

JOHN T. HAYNES

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EDUCATION

1994-95 Postdoctoral Fellowship, Department of Mineral Sciences, Smithsonian Institution
1989 Ph.D., The University of Cincinnati (Geology)
1985 M.S., The University of Cincinnati (Geology)
1981 B.S., Denison University (Geology major, with Chemistry concentration)

EMPLOYMENT

2014-present Associate Professor (Geology & Envi. Sci, and IdLS), James Madison University, Harrisonburg, VA
2008-2014 Assistant Professor (Geology & Envi. Sci, and IdLS), James Madison University, Harrisonburg, VA
2007-2008 Visiting Assistant Professor (Geology & Envi. Sci.), James Madison University, Harrisonburg, VA
2006-2007 Assistant Professor (Geology), Kent State University, Kent, OH
2003-2006 Adjunct Professor (Geology), University of Connecticut, Storrs, CT
1998-2006 Science Instructor, Pomfret School, Pomfret, CT
1995-1998 Science Instructor, McDonogh School, Owings Mills, MD
1994-1995 Postdoctoral Fellow, Dept. of Mineral Sciences, Smithsonian Institution, Washington, DC
1992-1998 Adjunct Professor (Geology), George Mason University, Fairfax, VA
1987-1993 Senior Geologist, Halliburton NUS and Brown & Root Environmental, Gaithersburg, MD
1987 Staff Geologist, Peer Consultants, Dayton, OH
1986 Geologist Summer Intern, U.S. Environmental Protection Agency, Washington, DC
1982-1987 Graduate Teaching and Research Assistant, University of Cincinnati, Cincinnati, OH
1981-1982 Staff Geologist, P.E. LaMoreaux and Associates, Tuscaloosa, AL and Lakeland, FL
1979-1981 Map librarian, Dept. of Geology & Geography, Denison University, Granville, OH

COURSES TAUGHT

2007-present Introduction to Oceanography; Earth Systems, Cycles, and Human Impact; Physical Geology (lab); Evolution of the Earth (lab); Science Processes; Science of the Planets; Geology & Ecology of the Bahamas; Earth Science for Teachers; Oceanography for Teachers; Field Geology (Ireland); The Sea as Metaphor; Genesis of Solid Earth Materials; Sedimentary Petrology; Sustainable Societies (Malta); Geowriting; Meteorology – James Madison University, Harrisonburg, VA
2006-2007 Earth History; Earth Dynamics; Environmental Geology – Kent State University, Kent, OH
2003-2006 Physical Geology; Earth and Life Through Time; Age of the Dinosaurs; Karst Geology in the Field – University of Connecticut, Storrs, CT
1998-2006 Physical Geology; Physical Oceanography; AP Environmental Science; Marine Biology; 9th grade Science Foundations - Pomfret School, Pomfret, CT
1995-1998 Chemistry; AP Environmental Science - McDonogh School, Baltimore, MD
1996 Geologic Field Studies in the High Chaparral - Duke University, 3-week summer field course, Taos, NM
1992-1998 Stratigraphy; Sedimentary Geology; Sedimentary Petrology - George Mason University, Fairfax, VA

GRANTS AND AWARDS

2017 \$10,766 as contract mapper mapping the bedrock geology of ¼ of the Eagle Rock 7½' quadrangle in support of the Virginia Division of Geology and Mineral Resources I-81 mapping program under STATEMAP
2016 \$10,827 as contract mapper mapping the bedrock geology of ¼ of the Eagle Rock 7½' quadrangle in support of the Virginia Division of Geology and Mineral Resources I-81 mapping program under STATEMAP
2015 \$10,827 as contract mapper mapping the bedrock geology of ¼ of the Eagle Rock 7½' quadrangle in support of the Virginia Division of Geology and Mineral Resources I-81 mapping program under STATEMAP
2012 JMU Geology major Selina Cole wins "Outstanding Undergraduate Student Research" for her poster presentation on March 31 at GSA-SE meeting in Asheville, competing with ~90 other undergrads, for her research under my supervision on stromatoporoid – coral biostromes in the Keyser Formation in Highland County, Virginia

