

REFERENCES

REFERENCES

- Abdul, A.S., S.F. Kia, and T.L. Gibson, 1989. Limitations of monitoring wells for the detection and quantification of petroleum products in soils and aquifers, *Ground Water Monitoring Review*, 9(2):90-99.
- Aller, L., T.W. Bennett, G. Hackett, R.J. Petty, J.H. Lehr, H.Sedoris, D.M. Nielsen, and J.E. Denne, 1989. Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells, NWWA, Dublin, OH.
- Anderson, W.G., 1986a. Wettability literature survey–Part 1: Rock/oil/brine interactions, and the effects of core handling on wettability, *Journal of Petroleum Technology*, October, pp.1125-1149.
- Anderson, W.G., 1986b. Wettability literature survey–Part 2: Rock/oil/brine interactions, and the effects of core handling on wettability, *Journal of Petroleum Technology*, November, pp. 1453-1468.
- Anderson, W.G., 1986c. Wettability literature survey–Part 3: Rock/oil/brine interactions, and the effects of core handling on wettability, *Journal of Petroleum Technology*, December, pp.1371-1378.
- Anderson, W.G., 1987a. Wettability literature survey–Part 4: Rock/oil/brine interactions, and the effects of core handling on wettability, *Journal of Petroleum Technology*, October, pp.1283-1300.
- Anderson, W.G., 1987b. Wettability literature survey–Part 5: Rock/oil/brine interactions, and the effects of core handling on wettability, *Journal of Petroleum Technology*, November, pp.1453-1468.
- Anderson, W.G., 1987c. Wettability literature survey–Part 6: Rock/oil/brine interactions, and the effects of core handling on wettability, *Journal of Petroleum Technology*, December, pp.1605-1622.

- API, 1989. *A Guide to the Assessment and Remediation of Underground Petroleum Releases*, 2nd Edition, API Publication 1628, Washington, D.C.
- API, 1996. *A Guide to the Assessment and Remediation of Underground Petroleum Releases*, 3rd Edition, API Publication 1628, Washington, D.C.
- ASTM, 1995. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*, E 1739-95, Annual Book of ASTM Standards, Philadelphia, Pennsylvania.
- Baker, R.S., and J. Bierschenk, 1995. Vacuum-enhanced recovery of water and NAPL: Concept and field test, *Journal of Soil Contamination*, 4(1):57-76.
- Ballesterro, T.P., F.R. Fiedler and N.E. Kinner, 1994. An investigation of the relationship between actual and apparent gasoline thickness in a uniform sand aquifer, *Ground Water*, 32(5):708-718.
- Bear, J., 1972. *Dynamics of Fluids in Porous Media*, American Elsevier Publishing Company, Inc., New York.
- Blake, S.B. and R.A. Hall, 1984. Monitoring petroleum spills with wells: some problems and solutions, *Proceedings, Fourth National Symposium on Aquifer Restoration and Groundwater Monitoring*, National Water Well Association, Columbus, OH, pp. 305-310.
- Busby, R.D., R.J. Lenhard, and D.E. Rolston 1995 An investigation of saturation-capillary pressure relations in two- and three-fluid systems for several NAPLs in different porous media, *Ground Water*, 33(4):570-578.
- Cary, J.W., J.F. McBride, and C.S. Simmons, 1991. Assay of organic liquid contents in predominantly water-wet unconsolidated porous media, *Journal of Contaminant Hydrology*, No. 8, pp. 135-142.
- Charbeneau, R.J. and C.Y. Chiang, 1995. Estimation of free-hydrocarbon recovery from dual-pump systems, *Ground Water*, 33(4):627-634.

