

JOHN J. MAHONEY, Ph.D.
PRINCIPAL GEOCHEMIST
MAHONEY GEOCHEMICAL CONSULTING LLC

892 S. Newcombe Way
Lakewood, CO 80226
jmahoney@mahoneygeochem.com
phone 303 986 7643
cell 720 224 3292
www.mahoneygeochem.com

EDUCATION

Ph.D., Geochemistry, Colorado School of Mines, Golden, Colorado, 1989

M.A., Geology, Boston University, Boston, Massachusetts, 1977

B.A., Geology, Boston University, Boston, Massachusetts, 1975

SUMMARY

Dr. John Mahoney is Principal Geochemist with Mahoney Geochemical Consulting LLC. Dr. Mahoney specializes in Aqueous Environmental Geochemistry and hydrogeochemical modeling as applied to industrial and mining related projects. He has conducted detailed studies and geochemical modeling for various mining operations (North America, South America, Indonesia, Tanzania, Botswana and South Africa) and for contaminated sites (fuels spills, chlorinated solvents and metals) primarily in the Western United States. Recently he prepared pit lake models for active and partially filled open pits for two different gold mining operations in Tanzania. He is also developing hydrogeochemical and transport models to evaluate issues associated with the in-situ recovery of uranium, the subsequent restoration of these zones, and discharge of process waters via deep disposal wells. Many of these projects involve detailed geochemical modeling using programs such as PHREEQC, PhreePlot, HYDRA/MEDUSA, PHAST for Windows and Geochemist's Workbench.

He conducted detailed laboratory testing and geochemical modeling to reduce the concentrations of soluble arsenic at a tailings management facility for a uranium mine in Saskatchewan. In support of the licensing of the Midwest Uranium Project he performed laboratory testing to develop reducing conditions to manage arsenic in waste rock. He also developed a testing procedure to evaluate the proportion of readily releasable arsenic in uranium mill tailings. Performed geochemical modeling, using PHREEQC, to identify possible phases that could control dissolved uranium concentrations in a uranium tailings facility. Evaluated mobility of uranium and other chemicals from backfill emplaced in underground workings for an underground mine in the Ambrosia Lake District, New Mexico.

Other work has included predicting the chemical composition of pit lakes in open pit mines in Nevada and Africa (gold mines), Canada (proposed nickel mine and several proposed diamond mines) and South America (copper mines), and predicting the composition of discharges for a copper mine in Indonesia.

He recently participated in design and evaluation of a stabilization testing program for arsenic trioxide waste for a gold mine in Ghana. Data analysis included review of TCLP results for ferric arsenate

precipitation and cement stabilization testing programs. Data evaluation included modeling of results using PHREEQC and PhreePlot.

He was involved in modeling the chemical composition of discharges from a proposed block cave copper mine in Arizona. Other project activities included geochemical modeling and design of remediation plan using reducing agents (molasses) for an open pit uranium mine in New Mexico; development of a kinetic based leaching model for in-situ recovery of uranium. Performed waste rock and tailings characterization for copper mines in Peru, evaluated the need for tailings pond liner for a mine in Brazil.

Dr. Mahoney recently organized and led numerous short courses on Introduction to Geochemical Modeling Tools: Equilibrium and Transport Applications. These courses were held in November 2010, June 2011, April and October 2012, and May 2013, April 2014, May 2015, April 2016, August 2016, May 2017, and April 2018. Present an advanced course in August 2016 in Kingsville, Texas (Texas A&M campus). He presented the introductory course for staff members of a consulting firm in South Africa (2011), for a uranium mining company in Saskatoon, Canada (2012, 2016 - advanced course) and for an oil sands extraction company in Calgary (2013). He has also presented this course in Sydney, Australia in December 2013.

As part of the 6th International Congress on Arsenic in the Environment (As2016) in Stockholm, Dr. Mahoney organized a three day short course on "Using PHREEQC and PhreePlot to Model Arsenic Geochemistry". This course was co-taught by Dr. Douglas Kent of the USGS, and was held on the Royal Institute of Technology (KTH) campus.

He also presents at conferences and has published numerous papers included a peer reviewed paper that corrected the surface complexation constants for uranium (as uranyl) adsorption onto hydrous ferric oxide. He continues to present his work at symposia throughout the world.