2012	\$20,915	as PI, EDMAP Award G12AC20312, U.S. Geological Survey, for bedrock mapping of the west half of the Monterey SE 7½' quadrangle, Virginia (with Rick Diecchio of George Mason Univ. as co-PI); August 1, 2012 – November 15, 2013
2011	\$4,000	JMU Summer Faculty Assistance Grant, for petrographic investigation of stone sculpture from China, with Janet Douglas of the Freer and Sackler Galleries, Smithsonian Institution; June-September 2011
2010	\$7,378	as PI, EDMAP Award G11AC20278, U.S. Geological Survey, for bedrock mapping of the southeast quarter of the Monterey SE 7½' quadrangle, Virginia; July 15, 2011 – October 31, 2012
2010		Awarded the Vincent E. Nelson Memorial Award for Best Poster at the September 2009 Evansville (IN) meeting of the Eastern Section of the American Association of Petroleum Geologists; September, 2010
2009	\$14,893	as PI, EDMAP Award G09AC00122, U.S. Geological Survey, for bedrock mapping of the north half of the Williamsville 7½' quadrangle, Virginia; May 1, 2009 – October 31, 2010
2009	\$6,000	as co-PI, Smithsonian Institution, National Museum of Natural History, Small Grant Award 000 2009 010001 332000 6100 to William DiMichele, for field work in Pella Iowa, related to the Pella lycopsid specimen; May 15, 2009 – September 1, 2010
2007	\$6,500	University Teaching Council Summer Research Award, Kent State University, for research on digitizing stereopair photographs into anaglyph images for use in introductory geology classes; June-September
2004	\$1,800	As co-investigator with William Melson, for U-Pb dating of zircon from Ordovician K-bentonites, Dept. of Mineral Sciences, Smithsonian Institution
2004	\$1,000	Cash award, The Prize for Teaching Excellence, Pomfret School
1995	\$18,800	From the Smithsonian Research Initiatives Program to fund study of large volume tephra as monitors of atmospheric wind circulation patterns. The dispersal pattern of Holocene tephra in Costa Rica provides an analog to ongoing study of the dispersal of Ordovician tephra (now preserved as K-bentonites) in the southern Appalachians
1994	\$21,000	As salary from the Smithsonian Office of Fellowships and Grants for a one-year Postdoctoral Fellowship in the Department of Mineral Sciences, plus \$1,000 for expenses during 1994. This award allowed me to take up residence fulltime in the Division of Petrology and Volcanology in the Department of Mineral Sciences at the Museum of Natural History in Washington.
1981		Awarded the Kirtley F. Mather Award, for Outstanding Geology Major: Denison University, Granville, OH

APPOINTMENTS and ELECTED OFFICES HELD

2016-present	Appointed by The College Board to be the Higher Education Co-chair of the Advanced Placement Environmental Science Development Committee, March 2016; appointment is through 2020
2013-present	Appointed by Governor McDonnell to the Virginia Cave Board for a four-year term, on August 23 rd , 2013, and re-appointed by Governor McAuliffe for a second four-year term in November, 2017
2013-2016	Appointed by The College Board to the Advanced Placement Environmental Science Development Committee, a one-year appointment renewable for three subsequent years; May 8 th , 2013
2014-2017	Appointed as a Research Collaborator in the Dept. of Mineral Sciences, Smithsonian Institution; November 15 th , 2014
2011-1014	Appointed as a Research Collaborator in the Dept. of Mineral Sciences, Smithsonian Institution; November 15 th , 2011
2008-2011	Appointed as a Research Associate in the Dept. of Mineral Sciences, Smithsonian Institution; November 15 th , 2008
2003-present	Appointed as an exam reader for The College Board's Advanced Placement Environmental Science reading
1998-99	Elected President of the Southeastern Section of SEPM

PROFESSIONAL CONSULTING

2017-present	Consulting geologist (sedimentary petrology and petrography), Council Oak Resources, Tulsa, OK
2016	Consulting geologist (sedimentary petrology), SinoPec Tech LLC, Houston, TX, and Beijing, China
2011-present	Consulting scientist for The College Board, various projects related to AP Environmental Science
2010-2011	Consulting geologist (sedimentary petrology and petrography), Saudi Aramco, Dhahran, KSA
2007-present	Consulting geologist (sedimentary petrology and petrography), Weatherford Laboratories, Houston, TX
2006-present	Consulting science educator for various publishers including Pearson/Prentice-Hall and McGraw-Hill
2001	Consulting geologist (STATEMAP, Pendleton County), W.Va. Geological Survey, Morgantown, WV

2008-2017 JMU UNDERGRADUATE RESEARCH PROJECTS (acting as ADVISOR or CO-ADVISOR)

