackley, **R.A. Locke**, I.G. Krapac, B. Wimmer, A. Iranmanesh, W.R. Kelly. 2013. Formation waters from Cambrian-age strata, Illinois Basin, USA: Constraints on their origin and evolution based on halide composition. *Geochimica et Cosmochimica Acta*, v. 122, p. 184-197. (<http://dx.doi.org/10.1016/j.gca.2013.08.021>)
- Dong, Yiran, Charu Gupta Kumar, Nicholas Chia, Pan-Jun Kim, Philip A. Miller, Nathan D. Price, Isaac K. O. Cann, Theodore M. Flynn, Robert A. Sanford, Ivan G. Krapac, **Randall A. Locke II**, et al., 2013. Halomonas sulfidaeris-dominated microbial community inhabits a 1.8 km-deep subsurface Cambrian Sandstone reservoir, *Environmental Microbiology*, v.16, p. 1695-1708. (<https://doi.org/10.1111/1462-2920.12325>)

Technical and Peer-Reviewed Publications (continued)

Long, C.M., J.J. Miner, and **R. Locke II**. 2013. Selected Scientific and Technical Information about Bennett's Terraqueous Gardens Nature Preserve and Fon du Lac Seep Nature Preserve Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 21 p.

Monson, J.L.B., J.J. Miner, and **R. Locke II**, 2013, Selected Scientific and Technical Information about McMahon Woods and Fen Nature Preserve Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 17 p.

Ackerman, J.R., J.L.B. Monson, **R. Locke II**, and J.J. Miner, 2013, Selected Scientific and Technical Information about Barber Fen Nature Preserve Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 18 p.

Locke, R. II, D. Larssen, W. Salden, C. Patterson, J. Kirksey, A. Iranmanesh, B. Wimmer, I. Krapac. 2013. *Preinjection reservoir fluid characterization at a CCS demonstration site: Illinois Basin – Decatur Project, USA*. Proceedings of the 11th International Conference on Greenhouse Gas Technologies, November 18-22, 2012, Kyoto, Japan. *Energy Procedia* Vol. 37, 2013, p. 6424-6433. (<http://dx.doi.org/10.1016/j.egypro.2013.06.572>)

2012

Dey, W.S., **R.A. Locke**, I.G. Krapac, C.G. Patterson, and J.L. Hurry, 2012, Preliminary Hydrogeologic Investigation of the FutureGen 2 Site in Morgan County, Illinois: Illinois State Geological Survey, Open File Series 2012-6, 61 p.

Knight, C.W., **Locke, R.A. II**, and Miner, J.J., 2012, Selected Scientific and Technical Information about Moews Dore Nature Preserve. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 15 p.

Knight, C.W., **Locke, R.A. II**, and Miner, J.J., 2012, Selected Scientific and Technical Information about Apple River Canyon Natural Area. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 16 p.

Knight, C.W., **Locke, R.A. II**, and Miner, J.J., 2012, Selected Scientific and Technical Information about Long Run Seep Nature Preserve. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 19 p.

2011

Knight, C.W., **Locke, R.A. II**, and Miner, J.J., 2011, Selected Scientific and Technical Information about Sand Ridge Nature Preserve. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 13 p.

Knight, C.W., **Locke, R.A. II**, and Miner, J.J., 2011, Selected Scientific and Technical Information about Searls Park Prairie Nature Preserve. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 15 p.

Technical and Peer-Reviewed Publications (continued)

Knight, C.W., **Locke, R.A. II**, and Miner, J.J., 2011, Selected Scientific and Technical Information about Yonder Prairie Nature Preserve. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 12 p.