As part of the current USEPA required recertification program, Dr. Mahoney is a member of the USEPA team reviewing the performance assessment for the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico. Work is primarily related to reviewing estimated solubilities of plutonium, neptunium, americium and uranium. Reviewed a paper on the thermodynamics of plutonium.

ACADEMIC PARTICIPATION

As a collaborator for a Natural Sciences and Engineering Research Council of Canada (NSERC) grant on control of arsenic in mining wastes, presented course in geochemical modeling at Department of Mining, Metallurgy and Materials Engineering at McGill University, Montreal, Quebec, Canada (December 2002). Work was directed by Dr. George Demopoulos. Attended annual project review meetings and co-authored papers with the group.

Instructor (one of three) in Short Course on Environmental Geochemistry and Geochemical Modeling (May 2006, May 2008) at the University of Alberta (Edmonton).

In May 2017, Dr. Mahoney served as External Examiner for the Ph.D. dissertation defense for Jared Robertson for the Department of Geological Sciences at the University of Saskatchewan, Saskatoon, Saskatchewan. Title "Geochemical Characteristics of Aluminum and Magnesium Secondary Mineral Phases in Uranium Mill Tailings."

In 2018, Dr. Mahoney served as an Affiliate Doctoral Member in the Environmental Engineering Department at Texas A&M University at Kingsville to serve as committee member for Nima

Ghahremani, Ph.D. Candidate. Title “Assessment of Chemistries and Geochemical Reactions for Alternative Hydraulic Fracturing Water Supplies and Produced Waters.”

Examiner for the Ph.D. thesis of Ohene Karikari-Yeboah titled “Effects of surcharge on the redox dynamics of pyritic sediment” - University of South Australia, Adelaide.

EXPERIENCE

Principal Geochemist, Mahoney Geochemical Consulting LLC - September 2009 to Present

Conducted geochemical modeling and statistical evaluation of lead, zinc and copper data in river water for a litigation driven project. Evaluated acid rock drainage issues and issues related to trace metal mobility in tailings and waste rock at gold mines in Brazil. Selected samples for acid base accounting and subsequent humidity cell tests, reviewed data and evaluated the nature and source of arsenic in mine wastes (gold and arsenic smelter) for a proposed gold mine in Mexico. Modeled reactions (describing uranium dissolution and sorption) between uranium and bicarbonate in a uranium mill tailings management facility in Canada. Prepared a model to assess mobility of uranium and other trace metals in a fen in northern Saskatchewan, Canada; discharge area for Cluff Lake Uranium Mill.

Prepared reactive transport models to assist in the evaluation of the use of steel making slags produced in Brazil as fill for embankments, roads and pathways.

Prepared specifications for a laboratory testing program related to ferric arsenate precipitation to stabilize arsenic trioxide wastes for a large gold mine in Ghana. Reviewed data for these tests and other testing options; conducted modeling using PHREEQC and PhreePlot to evaluate cement stabilization methods.

Served as a consultant to USEPA Region 10 as a reviewer of the geochemical conditions related to expansion at the Thompson Creek Mine in Idaho; work included a review of stability constants for molybdenum bearing minerals and geochemical modeling, review of treatment systems, and the pit lake composition. This was done as part of the USEPA’s NEPA review of the proposed mine expansion. Contracted through Sanford Cohen and Associates and served as a consultant to USEPA (Washington, DC) on geochemical issues related to revisions to 40 CFR part 192 - long term groundwater stability of in-situ recovery of uranium operations.

Evaluated the behavior of mine discharge waters for an underground mine near Triumph, Idaho. Prepared a pit lake model for an open pit gold mine in Botswana, and prepared a series of pit lake models for open pit mines in Tanzania. Prepared a pit lake model for a gold mine in western Tanzania (separate client). Prepared a pit lake model to evaluate fate of arsenic in a pit lake for a gold mine in Ghana.