2017-18	Mercer Parker Emily Brent &	Petrography of carbonate units comprising the Upper Floridan aquifer Geologic control on cave passages developed in biostromal and biohermal horizons
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	Michael Knez	of the Silurian Keyser Limestone, Highland County, Virginia
2017-18	Josh Morrison	The Devonian Elbow Ridge sandstone in northeastern West Virginia
2014-15	Ryan Cleveland	Ages of detrital zircons in Ordovician sandstones, southern Appalachians
	Charles Covington	Silurian facies changes from southern to northern Highland County
	Timothy Louie	The Origins of Upper Silurian chert in a calcarenaceous sandstone of the Tonoloway Limestone in Bath County, Virginia
2013-14	Tim Kropp & Katie McConahy Evan Bryant	Surface and subterranean mapping documents a regionally significant Alleghanian thrust system in the Millboro Quadrangle, Bath County, Virginia Sedimentary structures of the Silurian Wills Creek Formation, Highland County, Virginia
	Tom Durst	Petrography of pebbly beds in the Ordovician Oswego Sandstone, central Virginia
2012-13	Meghan Moss	Geochemical evidence of the source of heat of thermal spring waters in caves of Bath and Alleghany Counties, Virginia
2012	Tim Charlton & Joey Renner	Structural and stratigraphic controls on anomalous dye-tracing results, Cedar Creek, Bath County, Virginia
2011-12	Erika Powers (honors) Kyle Hazelwood	A walking tour of building stones in Harrisonburg Stratigraphy and structure of the Siluro-Devonian section on Bullpasture Mountain, Highland County
	Zachary Kirakofe	Origin of sandstone xenoliths in the Mole Hill basalt, Rockingham County
2010-12	Lena Cole (honors)	Paleoecology of a stromatoporoid-dominated reefal zone in the Keyser Formation, Highland County, Virginia
2010-11	Sharon Porter Aryn Hoge	Synthetic gamma ray log of a Marcellus Shale sequence, Highland County
	Susan Hoffman	Facies changes in Silurian sandstones of Highland County
2009-10	Katie Jepson Natalie Caro & Kim Walsh	Sequence boundaries in the Greenland Gap Group, Briery Gap He isotopes in the thermal infeeders of Warm River Cave Analyses of deformed zones in the Millboro Shale, Highland County, Virginia: Implications for Alleghanian tectonics
2008-10	Bonnie Ratkiewicz (honors) Seldon Walker	The Pella Lycopsid Tree: Understanding the preservational and growth context of one of the world's most important Paleozoic Coal Age fossil specimens Correlation of sandstones and flat-pebble conglomerates in carbonates of the Tonoloway and Keyser Formations, Highland County, Virginia
2008-09	Nick Silvis (honors)	Determining the source of heat impacting thermal springs in the Warm Springs Valley of Bath and Alleghany Counties, Virginia

OTHER ADVISORY DUTIES

2016-	Member of M.S. advisory committee for Juan Carlos Guerrero at Louisiana State University
2013-14	Member of M.S. advisory committee for Darren Bianco at the University of Malta
2006-08	Member of M.S. advisory committee for Yvette Vlack at Kent State University
1995-97	Member of M.S. advisory committee for Trudy Briggs at Georgia State University
1992-94	Principal faculty advisor for Keith Goggin's senior thesis research at George Mason University
1991-93	Member of M.S. advisory committee for Doug McVey at the University of Cincinnati

EXTERNAL RESEARCH COLLABORATORS, and RESEARCH ADVISORS

Achim Herrmann, Dept. of Geology & Geophysics, Louisiana State University, 2013-
Christopher Swezey, USGS, 2011-
Janet Douglas, Freer and Sackler Galleries, Smithsonian Institution, 2009-2015
Keith Goggin, Sedimentology Division, Weatherford Laboratories, 2009-2015
Rick Lambert and Phil Lucas, Virginia Speleological Survey, 2008-
Tim Rose, Dept. of Mineral Sciences, Smithsonian Institution, 2008-
Dan Chaney and Bill DiMichele, Dept. of Paleobiology, Smithsonian Institution, 2008-
James Aronson and Edward Meyer, Dept. of Earth Sciences, Dartmouth College, 1995-
Richard Diecchio, Dept. of Geography and Earth Systems Science, George Mason University, 1992-2016
W. Crawford Elliott, Dept. of Geology, Georgia State University, 1992-2003
Michael Kunk, U. S. Geological Survey, 1995-1997
Postdoctoral Advisor - William Melson, Dept. of Mineral Sciences, Smithsonian Institution
Ph.D. Dissertation Advisors - Warren Huff and Atilla Kilinc, Univ. of Cincinnati; Richard Hay, Univ. of Illinois
M.S. Thesis Advisors - Wayne Pryor, Paul Potter, Kees DeJong, and Barry Maynard, Univ. of Cincinnati

PUBLICATIONS – Peer-reviewed journal articles, papers or monographs, field trip guidebooks, geologic maps, or conference proceedings

I have authored or co-authored 33 such publications:

