TIMOTHY J. KNEAFSEY, P.E., Ph.D.
Department Head, Hydrogeology Department
Earth and Environmental Sciences Area
Lawrence Berkeley National Laboratory
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EDUCATION

Ph.D., Civil/Environmental Engineering, University of California at Berkeley, 1996, Minors: Chemical Engineering, Transport in Porous Media
M.S., Civil/Environmental Engineering, University of California at Berkeley, 1989, with honors
B.S., Civil Engineering, University of New Mexico, 1987, with distinction
B.S., Mechanical Engineering, University of New Mexico, 1983, with distinction

REGISTRATION

Professional Civil Engineer in California

HONORS

Outstanding Contributions in Geoscience Research, 2010, with Karsten Pruess, given by Geosciences Research Program, Office of Basic Energy Sciences, U.S. Department of Energy
Outstanding Performance Award, Lawrence Berkeley National Laboratory, June, 2006

RESEARCH INTERESTS

Experimental studies in reservoir processes and subsurface hydrology, including multiphase flow, phase change, thermal processes, thermal-chemical processes, gas hydrates, coal bed methane, tight gas, and carbon dioxide sequestration. Other interests include imaging tools to investigate flow processes.

RESEARCH EXPERIENCE

Staff Scientist, Lawrence Berkeley National Laboratory, 2012 - Present
Mechanical Engineer, Lawrence Berkeley National Laboratory, 2007 - 2012
Geological Scientist, Lawrence Berkeley National Laboratory, 1999 - 2007
Post-Doctoral Research Fellow, Lawrence Berkeley National Laboratory, 1996 - 1999
Graduate Research Assistant, University of California at Berkeley, 1991-1996

TEACHING EXPERIENCE

Teaching Assistant, University of California at Berkeley 1992 - 1993
Secondary School Mathematics Teacher, U.S. Peace Corps, Holy Rosary Secondary School, Pujehun, Sierra Leone, 1983 - 1985

PROFESSIONAL EXPERIENCE

Environmental Engineer, Kennedy/Jenks Consultants, San Francisco, California, 1989 - 1991
Environmental Engineer, U.S. Environmental Protection Agency, San Francisco, California, 1987 - 1989

PATENT

Freifeld, B.M., **T.J. Kneafsey**, J. Pruess, L. Tomutsa, P.A. Reiter, and T.M. deCastro, Portable imaging system method and apparatus, United States Patent 7,082,185, July 25, 2006

RESEARCH SUPERVISION

Naif B. Alqahtani, PhD. Student, (Advisor Jennifer Miskimins) Colorado School of Mines, Use of cryogens in fracturing
Dylan Myer, University of Texas, (Advisor Peter Flemings) Three-phase stability in gas hydrate

deposits
Mario Magliocco, Post-Doctoral Researcher, Lawrence Berkeley National Laboratory, Ph.D. Student, (Advisor Steven Glaser) University of California at Berkeley, Use of supercritical CO_2 as a heat transfer fluid in enhanced geothermal systems
Emily V. Rees, Post-Doctoral Researcher, Lawrence Berkeley National Laboratory, Gas hydrate formation/properties of gas hydrates in porous media
Tae-Hyuk Kwon, Post-Doctoral Researcher, Lawrence Berkeley National Laboratory, Mixed methane/CO_2 hydrate properties
Matthew Walsh, Ph.D. Student, (Advisor E. Dendy Sloan) Colorado School of Mines, Capillary pressure of hydrate-bearing sediments
Arvind Gupta, Ph.D. Candidate, (Advisor E. Dendy Sloan) Colorado School of Mines, Gas hydrate imaging, heat and mass transfer in gas hydrate-bearing porous media
Heather Elsen, Ph.D. Student, University of California at Berkeley, Gas hydrate formation and dissociation in porous media
Nefeli Moridis, Undergraduate Student, University of Texas, Gas Hydrate image analysis
Gordon Wu, Undergraduate Student, University of California at Berkeley, Validation of thermal property estimation technique
Jacob Pruess, Undergraduate Student, University of California at Berkeley, Portable x-ray CT Scanner, various investigations
Paul Reiter, Undergraduate Student, Princeton University, Portable x-ray CT scanner

LBNL SERVICE
Earth Sciences Safety Committee Chairperson/Member, 2005 – 2010, 2012 - present
LBNL Building Emergency Team Member, 2001 – 2009