Recently completed projects include: As part of a revision to an Alternative Concentration Limit (ACL) application updated a PHREEQC based geochemical transport model for a uranium tailings facility in Wyoming. Conducted geochemical modeling and data evaluation to optimize tailings performance and minimize releases of metals (U, Mo, Se) for a proposed uranium mine in Northern Canada (Nunavut). Conducting a review of groundwater samples results to fingerprint, classify and then estimate background concentrations for a proposed in-situ recovery uranium mine in

Wyoming. Performed geochemical modeling to evaluate treatment options for deep well injection of waters associated with uranium in-situ recovery operations.

Modeled mobility of uranium, radium and thorium to determine source term concentrations in a landfill in the St. Louis Area associated with uranium wastes from the Manhattan Project.

Currently preparing a PHREEQC based surface water discharge for a uranium mill in the Athabasca Basin in Saskatchewan, Canada. The current version of this model uses a GoldSim based water balance that provides the mixing parameters for the PHREEQC model calculations.

Performed geochemical modeling related to hexavalent chromium and arsenic for an aquifer recharge and storage project in California; performed similar review for another site in California.

Provides geochemical modeling support related to Steam Assisted Gravity Drainage (SAGD) operations (heavy oil, bitumen, recovery) in Alberta, Canada. Work was primarily related to modeling and assessing nature and extent of mineral precipitation reactions in well liners and in the bitumen bearing formations.

Conducted geochemical review of conditions and operations at an in-situ recovery operation for a uranium mine in Wyoming. Assessed geochemical conditions at another in-situ recovery operation to assess migration of uranium from an operating mine unit.

As part of a due diligence evaluation reviewed conditions for a proposed in-situ recovery operation for proposed copper mine in Arizona.

**Principal Geochemist, MWH Americas, Inc. Denver and Steamboat Springs, CO -
September 2006 to September 2009**

Conducted geochemical characterization (waste rock and tailings) and pit lake studies for various mines in Peru.

Evaluated the fate of uranium for a former open pit mine in New Mexico and developed a microcosm testing plan to evaluate the remediation of the pit lake through addition of an organic substrate. Prepared geochemical models to evaluate redox reactions and estimate initial amounts of reductant required.

Designed and conducted laboratory tests to control arsenic concentrations in waste rock by developing reducing conditions through addition of organic substances to a uranium mine pit lake. Prepared detailed tech memo summarizing the geochemical behavior of arsenic for a copper mining operation in the western United States. Evaluated the behavior of barium in tailings and developed possible treatment option for a mine in Brazil.

Evaluated geochemical reactions to update analytical parameter list at the landfills of an Air Force Base in Michigan; performed geochemical modeling to evaluate the proposed lead treatment option at a shooting range for an Air Force Base in Missouri. Designed a laboratory characterization program to measure concentration of hydrous ferric oxide to evaluate uranium mobility and extent of sorption in sandstones beneath a tailings facility in Utah.

Other projects while at MWH:

Resolution Copper Mining Limited, Superior Arizona

Developed conceptual geochemical model to predict the chemical composition of discharge of waters from a proposed block cave mining operation. Work involved review of geochemical conditions, sample selection and evaluation of rock testing program results.

Waste Isolation Pilot Plant (WIPP) Carlsbad, New Mexico

As part of the USEPA's Review Team conducted geochemical modeling using EQ3NR/EQ6 to assess reactions related to the breakdown on cellulose, rubber and plastics in the repository, and to determine if methods to control the pH from these reactions were acceptable. Reactions occur in high ionic strength solutions, and required Pitzer Equation models. Work was designed to verify assumptions related to conceptual models related to the chemical aspects of the repository.

Carson Hill Gold Mine, Angels Falls, California

Directed a geochemical characterization program to demonstrate that material in waste rock dumps was not a source of sulfate and therefore should not be classified as a Group B material. Used geochemical modeling to identify reactions that controlled the release of sulfate from the former leach pads. As part of the detailed hydrogeologic characterization performed additional model and fingerprinting of waters from the site. Designed and directed waste characterization testing involving standard humidity cell tests and specialized barrel scale tests; presented results to California Regional Water Quality Board.