- HAYNES, J.T., and HUFF, W.D., 1990, Discussion of 'Origin and tectonic setting of Ordovician bentonites in North America: Isotopic and age constraints': *Geological Society of America Bulletin*, v. 102, p. 1439-1440.
- MATA, L., and HAYNES, J.T., 1991, A suggested strategy for characterizing the hydrogeologic regime of karst terranes in the Valley and Ridge province, in Kastning, E.H., and Kastning, K.M., eds., *Appalachian Karst: Proceedings of the Appalachian Karst Symposium*, Radford, Virginia: National Speleological Society, Huntsville, p. 237-239.
- HAYNES, J.T., 1991, Stratigraphy of the Waynesboro Formation (Lower and Middle Cambrian) near Buchanan, Botetourt County, Virginia: *Virginia Division of Mineral Resources Publication* 116, 22 p.
- HAYNES, J.T., 1992, Reinterpretation of Rocklandian (Upper Ordovician) K-bentonite stratigraphy in southwest Virginia, southeast West Virginia, and northeast Tennessee, with discussion of the conglomeratic sandstones in the Bays and Moccasin Formations: *Virginia Division of Mineral Resources Publication* 126, 58 p.
- HAYNES, J.T., and GOGGIN, K.E., 1993, Field guide to the Ordovician Walker Mountain Sandstone Member: Proposed type section and other exposures: *Virginia Minerals*, v. 39, p. 25-36.
- HAYNES, J.T., 1994, The Ordovician Deicke and Millbrig K-bentonite Beds of the Cincinnati Arch and the southern Valley and Ridge province: *Geological Society of America Special Paper* 290, 80 p; doi: 10.1130/SPE290-p1
- HAYNES, J.T., and GOGGIN, K.E., 1994, K-bentonites, conglomerates, and unconformities in the Ordovician of southwestern Virginia, in Schultz, A., and Henika, W., eds., Field guides to southern Appalachian structure, stratigraphy, and engineering geology, *Virginia Tech Department of Geological Sciences Guidebook Number 10: Blacksburg, Virginia Tech*, p. 65-93.
- HAYNES, J.T., MELSON, W.G., and KUNK, M.J., 1995, Composition of biotite phenocrysts in Ordovician tephra casts doubt on the proposed trans-Atlantic correlation of the Millbrig K-bentonite (U.S.A.) and the Kinnekulle K-bentonite (Sweden): *Geology*, v. 23, p. 847-850; doi: 10.1130/0091-7613(1995)023<0847:COBPIO>2.3.CO;2
- HAYNES, J.T., MELSON, W.G., and GOGGIN, K.E., 1996, Biotite phenocryst composition shows that the two K-bentonites in the Little Oak Limestone (Ordovician) at the Old North Ragland quarry, Alabama, are the same structurally repeated tephra layer: *Southeastern Geology*; v. 36, p. 85-98.
- HAYNES, J.T., and MELSON, W.G., 1997, SEM and EMX study of titaniferous minerals in the Ordovician Deicke K-bentonite of southwestern Virginia: *Virginia Minerals*, v. 43, p. 1-7.
- HAYNES, J.T., MELSON, W.G., O'HEARN, T., GOGGIN, K.E., and HUBBELL, R., 1998, A high potassium mid-Ordovician shale of the central Appalachian foredeep: Implications for reconstructing Taconian explosive volcanism, in Schieber, J., ed., *Shales and Mudstones*, Vol. 2: Stuttgart, E. Schweizerbart'sche, p. 129-141.
- MELSON, W.G., HAYNES, J.T., O'HEARN, T., HUBBELL, R., GOGGIN, K.E., LOCKE, D., and ROSS, D., 1998, K-shales of the central Appalachian Paleozoic: properties and origin, in Schieber, J., ed., *Shales and Mudstones*, Vol. 2: Stuttgart, E. Schweizerbart'sche, p. 143-159.
- VERHOECKX-BRIGGS, G.A., HAYNES, J.T., ELLIOTT, W.C., and VANKO, D.A., 2001, A study of plagioclase-hosted melt inclusions in the Ordovician Deicke and Millbrig K-bentonites, southern Appalachian basin: *Southeastern Geology*, v. 40, p. 273-284.
- ELLIOTT, W.C., and HAYNES, J.T., 2002, The chemical character of fluids forming diagenetic illite in the Southern Appalachian basin: *American Mineralogist*, v. 87, p. 1519-1527; doi:10.2138/am-2002-11-1201
- HAYNES, J.T., 2005, Fire: Its ecological role, and economic and political consequences, in Wells, E., and others, eds., *AP Instructor's Guide for Miller's Living in the Environment*, 14th ed.: Pacific Grove, Brooks Cole, p. 4.1-4.8.

