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## **Sean Kosinski** **Managing Scientist**

### **PROFESSIONAL PROFILE**

Mr. Sean Kosinski has 9 years of consulting experience, and his primary area of expertise is in numerical simulation of hydrologic systems. He has worked on and managed projects that involved modeling large-scale dewatering operations at open-pit mines; simulating fate and transport of metals, volatile organic compounds, and chlorinated solvents; designing bioremediation systems and assessing their performance; optimizing remediation systems; designing monitoring networks; and simulating transport of radionuclides in fractured rock using stochastic methods. His experience as a groundwater modeler includes developing deterministic and stochastic flow and transport models and their calibration using inverse methods, performing independent reviews of groundwater models, developing basin-scale hydrologic budgets, and acquisition and statistical analysis of field and laboratory data. Mr. Kosinski is well versed in hydrologic field methods, including the planning, implementation, and interpretation of tracer, pumping, and slug testing; geologic log interpretation; and vadose zone monitoring. Recently, he has worked to resolve permitting and compliance issues with federal and state regulators. Examples include facilitating contaminated site closure at sites as complex as those at the Nevada Test Site and coordinating responses to public comments on EISs for mining clients.

### **CREDENTIALS AND PROFESSIONAL HONORS**

M.S., Hydrogeology, University of Nevada, Reno, Nevada, 2001  
B.S., Environmental Earth Science, Eastern Connecticut State University, Willimantic, Connecticut, 1998

### **CONTINUING EDUCATION AND TRAINING**

Certificate, Business Management, University of Nevada, Las Vegas, Nevada (2002)  
Hazardous Waste Operations and Emergency Response 40-hour Certification (1999; refreshers 2000–present)  
Advanced Techniques in Calibration, Optimization, and Uncertainty Analysis (2005)  
National Registry of Environmental Professionals, Registered Environmental Manager, REM #11196 (2001, 2002)  
Radiological Worker II Training  
First Aid and CPR certified (1999)

## PROFESSIONAL AFFILIATIONS

Member of National Groundwater Association

Member of American Geophysical Union

## RELEVANT EXPERIENCE

### *Mining and Water Resources*

*NEPA Permitting of a Large Open-Pit Gold Mine, Nevada*—Managed and coordinated technical aspects of several environmental impact investigations performed to support the permitting of a large open-pit gold mine in north-central Nevada. Major components of the investigation included a baseline investigation of water quantity and quality, a waste rock assessment, groundwater flow modeling, pit lake water quality predictions, and an ecological risk assessment. Participated and presented at public scoping meetings, project scoping meetings with the Nevada Department of Environmental Protection and BLM, and presented the approach and results with nongovernmental organizations. The approach was considered technically sound, which aided in successful acquisition of a record of decision by the operator in 2008.

*Development of a Regional Groundwater Flow Model to Assess Impacts from Mining, Nevada*—Created and calibrated 3-dimensional basin-scale, steady-state and transient models of groundwater flow for a 700-square-mile basin in north-central Nevada. The model includes simulation of natural and anthropogenic stress resulting from dewatering and infiltration activities related to open pit and underground mining. The groundwater model underwent intense scrutiny by regulators and stakeholders prior to its use in support of predictions made in an EIS. The site is considered the flagship project for one of the world's largest gold producers. The groundwater model was unsuccessfully challenged by a nongovernmental organization, and the client recently received a favorable record of decision.

*Impact Assessment of Backfilled Waste Rock into an Open Pit, Nevada*—Developed a 3-dimensional local-scale finite difference groundwater flow and transport model to evaluate transport of inorganic solutes resulting from the placement of backfill into a proposed open-pit gold mine. The model is an inset model to a regional finite element groundwater flow model that had insufficient resolution to evaluate transport on a necessary scale. The model was coupled with PHREEQC and used to predict mass loading at offsite locations. The modeling documents for this project are currently being used to support an EIS.

*Development of a Groundwater Flow Model to Assess Impacts from Mining, Nevada*—Created and calibrated 3-dimensional steady-state and transient numerical models of groundwater flow for a 140-square-mile area at the site of a proposed open-pit gold mine using an enhanced version of MODFLOW. The model was used to evaluate impacts to water resources during mine dewatering and pit filling.