Senior Geochemist, Hydrologic Consultants Inc. Lakewood, CO - December 1991 to September 2006. (List of Selected Projects)

McClean Lake Operation in the Athabasca Basin (Saskatchewan), Canada

Performed detailed laboratory studies on the neutralization of uranium mill raffinates, data evaluation and geochemical modeling to evaluate treatment options to reduce arsenic concentrations in pore waters in uranium mill tailings for the McClean Lake Operation (originally COGEMA Resources Inc., AREVA Resources, Inc.) in Saskatchewan. Designed and reviewed tests used to evaluate long term performance of arsenic retention in the JEB Tailings Management Facility (TMF). Evaluated annual sampling results and performed geochemical modeling to assess performance of JEB TMF. Participated in Joint Federal and Provincial Public Hearings for Midwest Project (Panel Review).

Environment Public Authority, State of Kuwait

Served on a panel of experts for the Chairman of the Board and Director General of the Environment Public Authority, State of Kuwait. The panel evaluated the origin, distribution and impacts of hydrogen sulfide gas in ground water in Kuwait City.

New Mexico Environmental Department (Ground Water Division)

Served as the state-selected third-party reviewer for the New Mexico Environmental Department (Ground Water Division). Work involved evaluating hydrologic and geochemical models to predict long-term impacts to ground water from pit lakes from three open pit copper mines in southwestern New Mexico.

Bureau of Land Management, Yarnell Gold Mine, Arizona

Participated in third party review of proposed Yarnell Gold Mine in Arizona. Prepared sections for Environmental Impact Statement (EIS) for Bureau of Land Management. Completed detailed appendix describing chemical fate and behavior of cyanide in gold mining operations. Assessed adequacy of waste rock sampling, prepared responses to public comments.

Echo Bay Minerals, McCoy and Cove Mine, Battle Mountain, Nevada

Performed predictive geochemical modeling to predict the chemical composition of the Cove Pit Lake. Work employed evaluation of testing results, coordination with groundwater modeling results, and geochemical modeling using PHREEQC. Work also evaluated impact to pit lake if waste rock was disposed into the pit lake.

Other

- Used geochemical modeling techniques and field analytical methods to assess the fate of iron, barium and manganese in discharge waters from coal-bed methane operation in the Powder River Basin, Wyoming. Predicted impact of coal-bed methane discharge waters on the sodium adsorption ratio (SAR) of rivers in Wyoming.
- Course Organizer and Lead Instructor for the Short Course Introduction to Geochemical Modeling Tools held at the Fifth International Conference on Acid Rock Drainage (ICARD 2000), Denver CO.
- Used geochemical modeling methods to predict the chemical concentrations of mine discharge waters from a copper mine in Irian Jaya (now West Papua), Indonesia. Work was in support of an Environmental Risk Assessment to evaluate impacts to rivers in the area. Instructed mine Hydrology Staff in geochemical methods as they pertain to fingerprinting and identifying sources of ground water and to improving the capture of acid rock drainage. Modeled acid mine drainage potential from gold mines using the geochemical codes *PHREEQE*, and *MINTEQA2*. Used diffuse-layer adsorption model to predict metal availability in surface waters. Conducted intensive (week long) training sessions to Staff of Environmental Department in Environmental Geochemistry as Applied to Mining (2002), and Geochemical Modeling (2005, and 2007 while at MWH).

Senior Scientist (Geochemist), Geraghty and Miller, Inc., Denver - February 1988 to November 1991. Coordinated laboratory analyses, interpreted and evaluated data involving contamination of soil and ground water by inorganic and organic substances, and modeled fate of contaminants. Conducted field analyses with portable gas chromatograph and trained others in its use. Designed and supervised soil-vapor surveys at numerous sites in the western U.S. As Western Regional Quality Assurance Officer conducted performance evaluation audits at environmental laboratories and supervised data validation efforts. Applied geostatistical methods to various environmental problems. Evaluated geochemical conditions related to mobility of uranium and other metals at uranium mill tailings sites (UMTRA) in Colorado and Texas. Served on Peer Review Team to evaluate proposed remedial design for the Gunnison, Colorado DOE UMTRA Project Site.