- HAYNES, J.T., and GOGGIN, K.E., 2011, Stratigraphic relations of quartz arenites and K-bentonites in the Ordovician Blount molasse, Alabama to Virginia, southern Appalachians, USA, *in* Gutierrez-Marco, J.C., Rabano, I., and Garcia-Bellido, D. (eds.), *Ordovician of the World: Cuadernos del Museo Geominero*, 14, p. 221-228.
- HAYNES, J.T., HUFF, W.D., and MELSON, W.G., 2011, Major Ordovician tephra generated by caldera-forming explosive volcanism on continental crust: Evidence from biotite compositions, *in* Gutierrez-Marco, J.C., Rabano, I., and Garcia-Bellido, D. (eds.), *Ordovician of the World: Cuadernos del Museo Geominero*, 14, Instituto Geologico y Minero de Espana, Madrid, p. 229-235.
- ENOMOTO, C.B., COLEMAN, J.L. Jr., HAYNES, J.T., WHITMEYER, S.J., McDOWELL, R.R., LEWIS, J.E., SPEAR, T.P., and SWEZEY, C.S., 2012, Geology of the Devonian Marcellus Shale – Valley and Ridge Province, Virginia and West Virginia – A field trip guidebook for the American Association of Petroleum Geologists Eastern Section Meeting, September 28-29, 2011: *U.S. Geological Survey Open-File Report 2012-1194*, 55 p.; doi <http://pubs.usgs.gov/of/2012/1194/>.
- JOHNSON, E.A., KIRACOFÉ, Z.A., HAYNES, J.T., and NASHIMOTO, K., 2013, The origin of sandstone xenoliths in the Mole Hill basalt, Rockingham County, Virginia: Implications for magma ascent and crustal structure in the western Shenandoah Valley: *Southeastern Geology*, v. 49, p. 95-118.
- DOUGLAS, J.S., and HAYNES, J.T., 2014, Petrography of stone used for sculpture from the Buddhist cave temples of Xiangtangshan dating to the Northern Qi Dynasty: *Metropolitan Museum Studies in Art, Science, and Technology* 2: p. 93-114.
- HAYNES, J.T., JOHNSON, E.A., and WHITMEYER, S.J., 2014, Active features along a “passive” margin: The intriguing interplay between Silurian–Devonian stratigraphy, Alleghanian deformation, and Eocene magmatism of Highland and Bath Counties, Virginia, *in* Bailey, C.M., and Coiner, L.V., eds., *Elevating Geoscience in the Southeastern United States: New Ideas about Old Terranes: Field Guides for the GSA Southeastern Section Meeting*, Blacksburg, Virginia, 2014: *Geological Society of America Field Guide* 35, p. 1-40; doi:10.1130/2014.0035(01)
- COLE, S.R., HAYNES, J.T., LUCAS, P.C., and LAMBERT, R.A., 2015, Faunal and sedimentological analysis of a latest Silurian stromatoporoid biostrome from the central Appalachian Basin: *Facies*, v. 61, no. 3, 16 p; doi:10.1007/s10347-015-0440-x
- HAYNES, J.T., 2015, The geological setting of Breathing Cave, *in* Zimmerman, R., ed., *Breathing Cave, Bath County, Virginia: Virginia Speleological Survey Monograph # 1*, p. 33-64.
- HAYNES, J.T., DIECCHIO, R.J., and WHITMEYER, S.J., 2015, Stratigraphy of Silurian sandstones in western Virginia from Eagle Rock to Bluegrass: *45th Annual Virginia Geological Field Conference Guidebook*, 48 p.
- HAYNES, J.T., GOGGIN, K.E., and ORNDORFF, R.C., 2015, Ordovician of Germany Valley, West Virginia – Mid-Conference Field Trip: *Stratigraphy*, v. 12, no. 2, p. 252-296.
- HAYNES, J., PITTS, A., DOCTOR, D., DIECCHIO, R., and BLAKE, M., 2015, Appalachian stratigraphy, tectonics, and eustasy from the Blue Ridge to the Allegheny Front, Virginia and West Virginia: *Field Trip 408*, Geological Society of America Annual Meeting, Baltimore, 75 p.
- HERRMANN, A., and HAYNES, J.T., 2015, Ordovician of the Southern Appalachians, USA – Pre-Conference Field Trip: *Stratigraphy*, v. 12, no. 2, p. 203-251.
- SWEZEY, C.S., and HAYNES, J.T., 2015, Appendix A – The stratigraphic nomenclature of Burnsville Cove, Bath and Highland Counties, Virginia, *in* White, W.B., ed., *The Caves of Burnsville Cove, Virginia: Springer International Publishing Switzerland, Cave and Karst Systems of the World*, p. 459-474; doi:10.1007/978-3-319-14391-0_16
- SWEZEY, C.S., HAYNES, J.T., LAMBERT, R.A., LUCAS, P.C., GARRITY, C.P., and WHITE, W.B., 2015, The geology of Burnsville Cove, Bath and Highland Counties, Virginia, *in* White, W.B., ed., *The Caves of Burnsville Cove, Virginia: Springer International Publishing Switzerland, Cave and Karst Systems of the World*, p. 299-334; doi: 10.1007/978-3-319-14391-0_16