JOURNAL SERVICE
Guest Editor, Energy Conversion and Management, 2006

PUBLICATIONS
Journal Papers/Conference Papers/Book Chapter
1. Bikkina, P., J. Wan, Y. Kim, **T.J. Kneafsey** and T. K. Tokunaga (2016). "Influence of wettability and permeability heterogeneity on miscible CO_2 flooding efficiency." Fuel **166**: 219-226, doi:10.1016/j.fuel.2015.10.090.
2. Chang, C., Q. Zhou, **T.J. Kneafsey**, M. Oostrom, T. W. Wietsma and Q. Yu (2016). "Pore-scale supercritical CO_2 dissolution and mass transfer under imbibition conditions." Advances in Water Resources **92**: 142-158, doi:10.1016/j.advwatres.2016.03.015.
3. Dafflon, B., S. Hubbard, C. Ulrich, J. Peterson, Y. Wu, H. Wainwright and **T. Kneafsey** (2016). "Geophysical estimation of shallow permafrost distribution and properties in an ice-wedge polygon-dominated Arctic tundra region." GEOPHYSICS **81**(1): WA247-WA263, doi: 10.1190/geo2015-0175.
4. Zhang, S., DePaolo, D. J., Voltolini, M., & **Kneafsey, T.** (2015). CO_2 mineralization in volcanogenic sandstones: geochemical characterization of the Etchegoin formation, San Joaquin Basin. Greenhouse Gases: Science and Technology, n/a-n/a. doi: 10.1002/ghg.1508
5. Magliocco, M., Glaser, S., & **Kneafsey, T.** (2015). Laboratory and Numerical Studies of Heat Extraction from Hot Porous Media by Means of Supercritical CO_2. Transport in Porous Media, 108(1), 85-104. doi: 10.1007/s11242-015-0474-0
6. You, K., **Kneafsey, T.J.**, Flemings, P.B., Polito, P., & Bryant, S.L. (2015). Salinity-buffered methane hydrate formation and dissociation in gas-rich systems. Journal of Geophysical Research: Solid