Senior Research Scientist, Battelle Pacific Northwest Laboratory, Chemical Systems Analysis Section, Richland, Washington, - December 1985 to January 1988. Evaluated analytical results from Hydrothermal Testing Program of Basalt Waste Isolation Program (BWIP) and used various geochemical computer codes to determine interactions between spent nuclear fuel, water and rock, and to predict fate of uranium, plutonium and other radionuclides in waste-package environment. Modeled degradation of uranium-doped glasses to estimate rate of uranium release into the environment. Compared PHREEQE, EQ3NR/EQ6 and MINTEQ on problems related to Aquifer Thermal Energy Storage. Evaluated the solubility of plutonium in brines. Researched kinetics of sulfate reduction by hydrogen gas and impacts to the proposed nuclear waste repository (Salt Repository Project, Texas). Qualified as fissile material handler. Held DOE L and Q clearances.

Teaching/Research Assistant, Colorado School of Mines, Department of Chemistry and Geochemistry, Golden, Colorado, - August 1983 to November 1985. Research involved determination and modeling of aqueous species in solutions and ground waters to determine effect of high ionic strength solutions (brines) on cation adsorption on clays. Funded by Department of Energy Office of Nuclear Waste Isolation (OWNI) for proposed nuclear waste repository in salt.

Geologist and Manager of Quality Assurance, Weston Geophysical Corp., Westboro, Massachusetts, June 1977 to July 1983. Work involved applications of mineralogy, petrology, and geochemistry. Served as Site Geologist for Angra Nuclear Center in Brazil. Implemented corporate and client specific Quality Assurance Program complying with 10 CFR 50 Appendix B.

ORGANIZATIONS

American Chemical Society

PUBLICATIONS/PRESENTATIONS

- Ameur, Z. O., Kudrashou, V. Y., Nasr-El-Din, H. A., Forsyth, J. P. J., *Mahoney, J. J.*, & Daigle, B. J. (2015, April 13). Stimulation of High Temperature SAGD Producer Wells Using a Novel Chelating Agent (GLDA) and Subsequent Geochemical Modeling Using PHREEQC. Society of Petroleum Engineers. doi:10.2118/173774-MS
- Bird, D.A., and *Mahoney, J.J.*, 1994, Estimating post-mining pit lake geochemistry utilizing geochemical and numerical modeling: Reprint of paper presented at 1994 Annual Meeting of Society for Mining, Metallurgy, and Exploration, Albuquerque, New Mexico, 5 p.
- Bird, D.A., and *Mahoney, J.J.*, 2000, Hydrogeochemical tools to define sources of ground-water inflow to surface and underground mines: Proceedings of the XXX IAH Congress on Groundwater: Past Achievements and Future Challenges, Cape Town, South Africa, p. 1091-1097.
- Bohan, M.T., *Mahoney, J.J.* and Demopoulos, G.P. 2014. The synthesis and stability of yukonite: Implications in solid arsenical waste storage. *in* TMS Proceedings 2014, Rare Metal Extraction & Processing Symposium, San Diego, USA.
- Blanchard, P.E.R., Van Loon, L.L., Reid, J.W., Cutler, J.N., Rowson, J., Hughes, K.A., Brown, C.B., *Mahoney, J.J.*, Xu, L., Bohan, M., Demopoulos, G.P. 2017. Investigating arsenic speciation in the JEB Tailings Management Facility at McClean Lake, Saskatchewan using X-ray absorption spectroscopy. *Chemical Geology*, 2017, 466, 617-625.
- Burse, G.G., *Mahoney, J.J.*, Gale, J.E., Dignard, S.E., Napier, W., Reihm, D., and Downing, B., 1997, Approach used to model pit filling and pit lake chemistry on mine closure - Voisey's Bay, Labrador: Paper presented at Fourth International Conference on Acid Rock Drainage, Vancouver, B.C., Proceedings, vol. 1, p. 255-276.
- Coles, D.G., *Mahoney, J.J.*, and Burnell, J.R., 1986, Observations of selected actinide and fission product chemistry during basalt-repository waste-package hydrothermal experiments containing spent fuel: Paper presented at Northwest Section Meeting of American Chemical Society, Portland, Oregon.
- Duthe, D. M., *Mahoney, J.J.*, Shchipansky, A.A., and Terrell, C.L., 2011, Assessment of the Process of Pit Lake Formation and Associated Geochemistry in Open Pits – Mupane Gold Mine, Botswana. – In: Rude, R.T., Freund, A. and Wolkersdorfer, Ch.: Mine Water Managing the Changes. p. 511-515. Aachen, Germany.
- Emble, R.F., Walder, I.F., and Mahoney, J.J., 2018. Forsterite and pyrrhotite dissolution rates in a tailings deposit obtained from column leaching experiments and inverse modeling: A novel method for a mine tailings sample, *Applied Geochemistry*, 98, p. 65-74.