- HAYNES, J.T., 2016, Geologic Map of the Southeast Quarter of the Eagle Rock Quadrangle, Virginia: Virginia Division of Geology and Mineral Resources 2016 STATEMAP Deliverable, 1:24,000-scale geologic map, 1 sheet with text.
- SWEZEY, C.S., HAYNES, J.T., LUCAS, P.C., and LAMBERT, R.A., 2017, Geological Controls on Cave Development in Burnsville Cove, Bath and Highland Counties, Virginia, in Bailey, C.M., and Jaye, S., eds., *From the Blue Ridge to the Beach: Geological Excursions across Virginia: Geological Society of America Field Guide 47*, p. 89-123; doi:10.1130/2017.0047(04)
- QUINTON, P.C., LAW, S., MACLEOD, K.G., HERRMANN, A.D., HAYNES, J.T., and LESLIE, S.A., 2017, Testing the early Late Ordovician cool-water hypothesis with oxygen isotopes from conodont apatite: *Geological Magazine*, v. 143, p.1-15, doi:10.1017/S0016756817000589
- HAYNES, J.T., 2017, Geologic Map of the South Half of the Eagle Rock Quadrangle, Virginia: Virginia Division of Geology and Mineral Resources 2017 STATEMAP Deliverable, 1:24,000-scale geologic map, 1 sheet with text.

Abstracts

- HAYNES, J.T., HUFF, W.D., and HAY, R.L., 1987, Compositional variations in the Middle Ordovician Deicke (T-3) and Millbrig (T-4) K-bentonites in the southeastern United States: *Geol. Soc. of America Abstracts with Programs*, v. 19, NC section p. 203.
- HAYNES, J.T., HUFF, W.D., and KOLATA, D.R., 1988, The Upper Ordovician Millbrig K-bentonite Bed of the southern Appalachians: a marker bed in clastic and carbonate facies: *Abstracts volume*, Vth International Symposium on the Ordovician System, St. Johns, Newfoundland, p. 27.
- HAYNES, J.T., and HUFF, W.D., 1989, The usefulness of K-bentonites as chronostratigraphic markers in Rocklandian (Upper Ordovician) strata of the southeastern United States: *Geol. Soc. of America Abstracts with Programs*, v. 21, p. A-133.
- HAYNES, J.T., and SICHELSTIEL, K.D., 1990, Geologic investigation of Quaternary sediments, the Patuxent Formation (Cretaceous), and the Baltimore Gneiss (Precambrian) at a former industrial site in the Inner Harbor of Baltimore, Maryland: *Geol. Soc. of America Abstracts with Programs*, v. 22, NE section, p. 23.
- HAYNES, J.T., 1991, Carbonate and clastic sedimentation in a restricted shelf setting: The Waynesboro Formation (Cambrian) of west-central Virginia: *Geol. Soc. of America Abstracts with Programs*, v. 23, NE-SE section, p. 43.
- HAYNES, J.T., 1992, Post-Knox Ordovician stratigraphic sequences and the significance of the Rocklandian K-bentonites, eastern United States: *Geol. Soc. of America Abstracts with Programs*, v. 24, p. A-197.
- GOGGIN, K.E., and HAYNES, J.T., 1994, Stratigraphic significance and provenance of the Ordovician Walker Mountain Sandstone Member, Virginia-Tennessee: *Geol. Soc. of America Abstracts with Programs*, v. 26, SE section, p. 16.
- GOGGIN, K.E., and HAYNES, J.T., 1995, Mohawkian clastic wedges in the central and southern Appalachians: Early signatures of the Taconic Orogeny?: *Geol. Soc. of America Abstracts with Programs*, v. 27, SE section, p. 58.
- HAYNES, J.T., and MELSON, W.G., 1995, Biotite composition indicates that the two Ordovician K-bentonites at the Old North Ragland Quarry, Alabama, are the same structurally repeated tephra layer: *Geol. Soc. of America Abstracts with Programs*, v. 27, SE section, p. 61.
- HAYNES, J.T., MELSON, W.G., O'HEARN, T., and HUBBELL, R., 1995, Evidence for a significant influx of pyroclastic material into the central Appalachian foredeep during the early stages of the Taconic Orogeny: *Geol. Soc. of America Abstracts with Programs*, v. 27, p. A-223.
- MELSON, W.G., HAYNES, J.T., O'HEARN, T., and HUBBELL, R., 1995, K-shales of the central Appalachian Paleozoic: *Geol. Soc. of America Abstracts with Programs*, v. 27, p. A-462