Locke, R.A. II, I.G. Krapac, J.L. Lewicki, and E. Curtis-Robinson. 2011. *Characterizing near-surface CO₂ conditions before injection – Perspectives from a CCS project in the Illinois Basin, USA*. Proceedings of the 10th International Conference on Greenhouse Gas Technologies, September 19-23, 2010, Amsterdam, The Netherlands. *Energy Procedia*, Vol. 4, 2011, p. 3306-3313. (<http://dx.doi.org/10.1016/j.egypro.2011.02.251>)

Wimmer, B. T., I.G. Krapac, **R.A. Locke II**, and A. Iranmanesh. 2011. *Applying monitoring, verification, and accounting techniques to a real-world, enhanced oil recovery operational CO₂ leak*. Proceedings of the 10th International Conference on Greenhouse Gas Technologies, September 19-23, 2010, Amsterdam, The Netherlands. *Energy Procedia*, Vol. 4, 2011, p. 3330-3337. (<http://dx.doi.org/10.1016/j.egypro.2011.02.254>).

2010

C.W. Knight, **R.A. Locke II**, and J.J. Miner. 2010. *Selected Scientific and Technical Information about Cotton Creek Marsh Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 18 p.

C.W. Knight, **R.A. Locke II**, and J.J. Miner. 2010. *Selected Scientific and Technical Information about Gladstone Fen Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 19 p.

C.W. Knight, **R.A. Locke II**, and J.J. Miner. 2010. *Selected Scientific and Technical Information about Trout Park Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 18 p.

2009

C.W. Knight, **R.A. Locke II**, and J.J. Miner. 2009. *Selected Scientific and Technical Information about George B. Fell Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 21 p.

C.W. Knight, **R.A. Locke II**, and J.J. Miner. 2009. *Selected Scientific and Technical Information about Goose Lake Prairie Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 21 p.

C.W. Knight, **R.A. Locke II**, and J.J. Miner. 2009. *Selected Scientific and Technical Information about Spring Grove Fen Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Geological Survey, Champaign, Illinois. 22 p.

Technical and Peer-Reviewed Publications (continued)

2008

Locke, R.A. II, B. Sperling, and J.J. Miner. 2008. *Selected Scientific and Technical Information about Braidwood Dunes and Savanna Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 20 p.

Locke, R.A. II, C.W. Knight, and J.J. Miner. 2008. *Selected Scientific and Technical Information about Elizabeth Lake Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 21 p.

Locke, R.A. II, C.W. Knight, and J.J. Miner. 2008. *Selected Scientific and Technical Information about Illinois Beach Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 17 p.

Locke, R.A. II, B. Sperling, and J.J. Miner. 2008. *Selected Scientific and Technical Information about Romeoville Prairie Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 18 p.

2007

Locke, R.A. II, and S.C. Meyer. 2007. *Kane County Water Resources Investigations: Final Report on Potentiometric Surface Mapping*. Illinois State Water Survey Contract Report 2007-06. Champaign, Illinois. 85 p. (<http://www.isws.illinois.edu/pubdoc/CR/ISWSCR2007-06.pdf>)

Locke, R.A. II and J.J. Miner. 2007. *Overview of Monitoring Data Collected at Lake in the Hills Fen Nature Preserve, McHenry County, Illinois*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 34 p.

Locke, R.A. II and K.L. Rennels. 2007. *Overview of Monitoring Data Collected at George B. Fell Nature Preserve, Ogle County, Illinois*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 34 p.

Locke, R.A. II, and C.W. Knight. 2007. *Scientific and Technical Information about Bluff Spring Fen Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 13 p.

Locke, R.A. II, and C.W. Knight. 2007. *Scientific and Technical Information about Lake in the Hills Fen Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 18 p.

Locke, R.A. II, and C.W. Knight. 2007. *Scientific and Technical Information about Lockport Prairie Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 16 p.

Locke, R.A. II, and C.W. Knight. 2007. *Scientific and Technical Information about Volo Bog Nature Preserve*. Contract report for the Illinois Department of Natural Resources (Illinois Nature Preserves Commission). Illinois State Water Survey, Champaign, Illinois. 15 p.