Earth, 120(2), 643-661. doi: 10.1002/2014JB011190
7. **Kneafsey, T.J**. and G. J. Moridis (2014). "X-Ray computed tomography examination and comparison of gas hydrate dissociation in NGHP-01 expedition (India) and Mount Elbert (Alaska) sediment cores: Experimental observations and numerical modeling." Marine and Petroleum Geology **58, Part A**(0): 526-539.
8. Cha, M., Yin, X., **Kneafsey, T**., Johanson, B., Alqahtani, N., Miskimins, J., . . . Wu, Y.-S. (2014). Cryogenic fracturing for reservoir stimulation – Laboratory studies. Journal of Petroleum Science and Engineering, 124(0), 436-450. doi:http://dx.doi.org/10.1016/j.petrol.2014.09.003
9. Nakagawa, S., **Kneafsey, T.J**., Daley, T.M., Freifeld, B.M. and Rees, E.V., 2013. Laboratory seismic monitoring of supercritical CO_2 flooding in sandstone cores using the Split Hopkinson Resonant Bar technique with concurrent x-ray Computed Tomography imaging. Geophysical Prospecting, 61(2): 254-269.
10. **Kneafsey, T.J.**, D. Silin, and J.B. Ajo-Franklin, Supercritical CO_2 flow through a layered silica sand/calcite sand system: Experiment and modified maximal inscribed spheres analysis. Int. J. Greenhouse Gas Control (2013), 14, 141–150 http://dx.doi.org/10.1016/j.ijggc.2012.12.031
11. Dai, S., Santamarina, J.C., Waite, W.F. and **Kneafsey, T.J.**, 2012. Hydrate morphology: Physical properties of sands with patchy hydrate saturation. Journal of Geophysical Research: Solid Earth, 117(B11): B11205.
12. Kim, Y., Wan, J., **Kneafsey, T.J.**, Tokunaga, T.K., Dewetting of Silica Surfaces upon Reactions with Supercritical CO_2 and Brine: Pore-Scale Studies in Micromodels, Environmental Science and Technology, 46, 7, 4228, 2012
13. Silin, D., **Kneafsey, T.J.**, Gas Shale: From Nanometer-Scale Observations to Well Modeling, Journal of Canadian Petroleum Technology, 51, 6, pp.464-475, November, 2012
14. Borgia, A., K. Pruess, **T.J. Kneafsey**, C.M. Oldenburg, and L. Pan (2012), Numerical simulation of salt precipitation in a fractured CO_2-Enhanced Geothermal System. Geothermics, 44, 13–22; DOI:10.1016/j.geothermics.2012.06.002. LBNL-5709E.
15. **Kneafsey, T.J**., Pruess, K., Laboratory experiments and numerical simulation studies of convectively enhanced carbon dioxide dissolution, Energy Procedia, 4, 5114-5121, 2011
16. Rees E.V.L., **T.J. Kneafsey**, and Y. Seol, "Methane Hydrate Distribution from Prolonged and Repeated Formation in Natural and Compacted Sand Samples: X-Ray CT Observations," Journal of Geological Research, vol. 2011, Article ID 791815, 15 pages, 2011. doi:10.1155/2011/791815 LBNL-5029E
17. Seol, Y., and **T.J. Kneafsey** (2011) "Methane hydrate induced permeability modification for multiphase flow in unsaturated porous media," J. Geophys. Res., 116(B8), B08102.
18. Kwon, T.H., **Kneafsey, T.J.**, and Rees, E.V.L. (2011) "Thermal dissociation behavior and dissociation enthalpies of methane-carbon dioxide mixed hydrates," Journal of Physical Chemistry B, Vol. 115,
pp. 8169-8175, doi: 10.1021/jp111490w, 23 May 2011.
19. Moridis, G.J., Collett, T.S., Pooladi-Darvish, M., Pooladi-Darvish, M., Santamarina, C., Boswell, R., **Kneafsey, T.J**., Rutqvist, J., Kowalsky, M.B., Reagan, M.T., Sloan, E.D., Sum, A., and Koh, C. 2011. Challenges, Uncertainties, and Issues Facing Gas Production From Gas-Hydrate Deposits. SPE Res Eval & Eng 14 (1): 76-112. SPE-131792-PA. doi: 10.2118/131792-PA
20. **Kneafsey, T**., Pruess, K. (2010). Laboratory Flow Experiments for Visualizing Carbon Dioxide-Induced, Density-Driven Brine Convection. *Transport in Porous Media, 82*(1), 123-139. doi:10.1007/s11242-009-9482-2
21. **Kneafsey, T.J.,** Y. Seol, A. Gupta, L. Tomutsa, "Permeability of Laboratory-Formed Methane-Hydrate-Bearing Sand," SPE Journal, 10.2118/139525-pa, October, 2010
22. **Kneafsey, T.J.**, Y. Seol, G.J. Moridis, L. Tomutsa, B.M. Freifeld, "Laboratory measurements on

core-scale sediment and hydrate samples to predict reservoir behavior," in T. Collett, A. Johnson, C. Knapp, and R. Boswell, eds., Natural gas hydrates—Energy resource potential and associated geologic hazards: AAPG Memoir 89, p. 705–713. 2009, LBNL-59085