- KREKELER, M.P.S., McVEY, D.E., JONES, R., RAPIEN, M., HUFF, W.D., and HAYNES, J.T., 1995, Differential distribution of feldspar minerals in Middle Ordovician K-bentonites in the eastern mid-continent and central Appalachians: *Geol. Soc. of America Abstracts with Programs*, v. 27, NE section, p. 62.
- LOCKE, D.R., MELSON, W.G., GOGGIN, K.E., HAYNES, J.T., O'HEARN, T., and HUBBELL, R., 1996, Appalachian calcareous Ordovician K-bentonites: properties and origin: *Geol. Soc. of America Abstracts with Programs*, v. 28, p. A-366.
- LOCKE, D.R., MELSON, W.G., HAYNES, J.T., GOGGIN, K.E., and O'HEARN, T., 1997, Air-fall tephra incorporated in shale of the Middle Ordovician Edinburg Formation at the classic Tumbling Run section: The mineralogical record of Early Taconic volcanism in the central Appalachians: *Geol. Soc. of America Abstracts with Programs*, v. 28, p. A-351.
- BRIGGS, G.A., ELLIOTT, W.C., VANKO, D.A., AND HAYNES, J.T., 1998, Plagioclase-hosted rhyolite glass inclusions in Ordovician K-bentonites in the southern Appalachian basin: *Geol. Soc. of America Abstracts with Programs*, v. 30, SE section, p. 5.
- HAYNES, J.T., and DIECCHIO, R.J., 1998, Systems tract development along Taconic collisional margin at the level of the second-order cycle, Virginia Appalachians: *Geol. Soc. of America Abstracts with Programs*, v. 30, SE section, p. 17.
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Client confidential reports

- P.E. LaMoreaux & Associates, 1981, Groundwater field investigation of the Sydney Mine Superfund Site, Florida: [PELA was contracted by Waste Management, Inc. to investigate a parcel of land on the Sydney mine site, a former phosphate mine in central Florida, for its potential suitability as a municipal landfill site. I was the site geologist responsible for overseeing a 3-man drill crew that carried out continuous coring at 10 locations, for a total of over 1000 feet of core sample, which I then logged]. Within weeks of our work this site was formally placed on the Superfund list because of two unlined waste ponds (surface impoundments) that were contaminating the surficial aquifer with septic wastes, pesticide residues, and heavy metal sludges. All planned development was halted. My work was incorporated by senior PELA staff into the report submitted in 1981 to Waste Management, Oak Brook.
- P.E. LaMoreaux & Associates, 1982, Groundwater field investigation of the Ottati & Goss/Kingston Steel Drum Superfund Site, Kingston, New Hampshire: [PELA was contracted by the Great Lakes Container Corp. to assist in determining the nature and origin of groundwater contamination associated with these two separate businesses on the same site. GLCC had been a long-time operator of the drum refurbishing operation in Kingston, and when it sold the property the new owner sublet the rear acreage to O&G, which ended up as a drum disposal site in the 1970s. When PELA staff were there, the Region I office of the U.S. EPA was carrying out a drum contents identification and removal effort from the O&G site; the KSD site had ceased operating some years prior. I was involved with a two-week long local inventory of shallow domestic wells, a weeks-long drilling effort in the glacial aquifer beneath the KSD portion of the property, and a level-2 (SCBA tanks with full-face respirator, Tyvek suits with no exposed skin, and full decontamination) sampling effort of groundwater from wells in the O&G portion]. My work was incorporated into the PELA report submitted to GLCC after I left PELA in mid-1982.
- Halliburton NUS Corporation, 1988, Calibration of ground-water modeling parameters using real-time monitoring data: [Under a comprehensive RCRA support contract administered by EPA Headquarters awarded to HNUS, we became involved with a major modeling effort intended to characterize contaminant behavior in groundwater in a variety of hydrogeologic settings. HNUS staff went to six active, legally permitted municipal landfills in Florida, Oregon, Texas, New Jersey, Wisconsin, and California and drilled and installed several individually designed monitoring wells and then collected a variety of chemical and geophysical data, as directed by EPA. I was the project manager. Monitoring data were incorporated into the report I wrote summarizing our work]. Submitted to Dr. Zubair Saleem, U.S. Environmental Protection Agency, Washington.
- Halliburton NUS Corporation, 1988, Results of the supplemental remedial investigation: [Findings based on the drilling of 11 additional shallow wells at the Allied-Signal property, Baltimore, Maryland, site of a former chromium chemicals manufacturing plant. HNUS was contracted to install 4 onshore and 7 offshore boreholes at the site, which is immediately east of the Fall Line. The drilling was part of a field investigation of the hexavalent chromium contamination in groundwater, especially the basal Cretaceous sand immediately overlying the saprolite on top of the gneiss]. Submitted to Mr. Mark Sylvester, Allied-Signal Corp., Baltimore.
- Halliburton NUS Corporation, 1990, Results of the initial investigation into recovery of solid waste for reuse and recycling from the Edinburg Landfill, Edinburg, N.Y., for the New York State Energy Authority, Albany: [This was a report funded by the U.S. EPA Region II office in New York City to obtain preliminary geologic and hydrogeologic information from the small, unlined landfill in Edinburg and its suitability to serve as a model for landfill "mining", a means of extending the useful life of a landfill with a fixed footprint. I was the principal field geologist, overseeing the onsite drilling (5 holes about 25 ft. each through the fill) and the author of the report]. Submitted to Mr. John Morelli of the New York State Energy Authority, Albany.
- Halliburton NUS Corporation, 1990, Geophysical investigation of eight former municipal landfills on U.S. Department of Interior lands under the authority of the Bureau of Land Management: [This was a comprehensive effort by BLM and Bureau of Mines to determine if long-abandoned landfills could be identified using remote sensing methods so as to minimize or eliminate direct drilling into the fill. Principal methods used included seismic line surveys, EM-31 and EM-34 magnetometer surveys, and ground-penetrating radar traverses. Historical aerial photo analysis was performed. HNUS was contracted to manage the project and write the final report. BLM estimates that 3,000+ abandoned landfills exist on public lands. I was the onsite NUS geologist at the Virginia City landfill site, Virginia City, Montana, in August 1990, and the Fairview landfill site, Coos Bay, Oregon, in September 1990, and the principal author of the report]. First draft report submitted to Ms. Pat McMillan, BLM-Denver, and Mr. David Green, U.S. Environmental Protection Agency on detail to the BLM-Washington.