Technical and Peer-Reviewed Publications (concluded)

2006 and previous years

- Locke, R.A. II**, J.J. Miner, S.V. Sinclair, M.A. Anliker, G.E. Pociask, B.J. Robinson, and W.S. Dey. 2005. *A Method for Estimating Groundwater Contribution Areas for Illinois Nature Preserves and Other Natural Areas*. Illinois State Water Survey Contract Report 2005-11. Champaign, Illinois. 57 p. (<http://www.isws.illinois.edu/pubdoc/CR/ISWSCR2005-11.pdf>)
- Locke, R.A. II**, and S.C. Meyer. 2005. *Kane County Water Resources Investigations: Interim Report on Potentiometric Surface Mapping*. ISWS Contract Report 2005-04. Champaign, Illinois. 96 p. (<http://www.isws.illinois.edu/pubdoc/CR/ISWSCR2005-04.pdf>)
- Roadcap, G.S., M.B. Wentzel, S.D. Lin, E.E. Herricks, R.K. Raman, **R.A. Locke**, and D.L. Hullinger. December 1999. *An Assessment of the Hydrology and Water Quality of Indian Ridge Marsh and the Potential Effects of Wetland Rehabilitation on the Diversity of Wetland Plant Communities*. ISWS Contract Report 654. Champaign, Illinois. 97 p.
- Frankie, W.T., J.A. Devera, R.J. Jacobson, C.A. Phillips, **R.A. Locke II**, and M.J. Wagner. 1998. *Guide to the Geology of the LaRue-Pine Hills Area, Jackson and Union Counties, Illinois*. Illinois State Geological Survey Field Trip Guidebook 1998D/1999A. Champaign, Illinois. 77 p.
- Locke, R.A. II**, R.C. Berg, M.J. Mushrush. November 1997. *Vulnerability of Illinois Nature Preserves to Potential Ground-Water Contamination - Volume II: Selected Site Data from Vulnerability Assessments and Sensitivity Classifications*. Illinois State Water Survey Contract Report 612A. Champaign, Illinois. 427 p. (<http://www.isws.illinois.edu/pubdoc/CR/ISWSCR-612a.pdf>)
- Locke, R.A. II**, R.C. Berg, H.A. Wehrmann, M.V. Miller, D.A. Keefer. 1997. *Vulnerability of Illinois Nature Preserves to Potential Ground-Water Contamination - Volume I: Methodology and Initial Assessment*. Illinois State Water Survey Contract Report 612. Champaign, Illinois. 125 p. (<http://www.isws.illinois.edu/pubdoc/CR/ISWSCR-612.pdf>)
- Wehrmann, H.A., G.S. Roadcap and **R.A. Locke II**. April 1996. *Delineation of Time Related Capture Zones for Loves Park Wells 1 and 2*. Illinois State Water Survey, Office of Ground-Water Quality. Champaign, Illinois. 66 p.
- Locke, R.A. II**. May 1994. *Immediate Pumping Effects on Inorganic Water Chemistry and Nitrate Stratification in the Iowa River Alluvial Aquifer near Marengo, Iowa*. University of Iowa, Department of Geology. Iowa City, Iowa. M.S. thesis. 112 p.

Selected Presentations and Abstracts

I have given or coauthored about 100 technical presentations. Titles below are for selected presentations or abstracts for representative subject matter.

Locke, R.A. 2023. Managing CCS to Minimize Risk: Experiences from Decatur, Illinois. Lecture for the Stanford University CCS Course, September 20, 2023.

Locke, R.A. and Plankell E. 2022. Groundwater Monitoring and Technical Assessments at Nature Preserves and Other Areas. Illinois DNR Division of Natural Heritage and Illinois Nature Preserve Commission all staff meeting. Presentation on December 7, 2022, Toddhall Retreat Center, Columbia, Illinois.