23. **Kneafsey, T.J.** and K. Pruess, Laboratory Flow Experiments for Visualizing Carbon Dioxide-Induced, Density-Driven Brine Convection, Transport in Porous Media DOI 10.1007/s11242-009-9482-2, October, 2009, LBNL-2731E
24. **Kneafsey, T.J.,** H. Liu, W. Winters, R. Boswell, R. Hunter, and T.S. Collett, (2011), Examination of core samples from the Mount Elbert Gas Hydrate Stratigraphic Test Well, Alaska North Slope: Effects of retrieval and preservation, Marine and Petroleum Geology, *28*(2), 381-393., doi:10.1016/j.marpetgeo.2009.10.009 February 2011, LBNL-2730E
25. Gupta, A., G.J. Moridis, **T.J. Kneafsey,** and E.D. Sloan, "Modeling Pure Methane Hydrate Dissociation Using a Numerical Simulator from a Novel Combination of X-ray Computed Tomography and Macroscopic Data," Energy & Fuels, 23(12): 5958-5965, 2009, LBNL 2749E
26. W. Waite, C. Santamarina, D. Cortes, B. Dugan, N. Espinoza, J. Germaine, J. Jang, J. Jung, **T.J. Kneafsey**, H. Shin, K. Soga, W. Winters, T-S. Yun, "Physical Properties of Hydrate-Bearing Sediments," Rev. Geophys., 47, RG4003, doi:10.1029/2008RG000279, December, 2009
27. Seol, Y. and **T.J. Kneafsey**, "X-ray computed-tomography observations of water flow through anisotropic methane hydrate-bearing sand, Journal of Petroleum Science and Engineering 66 (2009) 121–132, doi:10.1016/j.petrol.2009.01.008
28. Waite, W. F., **T.J. Kneafsey**, W. J. Winters, and D. H. Mason (2008), "Physical property changes in hydrate-bearing sediment due to depressurization and subsequent repressurization," J. Geophys. Res., 113, B07102, doi:10.1029/2007JB005351, LBNL-664E
29. Ghezzehei, T.A., **T.J. Kneafsey**, and G.W. Su, "Correspondence of the Gardner and van Genuchten relative permeability function parameters," Water Resources Research, v. 43, W10417, doi:10.1029/2006WR005339, 2007
30. ***Kneafsey, T.J**., L. Tomutsa, G.J. Moridis, Y. Seol, B.M. Freifeld, C.E. Taylor, and A. Gupta, "Methane Hydrate Formation and Dissociation in a Core-Scale Partially Saturated Sand Sample," Journal of Petroleum Science and Engineering, 56 (2007) 108–126. LBNL-59087
31. ***Top Twenty Most Cited Articles 2007-2010, Journal of Petroleum Science and Engineering (Journal's Second Most Cited Article)**
32. Gupta, A., **T.J. Kneafsey**, G.J. Moridis, Y. Seol, M.B. Kowalsky, E.D. Sloan Jr., "Methane hydrate thermal conductivity in a large heterogeneous porous sample," J. Phys. Chem. B; 2006; ASAP Web Release Date: 02-Aug-2006; DOI: 10.1021/jp0619639LBNL-59088
33. Seol, Y., **T.J. Kneafsey**, and K. Ito, An Evaluation of the Active Fracture Concept with Modeling Unsaturated Flow and Transport in a Fractured Meter-Sized Block of Rock, Vadose Zone Journal, December, 2005, doi:10.2136/vzj2004.0175, LBNL-52818
34. Freifeld, B.M. and **T.J. Kneafsey**. "Investigating methane hydrate in sediments using X-ray computed tomography." In Advances in the Study of Gas Hydrates. Kluwer Academic/Plenum Press, 2004. p. 227-238, LBNL-55030
35. Salve, R., and **T.J. Kneafsey** (2005), Vapor-phase transport in the near-drift environment at Yucca Mountain, Water Resour. Res., 41, W01012, doi:10.1029/2004WR003373, LBNL-55212
36. Freifeld, B.M.; **Kneafsey, T.J.**, and Rack, F. "On-Site Geologic Core Analysis Using a Portable X-ray Computed Tomographic System," From: Rothwell, R.G. 2006. New Techniques in Sediment Core Analysis. Geological Society, London, Special Publications, 267, 165–178. 0305-8719/06, The Geological Society of London, 2006, LBNL-55698
37. **Kneafsey, T.J**., and Hunt, J.R. "Non-aqueous phase liquid spreading during soil vapor extraction," Journal of Contaminant Hydrology, 68(3-4), pp. 143-164, 2004, LBNL-46519

38. Hu, Q., **T.J. Kneafsey**, J.J. Roberts, L. Tomutsa, and J.S.Y. Wang¸" Characterizing Unsaturated Diffusion in Porous Tuff Gravel, Vadose Zone Journal 3:1425–1438 (2004), LBNL-51504
39. Dobson, P.F., **T.J. Kneafsey**, J. Hulen, and A. Simmons, "Porosity, permeability, and fluid flow in the Yellowstone Geothermal System, Wyoming," Journal of Volcanology and Geothermal Research, v 123, 313-324, 1 May 2003, LBNL-50044
40. Dobson, P.F., **T.J. Kneafsey**, E.L. Sonnenthal, N. Spycher, and J.A. Apps, "Experimental and numerical simulation of dissolution and precipitation: Implications for fracture sealing at Yucca Mountain, Nevada, Journal of Contaminant Hydrology, v 62-63, 459-476, 2003, LBNL-48872
41. Hu, M.Q., **T.J. Kneafsey**, R.C. Trautz, and J.S.Y. Wang, "Tracer Penetration into Welded Tuff Matrix from Flowing Fractures, Vadose Zone Journal, Vol. 1, No. 1, August 2002, LBNL 46400
42. **Kneafsey, T.J**. and K. Pruess "Laboratory Experiments on Heat-Driven Two-Phase Flows in Natural and Artificial Rock Fractures," Water Resources Research, Vol. 34, No. 12, p. 3349, December, 1998