- Chouke, R.L., P. Van Meurs, and C. Van der Poel, 1959. The instability of slow, immiscible, viscous liquid-liquid displacements in permeable media, *Petrol. Trans. AIME*, 216:188-194.
- Cohen, R.M., A.P. Bryda, S.T. Shaw, and C.P. Spalding, 1992. Evaluation of visual methods to detect NAPL in soil and water, *Ground Water Monitoring Review*, 12(4):132-141.
- Cohen, R.M., and J.W. Mercer, 1993. *DNAPL Site Evaluation*, CRC Press, Boca Raton, FL.
- Cole, G.M., 1994. *Assessment and Remediation of Petroleum Contaminated Sites*, Lewis Publishers, CRC Press, Boca Raton, FL, 360p.
- Corey, A.T., C.H. Rathjens, J.H. Henderson and M.R.J. Wyllie, 1956. Three-phase relative permeability, *Society of Petroleum Engineering Journal*, 207:349-351.
- Demond, A.H. and P.V. Roberts, 1987. An examination of relative permeability relations for two-phase flow in porous media, *Water Resources Bulletin*, 23(4):617-628.
- de Pastrovich, T.L., Y. Baradat, R. Barthel, A. Chiarelli, and D.R. Fussell, 1979. Protection of ground water from oil pollution, CONCAWE, The Hague, Netherlands.
- Driscoll, F.G., 1986. *Groundwater and Wells*, Johnson Division, St. Paul, MN.
- Durnford, D., J. Brookman, J. Billica and J. Milligan, 1991. LNAPL distribution in a cohesionless soil: A field investigation and cryogenic sampler, *Ground Water Monitoring Review*, 11(3):115-122.
- Eastcott, L., W.Y. Shin, and K. Mackay, 1988. Environmentally relevant physical-chemical properties of hydrocarbons: A review of data and development of simple correlations, *Oil and Chemical Pollution*, 4(3):191-216.
- El-Kadi, A.I., 1992. Applicability of sharp-interface models for NAPL transport: 1. infiltration, *Ground Water*, 30(6):849-856.

- El-Kadi, A.I., 1994. Applicability of sharp-interface models for NAPL transport: 2. spreading of an LNAPL, *Ground Water*, 32(5):784-795.
- EPA, 1990. *Assessing UST Corrective Action Technologies: Early Screening of Cleanup Technologies for the Saturated Zone*, EPA/600/2-90/027, Risk Reduction Engineering Laboratory.
- EPA, 1992. Filter canisters: A new method for recovering free product, EPA-510-8-92-002, Office of Solid Waste and Emergency Response, Washington, D.C.
- EPA, 1993. *Subsurface Characterization and Monitoring Techniques*, Volume 1, Solids and Groundwater, EPA/625/R-93/003a.
- EPA, 1995. OSWER Directive 9610.17: Use of Risk-Based Decision-Making in UST Corrective Action Programs, Office of Underground Storage Tanks.
- EPA, 1995. *How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers*, Office of Underground Storage Tanks, EPA 510-B-95-007.
- Farr, A.M., R.J. Houghtalen and D.B. McWhorter, 1990. Volume estimation of light nonaqueous phase liquids in porous media, *Ground Water*, 28(1):48-56.
- Faust, C.R., J.H. Guswa, and J.W. Mercer, 1989. Simulation of three-dimensional flow of immiscible fluids within and below the saturated zone, *Water Resources Research*, 25(12):2449-2464.
- Freeze, R.A. and J.A. Cherry, 1979. *Ground Water*, Prentice-Hall, Inc., Englewood Cliffs, NJ.
- Frick, T., ed., 1962. *Petroleum Production Handbook, 2nd ed.*, Society of Petroleum Engineers of AIME, Dallas, TX.
- Gruszczenski, T.S., 1987. Determination of a realistic estimate of the actual formation product thickness using monitor wells: A field bailout test, *Proceedings Conference on Petroleum Hydrocarbons*

and Organic Chemicals in Ground Water - Prevention, Detection, and Restoration, National Ground Water Association, Dublin, OH, pp. 300-304.