Halliburton NUS Corporation, 1991, Part B of the RCRA Permit Application for operation of a secondary lead smelter, Muncie, Indiana, by the General Battery Corporation: [This application was prepared for General Battery, an operating subsidiary of Exide Corporation, Reading, Penn., for submittal to the U.S. EPA Region V (Chicago) and the State of Indiana for a permit to operate a secondary lead smelter in Muncie. I was the principal author and technical manager of the Part B permit application]. Submitted to Mr. Jeff Leed, Exide Corporation, Reading. The permit was granted and soon thereafter the facility began to recover lead and plastic from over 25,000 lead-acid batteries daily.

Halliburton NUS Corporation, 1992, Part B of the RCRA Permit Application for open detonation of RCRA Subpart X explosive wastes at Fort Knox, Kentucky: [This application was prepared for Fort Knox for submittal to the U.S. EPA Region IV (Atlanta) and the Commonwealth of Kentucky for an operating permit to destroy unserviceable ordnance regulated under RCRA. My contribution was as author of the chapter on groundwater monitoring at the detonation site, which is of concern because it is less than a mile from the edge of the major Mississippian karst of western Kentucky associated with the St. Louis, Salem, and Ste. Genevieve Limestones and is directly underlain by a lesser karst system associated with the Harrodsburg Limestone]. First draft submitted to Mr. Jim Wilkins, Martin Marietta, Oak Ridge, Tennessee, and Mr. Donald McGar, Fort Knox, Kentucky.

Halliburton NUS Corporation, 1993, Preliminary Environmental Impact Statement for low-level radioactive waste disposal sites at the Oak Ridge Reservation (ORR), Tennessee: [A comprehensive EIS submitted to the U.S. Department of Energy, Oak Ridge office, for the planned onsite disposal of Class I and II radioactive wastes at the ORR. The principal concern is that the only suitable sites for Class I wastes overlie the Knox aquifer, a structurally complex karst aquifer that is the principal groundwater source in the Valley and Ridge of eastern Tennessee. This report required extensive integration of GIS data and kept two HNUS GIS technicians working fulltime for months. My contribution was as author of the chapter on Oak Ridge geology, including structure, stratigraphy, geomorphology, and hydrogeology]. First draft final submitted to Mr. Bill Gilbert, U.S. Department of Energy, Oak Ridge.

I was also a contributor to over 15 additional large reports and several lesser ones from 1987 to 1993, while employed by Halliburton NUS and Brown & Root Environmental, but the above list represents the most significant reports with which I was involved.

Miscellaneous publications

In May 2002, I was listed as a contributor to the preliminary geologic map of the Snowy Mountain (W.Va -- Va.) 7.5' quadrangle, which the West Virginia Geological Survey mapped in 2001 as part of the STATEMAP program; I joined the mapping crew in the field for several days in July 2001, to help them learn about and better understand the stratigraphy of the Ordovician carbonate sequence in and adjacent to the Snowy Mountain quadrangle.