CONFERENCE PUBLICATIONS AND PUBLISHED NON-PEER REVIEWED PAPERS

T.J. Kneafsey, S. Nakagawa, P.F. Dobson, S.E. Borglin, M.Voltolini, J.T. Smith, L. Yang, E.L. Sonnenthal, Laboratory Determination of Fracture Sustainability in EGS Systems, PROCEEDINGS, 41st Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, February 22-24, 2016, SGP-TR-209

T.J. Kneafsey, S. Nakagawa, P.F. Dobson, and B.M. Kennedy (2015). *Fracture Sustainability in EGS Systems – Results of Laboratory Studies*. Paper presented at the Fortieth Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California.

T.J. Kneafsey, S. Nakagawa, P. F. Dobson, B. M. Kennedy, J. P. Icenhower, S. Nakashima, Sustainability of Fractures in EGS Systems - A Laboratory Investigation
PROCEEDINGS, Thirty-Ninth Workshop on Geothermal Reservoir Engineering Stanford University, Stanford, California, February 24-26, 2014 SGP-TR-202

A. Borgia, K. Pruess, **T.J. Kneafsey**, C. M. Oldenburg, and L. Pan, Simulation of CO_2-EGS in a Fractured Reservoir with Salt Precipitation, PROCEEDINGS, Thirty-Seventh Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 30 - February 1, 2012, SGP-TR-194

M. Magliocco, **T.J. Kneafsey**, K. Pruess, and S. Glaser, Laboratory Experimental Study of Heat Extraction From Porous Media by Means of CO_2, PROCEEDINGS, Thirty-Sixth Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 31 - February 2, 2011, SGP-TR-191

Silin, D, **T J. Kneafsey**, J. B. Ajo-Franklin, and P. Nico, "A Multimodal 3D Imaging Study of Natural Gas Flow in Tight Sands" SPE Annual Technical Conference and Exhibition Society of Petroleum Engineers, 146611-MS, 2011

Silin, D., **T.J. Kneafsey**, "Gas Shale: From Nanometer-Scale Observations to Well Modeling," Canadian Unconventional Resources Conference, Society of Petroleum Engineers, 149489-MS, 2011

Seol, Y., **T.J. Kneafsey**, E. Myshakin, "Quantitative Applications of X-ray CT Observations for Core-Scale Hydrate Studies," Proceedings of the 7th International Conference on Gas Hydrates (ICGH 2011), Edinburgh, Scotland, United Kingdom, July 17-21, 2011.

Rees, E.V.L, S. Nakagawa, and **T.J. Kneafsey**, "The Geomechanical Properties of Synthetic Hydrate Bearing Sediments," Proceedings of the 7th International Conference on Gas Hydrates (ICGH 2011), Edinburgh, Scotland, United Kingdom, July 17-21, 2011.

Kneafsey, T.J., and S. Nakagawa, "Repeated Methane Hydrate Formation and Dissociation in a Partially Water Saturated Sand: Impact on Hydrate Heterogeneity and Sonic-Frequency Seismic

Properties," Proceedings of the 7th International Conference on Gas Hydrates (ICGH 2011), Edinburgh, Scotland, United Kingdom, July 17-21, 2011.

T.J. Kneafsey and G.J. Moridis, "Methane Hydrate Dissociation by Depressurization in a Mount Elbert Sandstone Sample: Experimental Observations and Numerical Simulations" OTC Paper Number 944097, 2011, Presented at the Arctic Technology Conference held in Houston, Texas, USA, 7–9 February 2011, LBNL-4936E

Kneafsey, T.J., and K. Pruess, "Laboratory Experiments and Numerical Simulation Studies of Convectively Enhanced Carbon Dioxide Dissolution, GHGT-10, Amsterdam, September 2010

Nakagawa, S., and **T.J. Kneafsey**, "Split Hopkinson Resonant Bar Test And Its Application For Seismic Property Characterization of Geological Media," 44th U.S. Rock Mechanics Symposium and 5th U.S.-Canada Rock Mechanics Symposium, June 27 - 30, 2010, Salt Lake City, Utah, Paper Number 10-491

Ghezzehei, T.A. and **T.J. Kneafsey**, "Measurements of the Capillary Pressure-Saturation Relationship of Methane Hydrate Bearing Sediments," 2010 Offshore Technology Conference held in Houston, Texas, USA, 3–6 May 2010, OTC-20550-PP

Seol, Y., and **T.J. Kneafsey**, Fluid flow through heterogeneous methane hydrate bearing sand: observations using x-ray CT scanning, Proceedings of the 6th International Conference on Gas Hydrates (ICGH 2008), Vancouver, British Columbia, CANADA, July 6-10, 2008.