- Hall, R.A., S.B. Blake, and S.C. Champlin, Jr., 1984. Determination of hydrocarbon thickness in sediments using borehole data, *Proceedings, Fourth National Symposium on Aquifer Restoration and Groundwater Monitoring*, National Water Well Association, Columbus, OH, pp.300-304.
- Hampton, D.R. and P.D.G. Miller, 1988. Laboratory investigation of the relationship between actual and apparent product thickness in sands, *Proceedings Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water - Prevention, Detection, and Restoration*, National Ground Water Association, Dublin, OH, pp. 157-181.
- Hampton, D.R. and H.G. Heuvelhorst, 1990. Designing gravel packs to improve separate-phase hydrocarbon recovery laboratory experiments, *Proceedings Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water - Prevention, Detection, and Restoration*, National Ground Water Association, Dublin, OH.
- Hampton, D.R., T.R. Barrett, H.S. Nayyar, T.P. O'Connell, 1992. Hydrophobic gravel packs for product monitoring and recovery wells, *Proceedings National Outdoor Action Conference*, National Ground Water Association, Dublin, OH. pp. 581-595.
- Hampton, D.R., 1993. Improving monitoring and recovery of fluids immiscible in groundwater, in *Environmental Impact of Industrial Activities, Proceedings of Industrial and Agricultural Impacts on the Hydrologic Environment*. The 2nd USA/CIS Conference on Environmental Hydrology and Hydrogeology; Water Environment Federation, Alexandria, VA, pp. 111-125.
- Homsy, G.M., 1987. Viscous fingering in porous media, *Annual Review of Fluid Mechanics*, 19:271-311.
- Hughes, J.P., C.R. Sullivan, and R.E. Zinner, 1988. Two techniques for determining the true hydrocarbon thickness in an unconfined sandy aquifer, *Proceedings Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water - Prevention, Detection, and*

Restoration, National Ground Water Association, Dublin, OH, pp. 291-314.

- Huntley, D., R.N. Hawk, and H.P. Corely, 1992. Non-aqueous phase hydrocarbon saturations and mobility in a fine grained, poorly consolidated sandstone, *Proceedings Conference Petroleum Hydrocarbons and Organic Chemicals in Groundwater*, November, NGWA, Houston, TX.
- Kaluarachchi, J.J. and J.C. Parker, 1989. An efficient finite element model for modeling multiphase flow in porous media, *Water Resources Research*, 25(1):43-54.
- Kaluarachchi, J.J., J.C. Parker, and R.J. Lenhard, 1990. A numerical model for areal migration of water and light hydrocarbon in unconfined aquifers, *Advances in Water Resources*, 13:29-40.
- Katyal, A.K., J.J. Kaluarachchi, and J.C. Parker, 1991. MOFAT: A two-dimensional finite element program for multiphase flow and multicomponent transport, program documentation and user's guide, EPA-600/2-91-020, U.S. EPA/ORD Robert S. Kerr Environmental Research Laboratory, Ada, OK.
- Kemblowski, M.W. and C.Y. Chiang, 1990. Hydrocarbon thickness fluctuations in monitoring wells, *Ground Water*, 28(2):244-252.
- Kittel, J.A., R.E. Hinchey, R. Hoepfel, and R. Miller, 1994. Bioslurping - vacuum enhanced free product recovery coupled with bioventing: A case study, *Petroleum Hydrocarbons and Organic Chemicals in Groundwater: Prevention, Detection, and Remediation*, 1994 NGWA Conference Proceedings, Houston, TX.
- Lenhard, R.J. and J.C. Parker, 1987. A model for hysteretic constitutive relations governing multiphase flow 2. permeability-saturation relations, *Water Resources Research*, 23(12):2197-2206.
- Lenhard, R.J. and J.C. Parker, 1990. Estimation of free hydrocarbon volume from fluid levels in monitoring wells, *Ground Water*, 28(1):57-67.
- Lenhard, R.J., 1992. Measurement and modeling of three-phase saturation-pressure hysteresis, *Journal of Contaminant Hydrology*, 9(1992):243-269.