Locke, R.A. and the MGSC Monitoring Team. 2021. Environmental Monitoring for Industrial CCS: Experiences from the Decatur Projects. Presentation on February 10, 2021 for the SECURE International Platform for Environmental Monitoring Workshop (Virtual).

Locke, R.A. and the MGSC Monitoring Team. 2019. Environmental Monitoring for Industrial CCS: Experiences from the Decatur Projects. Presentation in Decatur, Illinois on September 19, 2019 to CCS experts from the SECURE international fact-finding team.

Locke, R.A. and the MGSC Project Team. 2019. Scaling Up CCS Testing and Deployment in the Illinois Basin. 14th CO₂ GeoNet Open Forum Workshop, Venice, Italy, May 8, 2019, Presentation without abstract.

Bauer, R.A., Jaques, P., (authors) and **Locke, R.A.** (presenter) Seismicity: Lessons Learned from Decatur, Illinois, USA. 14th CO₂ GeoNet Pre-Open Forum Workshop, Venice, Italy, May 6, 2019, Presentation without abstract.

Locke, R. A. and the MGSC Monitoring Team. 2018. Lessons learned from monitoring a one million tonne demonstration project in Decatur, Illinois, USA. Presentations to CCS technical experts associated with the European Union's [Enhancing Onshore Storage \(ENOS\) Project](#), including the project coordinator, Marie Gastine, at the French Geological Survey (BRGM) in Orleans, France and task leader, Ceri Vincent, at the British Geological Survey in Nottingham, England.

Locke, R. A. and the MGSC Monitoring Team. 2018. Optimization of Onshore Monitoring for Industrial CCS: Experience from the Decatur Projects. 13th CO₂ GeoNet Open Forum, Venice, Italy, April 26, 2018, Presentation without abstract.

Locke, R. A. and the PRI Natural Gas Working Group, An Introduction to Natural Gas Storage in Illinois. 2018. Presented to the Mahomet Aquifer Protection Task Force on March 26, 2018, Brookens Administration Center, Urbana, Illinois. Presentation without abstract.

Dana M. Labotka, Samuel V. Panno, **Randall A. Locke II.** 2016. A sulfate conundrum: dissolved sulfates of deep-saline brines and carbonate associated sulfates. 50th Annual Meeting of the North-Central Section of the Geological Society of America, Champaign, IL, April 18-19, 2016. *Abstracts with Programs – Geol Soc Am*; 48:5 (doi: [10.1130/abs/2016NC-275309](https://doi.org/10.1130/abs/2016NC-275309))

Shao, H., Freiburg, J.T., Berger, P.M., **Locke, R.A.**, Cohen, H.F., 2016, Evaluating Mobilization Potential of Trace Metals from the Mt. Simon Sandstone and Eau Claire Formation Under Geological CO₂ Sequestration Conditions. 50th Annual Meeting of the North-Central Section of the Geological Society of America, Champaign, IL, April 18-19, 2016. *Abstracts with Programs – Geol Soc Am*; 48:5.

Selected Presentations and Abstracts (continued)