- Embile, R.F., Walder, I.F., and Mahoney, J.J., 2019. Multicomponent reactive transport modeling of effluent chemistry using locally obtained mineral dissolution rates of forsterite and pyrrhotite from a mine tailings deposit. *Advances in Water Resources*, 128, p. 87-96.
- Emerson, D., Bessler, J., Podolski, M., and Mahoney, J., 2006, Hydrogeologic Characterization of the Gahcho Kué Diamond Project. Presented at 59th Canadian Geotechnical Conference and 7th Joint CGS/IAH-CNC Groundwater Specialty Conference (seatoskygeo.ca), October 2006, Vancouver. Sea to Sky Geotechnique 2006, p. 1723-1728.
- Gard, M., and Mahoney, J., 2012. Evaluating the Effects of Uranium Kd on the Restoration of ISR Wellfields Using PHT3D. *Tailings and Mine Waste 2012*, October 2012. Keystone, CO. Colorado State University. p. 435-443.
- Guerin, F., Banton, N., Mahoney, J. and Newman, G. 2011. Uranium Tailings Management at AREVA Resources Canada, Part 2: the Kiggavik Project in Nunavut. Presented at 18th BC MEND Metal Leaching Workshop – Vancouver, BC. November 30, 2011.
- Howell, R.L., Ugorets V.I., and Mahoney, J.J., 2006, Challenges to Hydrogeologic Investigations in the Canadian North. Presented at 59th Canadian Geotechnical Conference and 7th Joint CGS/IAH-CNC Groundwater Specialty Conference (seatoskygeo.ca), October 2006, Vancouver. Sea to Sky Geotechnique 2006, p. 1608-1612.
- Jakubowski, R.T., Oliver, D.S., and Mahoney, J.J., 2008. Infiltration and contaminant transport modeling for a uranium mill tailings-disposal facility. *in* Merkel, B.J. and Hasche-Berger, A., eds., *Uranium, Mining and Hydrogeology*; Springer, Berlin, p. 259 – 260. (Uranium Mining and Hydrogeology Congress V, Freiberg, Germany - September 2008).
- Langmuir, D., and Mahoney, J.J., 1984, Chemical equilibrium and kinetics of geochemical processes in ground water studies: *in* Hitchon, B., and Wallick, E., eds., *Practical Applications of Ground Water Geochemistry*, National Water Well Association, Dublin, Ohio.
- Langmuir, D., and Mahoney, J.J., 1997, Geochemical controls on arsenic levels in some mine tailings and groundwaters associated with saturated zone tailings disposal: paper presented at International Symposium on Geology and the Environment GeoEnv '97, Istanbul, Turkey, September 1-5.
- Langmuir, D., Mahoney, J.J., MacDonald, A.K., and Rowson, J., 1999, Predicting the arsenic source-term from buried uranium mill tailings: *in* Proceedings of Tailings and Mine Waste '99, Fort Collins, Colorado, 503-514.
- Langmuir, D., Mahoney, J., MacDonald, A., and Rowson, J., 1999, Predicting arsenic concentrations in the porewaters of buried uranium mill tailings: *Geochimica et Cosmochimica Acta*, vol. 63, p. 3379-3394.
- Langmuir, D., Mahoney, J.J., Slaughter, M., and Rowson, J.W., 2002, Controlling arsenic concentrations in buried uranium mill tailings: *Goldschmidt Conference Abstracts 2002*, p. A430.
- Langmuir, D., Mahoney, J.J., and Rowson, J.W., 2002, Arsenic releases from buried uranium mill tailings at McClean Lake: Application of geochemical concepts and license approval by the Canadian Government: *Geological Society of America Annual Meeting*. Denver. Abstract 201-7.
- Langmuir, D., Mahoney, J., and Rowson, J., 2006, Solubility products of amorphous ferric arsenate and crystalline scorodite (FeAsO₄·2H₂O) and their application to arsenic behavior in buried mine tailings: *Geochimica et Cosmochimica Acta*, vol. 70, p. 2942-2956.
- Liu, H., Mahoney, J.J., and Langmuir, D., 2002, Further refinements of the Davis-Ritchie model of pyrite oxidation in geologic materials associated with mining. *Geological Society of America Annual Meeting*. Denver. Abstract 84-2.