Kneafsey, T.J., K. Pruess, and N. Spycher, Preliminary experimental investigation of water injection to reduce non-condensible and corrosive gases in steam produced from vapor-dominated reservoirs, Proceedings, Thirty-Third Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 28-30, 2008. SGP-TR-185

Nakagawa, S., **T.J. Kneafsey**, and G.J. Moridis, Mechanical strength and seismic property measurements of hydrate-bearing sediments (HBS) during hydrate formation and loading tests, 2008 Offshore Technology Conference held in Houston, Texas, U.S.A., 5–8 May 2008, OTC 19559

Kneafsey, T.J., Y. Seol, A. Gupta, and L. Tomutsa, Permeability of Laboratory-Formed Methane-Hydrate-Bearing Sand, 2008 Offshore Technology Conference held in Houston, Texas, U.S.A., 5–8 May 2008, OTC 19536-PP

T.J. Kneafsey, K. Pruess, and N. Spycher, Preliminary Experimental Investigation of Water Injection to Reduce Non-Condensible and Corrosive Gases in Steam Produced from Vapor-Dominated Reservoirs, PROCEEDINGS, Thirty-Third Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 28-30, 2008, SGP-TR-185

K. Pruess, N.Spycher and **T.J. Kneafsey**, Water Injection as a Means for Reducing Non-Condensible and Corrosive Gases in Steam Produced from Vapor-Dominated Reservoirs, PROCEEDINGS, Thirty-Second Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 22-24, 2007. SGP-TR-183

Seol, Y., **T.J. Kneafsey**, L. Tomutsa, and G.J. Moridis. "Preliminary relative permeability estimates of methane hydrate-bearing sand." In TOUGH Symposium 2006, Berkeley, CA, 15-17 May 2006. 2006. LBNL-60368

Benson, S.M., L. Tomutsa, D. Silin, **T. Kneafsey**, L. Miljkovic, "Core scale and pore scale studies of carbon dioxide migration in saline formations," 8th International Conference on Greenhouse Gas Control Technologies, Trondheim, Norway, 19-22 June 2006, LBNL-59082

Su, G.W., **T.J. Kneafsey**, T.A. Ghezzehei, B.D. Marshall, and P.J. Cook, "Field Investigation of the Drift Shadow," International High-Level Radioactive Waste Management Conference 2006, Las Vegas, Nevada, April 30 - May 4, 2006 LBNL-59455

Salve, R. and **T.J. Kneafsey**, "Microclimate Dynamics in a Non-Ventilated Drift at Yucca Mountain," International High-Level Radioactive Waste Management Conference 2006, Las Vegas, Nevada, April 30 - May 4, 2006

Kneafsey, T.J., L. Tomutsa, G.J. Moridis, C.E. Taylor, and A. Gupta, "Methane Hydrate Formation and Dissociation in a Partially Saturated Sand – Measurements and Observations," Fifth International Conference on Gas Hydrates, Trondheim, Norway, June 2005, LBNL 56379 Abs

Kneafsey, T.J., Moridis, G., Freifeld, B., Tomutsa, L., Seol, Y. and Taylor, C.E., 2005. Understanding Methane Hydrate Behavior Using X-ray Computed Tomography, Fire in the Ice, The National Energy Technology Laboratory Methane Hydrate Newsletter, pp. 1-4 LBNL/PUB-926

Moridis, G.J., Seol, Y. and **Kneafsey, T.J.**, 2005. Studies of reaction kinetics of methane hydrate dissociation in porous media, Fifth International Conference on Gas Hydrates (ICGH 5), Trondheim, Norway, LBNL-57298.

Gupta, A., E.D. Sloan, **T.J. Kneafsey**, L. Tomutsa, G. Moridis, "Modeling methane hydrate dissociation x-ray CT data using a heat transfer model," Fifth International Conference on Gas Hydrates, Trondheim, Norway, June 2005

Kneafsey, T.J., Tomutsa, L., Taylor, C.E., Gupta, A., Moridis, G., Freifeld, B. and Seol, Y., 2005. Methane hydrate formation and dissociation in a partially saturated sand, The 229th ACS National Meeting, San Diego, CA, LBNL-56933 Ext. Abs.