- H.M. Edenborn, D.J. Vesper, J. Jain, A. Iranmanesh, B.T. Wimmer, and **R.A. Locke II**. 2016. Comparison of CO₂ Detection Methods Tested in Shallow Groundwater Monitoring Wells at a Geological Sequestration Site. 50th Annual Meeting of the North-Central Section of the Geological Society of America, Champaign, IL, April 18-19, 2016. *Abstracts with Programs – Geol Soc Am*; 48:5.
- Carman, Carl H. and **Randall A. Locke II**. 2016. Soil CO₂ Flux Monitoring Experiences from a Large-scale Carbon Sequestration Demonstration Project. Oral presentation and abstract. 50th Annual Meeting of the North-Central Section of the Geological Society of America, Champaign, IL, April 18-19, 2016. *Abstracts with Programs – Geol Soc Am*; 48:5.
- Wimmer, B.T., **Locke, R.A.**, Iranmanesh, A., Berger, P.M., 2016, Evaluation of groundwater quality variability in Quaternary deposits due to varying flow rates and redox conditions near the Illinois Basin – Decatur Project, Decatur, IL, USA. 50th Annual Meeting of the North-Central Section of the Geological Society of America, Champaign, IL, April 18-19, 2016. *Abstracts with Programs – Geol Soc Am*; 48:5.
- Locke, R.A. II.**, 2015. Overview of the Illinois Basin – Decatur Project. Field trip and presentation for Illinois State Senator Koehler and ILGA Environmental Committee, Decatur, IL, August 14, 2015.
- Locke, R.A. II.**, and Sallie Greenberg, 2015. The Illinois Basin – Decatur Project: Permitting Experiences. Invited presentation for International Energy Agency – Greenhouse Gas Research and Development Program – Monitoring Network Meeting, Berkeley, CA, June 10, 2015.
- Locke, R.A. II.** 2014. The Illinois Basin – Decatur Project: Experiences from Monitoring a Carbon Storage Demonstration. Invited John W. Foster Lecture hosted by the Illinois State University, Normal Illinois. September 3, 2014.
- Zimmerman, J.W., **R.A. Locke II**, C.S. Blakley, M.B. Frish, M.C. Laderer, R.T. Wainner. 2014. Initial testing of prototype tunable diode laser absorption spectrometers for CO₂ monitoring applications at the Illinois Basin - Decatur Project, USA. Abstract in Proceedings of the 13th Annual Carbon Capture, Utilization and Storage Conference, April 28th – May 1st, Pittsburgh, PA, (Poster #78) .
- Dong, Yiran, Robert A. Sanford, **Randall A. Locke II**, Joseph R. Weber, Sheila M. Egan, Isaac L.O. Cann, Roderick I. Mackie, Bruce W. Fouke, Bacterial Ferric Iron Reduction by a Fermentative *Orenia* sp. (Strain 6634) Isolated from 2.02 KM Depth Cambrian-age Mt. Simon Sandstone, Illinois Basin, USA, General Meeting for the American Society of Microbiology. Denver, Colorado, 18-21 May, 2013.
- Giunta, T., Ader, M., **Locke R.**, Agrinier, P. 2013. $\delta^{37}\text{Cl}$ variations with depth in Mount Simon Sandstone basinal brines. Abstract and poster for the American Geophysical Union Fall meeting, San Francisco, California December 9-13, 2013.
- Locke, R.A. II.**, Wimmer, B., Iranmanesh, A., Panno, S. 2013. The Illinois Basin – Decatur Project: Experiences of the Shallow Groundwater Monitoring Program. Presentation to the International Energy Agency – Greenhouse Gas Research and Development Program – Monitoring and Environmental Research Combined Network Meeting, Canberra, Australia, August 28, 2013.

Selected Presentations and Abstracts (continued)