- Mahoney, J.J.*, 1989, Adsorption of strontium on kaolinite and montmorillonite at high ionic strengths: Ph.D. Dissertation, Colorado School of Mines.
- Mahoney, J.J.*, 1998, Incorporation of coprecipitation reactions in predictive geochemical models: in Proceedings of Tailings and Mine Waste '98, Fort Collins, Colorado, p. 689-697.
- Mahoney, J.J.*, 2000, Geochemistry of Coal Bed Methane Discharge Waters - Powder River Basin, Wyoming. Presented at Office of Surface Mining Bond Release Forum, Billings, Montana, September, 2000.
- Mahoney, J.J.*, 2001, Coprecipitation reactions – verification of computational methods in geochemical models: in Mining Impacted Pit Lakes 2000 Workshop Proceedings: a Multimedia CD Presentation. (Workshop held April 4–6, 2000 Reno, NV) United States Environmental Protection Agency Office of Research and Development. EPA/625/C-00/004. Session 4.
- Mahoney, J.J.*, 2012, Importance of Database Evaluation in Modeling the Transport of Uranium. Presented at National Mining Association Nuclear Regulatory Commission (NMA\NRC) Uranium Recovery Workshop, May 2012, Denver, CO.
- Mahoney, J. J.*, 2013, Sensitivity of Database Selection in Modeling the Transport of Uranium. – *in*: Brown, A., Figueroa, L. & Wolkersdorfer, Ch.: Reliable Mine Water Technology (Vol I). – p. 411 – 417; Denver, Colorado, USA. ISBN 978-0-615-79385-6. Also presented at SME Global Uranium Symposium 2013, at Corpus Christi, Texas, October 1, 2013.
- Mahoney, J. J.*, 2015, Using PhreePlot to calibrate mining related geochemical models: a user's perspective. 10th International Conference on Acid Rock Drainage & IMWA Annual Conference, p. 736-746. Santiago, Chile.
- Mahoney, J.J.*, Bohan, M.T, and Demopoulos, G.P., 2016. Solubility product constants for the calcium ferric arsenate mineral, Yukonite: Fitting possible formulas with PhreePlot. *in* Arsenic Research and Global Sustainability - Battacharya, Vahter, Jarsjo, Kumpiene, Ahmad, Sparrenbom, Jacks, Donselaar, Bundschuh and Naidu, (Eds) Taylor and Francis Group, London, ISBN 978-1-138-02941-5, pp. 137-138.
- Mahoney, J.J.*, Cadle, S.A, and Jakubowski, R.T., 2009. Uranyl adsorption onto hydrous ferric oxide – a re-evaluation for the diffuse layer model database. *Environmental Science and Technology*. v. 43, no. 24, p. 9260-9266. DOI 10.1021/es901586w.
- Mahoney, J.J.*, and Coles, D.G., 1986, Examination of spent fuel reactions under hydrothermal conditions: Final Program and Abstracts, 1986 Fall Meeting of Materials Research Society.
- Mahoney, J.J.*, and Frey, R.A., 2014, Calibration of a PHREEQC Based Geochemical Model to Predict Surface Water Discharge Compositions from an Operating Uranium Mill in the Athabasca Basin. Presented at URAM 2014 - International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Exploration, Mining, Production, Supply and Demand, Economics and Environmental Issues. IAEA Vienna, Austria, 23-27 June 2014. Manuscript submitted.
- Mahoney, J.J.*, and Jakubowski, R.T., 2008, Assessment of uranyl sorption constants on ferrihydrite – Comparison of model derived constants and updates to the diffuse layer model database. *in* Merkel, B.J. and Hasche-Berger, A., eds., Uranium, Mining and Hydrogeology; Springer, Berlin, p. 919 – 928. (Presented at Uranium Mining and Hydrogeology Congress V, Freiberg, Germany - September 2008).
- Mahoney, J.J.*, Jakubowski, R.T. and Cadle, S.A., 2009, Corrections to the diffuse layer model database for uranyl adsorption onto hydrous ferric oxide - Ramifications for solute transport modeling. (Poster presented at U2009 Global Uranium Symposium, May 2009 Keystone, CO.)