- Luckner, C.A., M.T. van Genuchten and D.R. Nielsen, 1989. A consistent set of parametric models for two-phase flow of immiscible fluids in the subsurface, *Water Resources Research*, 25(10):2187-2193.
- Lundy, D.A. and A.J. Gogel, 1988. Capabilities and limitations of wells for detecting and monitoring liquid phase hydrocarbons, *Second National Symposium on Aquifer Restoration, Ground Water Monitoring and Geophysical Methods*, National Water Well Association, Las Vegas, NV, pp. 23-25.
- Lyman, W.J., W.F. Reehl and D.H. Rosenblatt, 1982. *Handbook of Chemical Property Estimation Methods*, Environmental Behaviour of Organic Compounds, McGraw-Hill Book Co., New York.
- McDonald, H.G. and A.W. Harbaugh, 1984. A Modular Three-Dimensional Finite-Difference Groundwater Flow Model, United States Geological Survey, Reston, VA.
- McWhorter, D., and D.K. Sunada, 1977. *Ground-Water Hydrology and Hydraulics*, Water Resources Publications. Fort Collins, CO.
- Mercer, J.W., and R.M. Cohen, 1990. A review of immiscible fluids in the subsurface: Properties, models, characterization, and remediation, *Journal of Contaminant Hydrology*, 6:107-163.
- Mishra, A., J.C. Parker, and N. Singhal, 1989. Estimation of soil hydraulic properties and their uncertainty from particle size distribution data, *Journal of Hydrology*, 108:1-18.
- Morris, D.A. and A.I. Johnson, 1967. Summary of hydrologic and physical properties of rock and soil materials as analyzed by the hydrologic laboratory of the U.S. Geological Survey, U.S. Geological Survey Water Supply Paper, 1839-D.
- Mualem, Y., 1976. A new model for predicting the hydraulic conductivity of unsaturated porous media, *Water Resources Research*, 12(3):513-522.
- Newell, C.J., S.D. Acree, R.R. Ross, and S.G. Huling, 1995. *Light Non-aqueous Phase Liquids*, USEPA/ORD Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma, EPA-540-5-95-500.

- Peargin, T., 1995. Vacuum-enhanced recovery: theory, *Underground Tank Technology Update*, 9(4):2-7.
- Robbins, G.A., B.E. McAninch, F.M. Gavas, and P.M. Ellis, 1995. An Evaluation of Soil-Gas Surveying for H₂S for Locating Subsurface Hydrocarbon Contamination. *Groundwater Monitoring and Remediation*, 15(1):124-132.
- Schiegg, H.O., 1985. Considerations on water, oil, and air in porous media, *Water Science and Technology*, 17:467-476.
- Schowalter, T.T., 1979. Mechanics of secondary hydrocarbon migration and entrapment, *The American Association of Petroleum Geologists Bulletin*, 63(5):723-760.
- Schwille, F., 1988. *Dense Chlorinated Solvents in Porous and Fractured Media*, Lewis Publishers, Chelsea, MI.
- Senn, R.B. and M.S. Johnson, 1987. Interpretation of gas chromatographic data in subsurface hydrocarbon investigations, *Ground Water Monitoring Review*, 7(1):58-63.
- Snell, R.W., 1962. Three-phase relative permeability in an unconsolidated sand, *Journal of Inst. Petroleum*, 84:80-88.
- Strack, O.D.L., 1994. Modeling capture zones of groundwater well, using analytic elements. CZAEM User's Guide. EPA/600/R-94/174, U.S. EPA/ORD, Robert S. Kerr Environmental Research Laboratory, Ada, OK.
- Wagner, R.B., D.R. Hampton, and J.A. Howell, 1989. A new tool to determine the actual thickness of free product in a shallow aquifer, *Proceedings Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water*, November, Houston, TX, NWWA/API, pp. 45-59.
- Weaver, J.W., R.J. Charbeneau, J.K. Tauxe, B.K. Lien, and J.B. Provost, 1994. *The Hydrocarbon Spill Screening Model (HSSM) Volume 1: User's Guide*, U.S. EPA, EPA/600/R-94/039a.

- Wilson, S. and R. Brown, 1989. In-situ bioreclamation: A cost-effective technology to remediate subsurface organic contamination, *Ground Water Monitoring Review*, 9(1):173-179.
- Wilson, J.L., S.H. Conrad, W.R. Mason, W. Peplinski and E. Hagen, 1990. Laboratory investigation of residual liquid organics, U.S. EPA/600/6-90/004. Robert S. Kerr Environmental Research Laboratory, Ada, OK.