Spycher, N., Sonnenthal, E., **Kneafsey, T.** and P. Dobson, "An integrated approach to predict coupled processes at a nuclear waste repository," 11th Annual Symposium on Water-Rock Interaction, Sarasota Springs, NY, June 25 – July 2, 2004, LBNL-55099 Ext. Abs.

Freifeld, B.M., **T.J. Kneafsey**, L. Tomutsa, L.A. Stern, and S.H. Kirby, "Use of X-Ray Computed Tomographic Data for Analyzing the Thermodynamics of a Dissociating Porous Sand/Hydrate Mixture," Proceedings of the Fourth International Conference on Gas Hydrates, Yokohama, May 19-23, 2002, pp. 750-755, LBNL-49859

Tomutsa, L., B. Freifeld, **T.J. Kneafsey**, and L.A. Stern, "X-ray Computed Tomography Observation of Methane Hydrate Dissociation," SPE Gas Technology Symposium held in Calgary, Alberta, Canada, 30 April–2 May 2002, SPE 75533, LBNL 49580

Kneafsey, T.J., J.A. Apps, and E.L. Sonnenthal, "Tuff Dissolution and Precipitation in a Boiling, Unsaturated Fracture," 2001 International High-Level Radioactive Waste Management Conference, Las Vegas, Nevada, April 29-May 3, 2001, LBNL 46149

Dobson, P., J. Hulen, **T.J. Kneafsey**, and A. Simmons, "Permeability at Yellowstone: A Natural Analog for Yucca Mountain Processes," 2001 International High-Level Radioactive Waste Management Conference, Las Vegas, Nevada, April 29-May 3, 2001, LBNL 47051

Dobson, P., J. Hulen, **T.J. Kneafsey**, and A. Simmons, "The Role of Lithology and Alteration on Permeability and Fluid Flow in the Yellowstone Geothermal System, Wyoming," Proceedings, Twenty-Sixth Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 29-31, 2001, SGP-TR-168, LBNL-47129

Kneafsey, T.J. and K. Pruess, "Vaporizing Flow in Hot Fractures: Observations from Laboratory Experiments," Proceedings, Dynamics of Fluids in Fractured Rocks, Concepts and Recent Advances, February 10 - 12, 1999, Lawrence Berkeley National Laboratory, Berkeley, California, LBNL-42292

Kneafsey, T.J. and J.J. Roberts, "Water Flow, Imbibition, and Mineral Precipitation in a Boiling Tuff Fracture - Experimental Results," Field Testing and Associated Modeling of Potential High-Level Nuclear Waste Geologic Disposal Sites, December 11, 1998, Lawrence Berkeley National Laboratory, Berkeley, California

Kneafsey, T.J. and K. Pruess, "Thermohydrological Laboratory Tests - Insights into Processes and Behavior," Eighth International Conference on High-Level Radioactive Waste Management, May 11 - 14, 1998, Las Vegas, Nevada

PRESENTATIONS
*Invited indicated with **

S. Nakagawa, **T. J. Kneafsey**, S. E. Borglin, Laboratory Visualization of Hydraulic Fracture Propagation and Interaction with a Network of Preexisting Fractures, 2015 AGU Fall Meeting, San Francisco CA, December 14-18, 2015

N. Raz Yaseef, M. S. Torn, D. P. Billesbach, Y. Wu, **T. J. Kneafsey**, V. E. Romanovsky, D. R. Cook, R. Commane, J. Henderson, C. E. Miller, S. D. Wullschleger, Multi-scale Evidence of Large CO_2 and CH_4 Emissions from Permafrost During Spring Thaw in Northern Alaska, 2015 AGU Fall Meeting, San Francisco CA, December 14-18, 2015

C. Ulrich, B. Dafflon, Y. Wu, **T. J. Kneafsey**, R. D. López, J. Peterson, S. S. Hubbard, Lab-Scale Investigation of Multi-dimensional Relationships between Soil Intrinsic Properties to Improve Estimation of Soil Organic and Ice Content using Novel Core Imaging and Geophysical Techniques in Arctic Tundra, 2015 AGU Fall Meeting, San Francisco CA, December 14-18, 2015

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