- Mahoney, J.J.*, and Howell, R.L., 2006, Presence of Tyrell Sea Water in Deep Ground Water Samples near James Bay, Ontario. Presented at 59th Canadian Geotechnical Conference and 7th Joint CGS/IAH-CNC Groundwater Specialty Conference (seatoskygeo.ca), October 2006, Vancouver. Sea to Sky Geotechnique 2006, p. 1695-1700.
- Mahoney, J.*, and Langmuir, D., 1991, Adsorption of Sr on kaolinite, illite and montmorillonite at high ionic strengths, *Radiochimica Acta*, vol. 54, p. 139-144.
- Mahoney, J.*, and Langmuir, D., 2002, The corrected solubility product of scorodite and its application to arsenic behavior in buried mine tailings. Geological Society of America Annual Meeting, Denver. Abstract 84-17.
- Mahoney, J.*, Langmuir, D., Gosselin, N., and Rowson, J., 2005, Arsenic readily released to pore waters from buried mill tailings. *Applied Geochemistry*, Vol. 20 (5), p. 947 –959.
- Mahoney, J.*, Langmuir, D., and Rowson, J., 2005, A method to measure arsenic readily released to pore waters from uranium mill tailings, *in* Merkel, B.J. and Hasche-Berger, A., eds., *Uranium in the Environment - Mining Impact and Consequences*, Springer, Berlin, p. 97 – 106. (Presented at Uranium Mining and Hydrogeology Congress IV, Freiberg, Germany - September 2005.)
- Mahoney, J.*, Langmuir, D., Slaughter, M., and Rowson, J., 2005, Raffinate neutralization experiments at the McClean Lake Mill – removal of arsenic and nickel, *in* Merkel, B.J. and Hasche-Berger, A., eds., *Uranium in the Environment - Mining Impact and Consequences*, Springer, Berlin, p. 225 – 234. (Presented at Uranium Mining and Hydrogeology Congress IV, Freiberg, Germany - September 2005.)
- Mahoney, J.J.*, Liu, H., Warner, J., and Sterrett, R.J., 1996, In-situ measurement of the rate of vinyl chloride degradation in a gravel aquifer: abstract and poster session presentation at the Conference on Intrinsic Remediation of Chlorinated Solvents, Salt Lake City, Utah, April 2.
- Mahoney, J.*, Slaughter, M., Langmuir, D., and Rowson, J., 2007, Control of As and Ni releases from a uranium mill tailings neutralization circuit: Solution chemistry, mineralogy, and geochemical modeling of laboratory study results. *Applied Geochemistry*, Vol. 22, (12) p. 2758 – 2776.
- Payne, A.A., and *Mahoney, J.J.*, 2018. Geochemical Fate and Transport of Dissolved Uranium in an ISR Wellfield Using Kinetic-Based Modeling Approach with PHREEQC and PHAST”. To be presented at the NMA Uranium Recovery Workshop, Denver, CO. June 4,5, 2018.
- Sutphin, J.D, Atkinson, L.C., and *Mahoney, J.J.*, 2006, Monitoring and Sampling of Groundwater from Beneath Deep Permafrost. Presented at 59th Canadian Geotechnical Conference and 7th Joint CGS/IAH-CNC Groundwater Specialty Conference (seatoskygeo.ca), October 2006, Vancouver. Sea to Sky Geotechnique 2006, p. 1613-1618.
- Vanhooydonck, J., *Mahoney, J.*, Stephen, R., and Maclear, G., 2015. Selecting Pit Lake Model Approaches Based on Data Availability. 10th International Conference on Acid Rock Drainage & IMWA Annual Conference, p. 1913-1923. Santiago, Chile.