- Locke, R.A. II.** 2013. The Illinois Basin – Decatur Project Monitoring Experiences. Presentation to the USA-Norway Workshop: CO₂ Storage Demonstration Projects: The value of monitoring technology. Pittsburgh, PA. August 19, 2013.
- Iranmanesh, A., **Locke, R.A. II.**, and Wimmer, B., 2013, Statistical Evaluation of Groundwater Compliance Data from the Illinois Basin – Decatur Project. Poster and published abstract at the Annual Carbon Capture, Utilization and Storage Conference (CCUS-12), David H. Lawrence Convection Center, Pittsburgh, PA, May 13 -17, 2013.
- Wimmer, B., **Locke, R.A. II.**, Panno, S., Iranmanesh, A., and Krapac, I., 2013. Developing a conceptual model of shallow groundwater hydrology and geochemistry at the Illinois Basin – Decatur Project, USA. Poster and published abstract at the Annual Carbon Capture, Utilization and Storage Conference (CCUS-12), David H. Lawrence Convection Center, Pittsburgh, PA, May 13 -17, 2013.
- Locke, R.A. II.** 2012. Illinois Basin – Decatur Project (IBDP) Monitoring, Verification, and Accounting Program: Near-Surface. Presentation and abstract for the Midwest Carbon Sequestration Science Conference. University of Illinois, Champaign, Illinois. September 18, 2012.
- Parris, T., G. Beck, S. Frailey, K. Takacs, **R. Locke**, A. Iranmanesh, and B. Wimmer. 2012. *Summary of CO₂ Injection Pilot Project, Sugar Creek Field, Hopkins County, Kentucky.* Presentation and abstract for the American Association of Petroleum Geologists, Eastern Section Meeting, Cleveland, Ohio, September 22-26, 2012.
- Dong, Yiran, Robert A. Sanford, Isaac Cann, Roderick Mackie, **Randy A. Locke II**, Bruce W. Fouke, Detection and Preliminary Characterization of Active Iron-Reducing Bacterial Populations in Deeply Buried (1.7-2.0 KM) Saline Sandstone Reservoirs of the Illinois Basin, Midcontinent, USA, 2012 General Meeting for the American Society of Microbiology. San Francisco, CA, 16-19 June, 2012.
- Locke, R.A. II.** 2012. Illinois Basin – Decatur Project (IBDP) Monitoring, Verification, and Accounting Program. Poster with abstract for the U.S. Department of Energy, Carbon Storage Research and Development Project Review Meeting, Sheraton Station Square, Pittsburgh, Pennsylvania, August 21-23..
- Beck, E., K. Takacs, T. Parris, D. Wedding, **R. Locke**. 2011. *Aqueous geochemical responses associated with the Sugar Creek CO₂ enhanced oil recovery in Hopkins County, Kentucky.* Presentation and abstract for the Geological Society of America, Southeastern Section Meeting, Lexington, Kentucky, March 23-25, 2011. p. 54.
- Takacs, K., Beck, E., T. Parris, D. Wedding, **R. Locke**. 2011. *Aqueous geochemistry of a CO₂-enhanced oil recovery project in the Sugar Creek oil field, Hopkins County, Kentucky.* Presentation and abstract for the Kentucky Water Resources Annual Symposium, Abstracts with Programs, Lexington, Kentucky, March 21, 2011. p. 7.
- Locke, R.A. II.** 2011. *IL-ICCS Project: Near-Term Tasks of the Monitoring, Verification, and Accounting Program.* Presentation for the IL-ICCS Progress Meeting. U.S. Department of Energy, National Energy Technology Laboratory Offices, Pittsburgh, Pennsylvania, March 10, 2011.
- Locke, R.A. II.** 2010. *Illinois Basin – MVA Programs at Mumford Hills and Sugar Creek EOR Sites.* Presentation for the U.S. Department of Energy's Annual Regional Carbon Sequestration Partnership Review Meeting. Hilton Hotel, Pittsburgh, Pennsylvania, November 17, 2010.

Selected Presentations and Abstracts (continued)

- Locke, R.A. II.** 2009. Environmental Monitoring Update: Illinois Basin – Decatur Project. Presentation for the Midwest Geological Sequestration Consortium’s Annual Partnership Advisory Group Meeting. University of Illinois, Champaign, Illinois. September 23, 2009.
- Hnottavange-Telleen, K., R. Finley, I. Krapac, **R. Locke**, S. Greenberg, S. Marsteller, J. Kirksey. 2009. Second Iteration: Re-Assessing CCS Project Risk Using New Data. Presentation and abstract for the American Association of Petroleum Geologists – Hedberg Conference, Vancouver, BC, Canada, August 16-19, 2009. Mehnert, E., I. Krapac, B. Wimmer, A. Iranmanesh, and **R. Locke**. 2009. *Safeguarding Groundwater Quality at Geologic Carbon Sequestration Sites – An Illinois Basin Example*. Presentation and abstract for the American Water Works Association Conference, San Diego, California, June 13, 2009.
- Locke, R.A. II.** and J.J. Miner. October 4, 2007. *Geochemical Responses at Lake in the Hills Fen Nature Preserve to Aggregate Mine Reclamation*. Presentation and published abstract. Illinois Groundwater Association Fall 2007 Meeting. Northern Illinois University – Naperville Campus, Naperville, Illinois.
- Locke, R.A. II.** November 2, 2005. *Shallow Aquifer Potentiometric Mapping in Kane County, Illinois*. Presentation and published abstract. 50th Annual Midwest Groundwater Conference. November 1-3, 2006. Holiday Inn, Urbana, Illinois.
- Locke R.A. II.**, Bill Dey and Doug Walker. April 11, 2003. *Status Report on Water-Resource Investigations for Kane County*. Presentation and abstract for the Illinois Groundwater Association Spring 2003 Meeting. Fermi National Laboratory, Batavia, Illinois.
- Locke, R.A. II.** July 18, 2002. *Hydrologic Characteristics of Bluff Springs Fen*. Invited presentation to the Illinois Department of Natural Resources – Director’s Science Advisory Committee. IDNR Main Office, Springfield, Illinois.
- Locke, R.A. II.** May 17, 2001. *Class III Groundwater in Illinois*. Invited presentation to the Illinois Board of Natural Resources. Renaissance Hotel, Springfield, Illinois.
- Locke, R.A. II.** August 2, 2001. *Groundwater Recharge to Wetlands*. Invited presentation to the Barrington Area Council of Governments. Barrington Government Center, Barrington, Illinois.
- Locke, R.A. II.** October 18, 2000. *Geochemical Impacts of Sand and Gravel Mining to Lake in the Hills Fen Nature Preserve, McHenry County, Illinois*. Presentation and published abstract. 45th Annual Midwest Groundwater Conference sponsored by the Ohio Geological Survey and Ohio Environmental Protection Agency. October 17-19, 2000. Holiday Inn East, Columbus, Ohio. 46p.
- Locke, R.A. II.** September 8, 2000. *Groundwater Recharge to Wetlands*. Invited presentation to the Kane County Advanced Identification of Wetlands Committee. Kane County Government Center, Geneva, Illinois.
- Locke, R.A. II.** May 25, 1999. *Overview of Geology and Capture Zone Modeling for Loves Park Supply Wells 1 and 2*. Invited presentation. Loves Park Council Chambers, Loves Park, Illinois.
- Locke, R.A. II.** November 7, 1998 and April 10, 1999. *Ground-Water Conditions at LaRue Swamp*. Presentation on Illinois State Geological Survey field trip in the LaRue-Pine Hills Area - Southern Illinois.

Selected Presentations and Abstracts (concluded)

Locke, R.A. II and Randy R. Heidorn. 1998. *Potential for Ground-Water Contamination at Illinois Nature Preserves and Class III Ground Water*. Abstract and session leader for the 1998 Ground Water Protection Policy Forum, held by the Illinois Environmental Protection Agency, Springfield, Illinois.

Locke, R.A. II. October 24, 1996. *Ground-Water Protection for Illinois Nature Preserves: Identifying and Evaluating Vulnerability to Contamination*. Presentation and published abstract. 23rd Natural Areas, 15th North American Prairie, and Indiana Dunes Ecosystems National and International Conferences. October 23 - 26, 1996. St. Charles, Illinois.

Locke, R.A. II. October 17, 1995. *Immediate Pumping Effects on Inorganic Chemistry and Nitrate Stratification in the Iowa River Alluvial Aquifer near Marengo, Iowa*. Presentation and published abstract. 40th Annual Midwest Groundwater Conference sponsored by the Missouri Department of Natural Resources. October 16 - 18, 1995. Columbia, Missouri.