*Final Permanent Closure Plan of a Large Tailings Impoundment, Nevada*—Developed a final permanent closure plan for a large tailings impoundment in central Nevada. The plan

included a historical site assessment, fieldwork, numerical modeling, and an engineered facility for passive treatment of long-term drainage. Direct push installation of a series of piezometers was conducted to track changes in interstitial pore pressures during draindown, which were in turn used for numerical model calibration. The results of the numerical model were used to predict long-term drainage behavior, which led to the design of a passive treatment facility and reduced bonding costs for the operator. The investigation was successfully presented jointly to the BLM and Nevada Department of Environmental Protection.

*Simulation of Aquifer Subsidence from Mine Dewatering, Nevada*—Simulated aquifer deformation and subsidence from depressurization at an open-pit gold mine in north-central Nevada. A numerical model was calibrated to high-resolution interferogram maps and observed pressure head distributions to predict the occurrence and magnitude of subsidence induced by aquifer depressurization.

#### ***Litigation Support and Natural Resource Damage Assessment***

*Quantification of Available Water Resources for NRDA, Upper Midwest*—Constructed regional and site-scale water budgets to develop a site conceptual model and identify vulnerable water resources. Post-processed a regional-scale groundwater model to quantify useable groundwater resource volumes, by aquifer, in a highly heterogeneous multiple aquifer system.

*Comparison of Multiple Groundwater Models, West Coast*—Reconstructed several groundwater models of the same location using different numerical platforms into a single platform. Reviewed boundary conditions and transport pathways of chlorinated solvents for conceptual inconsistencies. Performed hypothesis testing using various boundary condition, model parameter, and source configurations.

*Quantification of Settlement Scenarios under Various Allocation Strategies, Southern California*—Developed a site conceptual model of contaminant fate and transport at a multi-party CERCLA facility. Compiled and reviewed historical photos and site documents during a Phase I assessment. Analyzed hydrocarbon and chlorinated solvent migration through variably saturated soils using VLEACH and contaminant reaction transport using BIOCHLOR. Quantitatively evaluated settlement scenarios for past and future remedial costs using multiple allocation strategies.

#### ***General Hydrogeology and Numerical Simulation***

*Evaluation of Effective Porosity Estimates from Multiple Tracer Tests, Nevada*—Assisted the development of a numerical model of flow and transport for fractured systems (FASTFLOTRAC). The code incorporated site heterogeneity by using innovative geostatistical techniques. This model was used in a Monte Carlo analysis to quantify fracture network parameter uncertainty in radionuclide travel-time estimates.

*Groundwater Impact Assessment at a Tidally Influenced Industrial Site, Maryland*—Developed a site-wide water budget and evaluated natural and anthropogenic water sources and

pathways. Designed an analytical element model to evaluate and optimize capture from a pumpback remediation system.

*Railyard Site, Minneapolis, Minnesota*—Developed a site conceptual model of contaminant fate and transport at a former railyard leading to settlement of a large multiparty litigation. Designed and optimized remedial pumping system and bioremediation injection system for an aquifer containing hydrocarbons and chlorinated solvent plumes using a site-scale groundwater model. Sited and logged the installation of remediation and monitoring wells.

*Optimization of Pump and Treat Remediation of Heavy Metals in Groundwater, Former Smelter Site, Oklahoma*—Evaluated pumping configurations and rates of a pump-and-treat remediation strategy for a large cadmium and zinc groundwater plume at a former smelter in Oklahoma. Optimized pumping withdraws using a basin-scale numerical groundwater flow model under various climatic conditions.

*Groundwater Resources Evaluation, Maui, Hawaii*—Prepared a comprehensive groundwater resources evaluation prior to a multi-million dollar property acquisition. Data from surface water diversions, groundwater withdraws, and the distribution of recharge were compiled and analyzed to determine the sustainable groundwater yield of the property. A water budget was developed and changes to the sustainable yield were analyzed under current and future land use scenarios.

*Cumulative Impact Assessment, Nevada*—Performed a comprehensive evaluation of potential cumulative impacts resulting from mine water management practices along the Carlin trend.

*Tailings Closure Site Investigation, Nevada*—Supervised and designed a direct-push and water quality sampling program in support of a final permanent closure plan for a 140-acre tailings impoundment.

*Basin-Scale Evapotranspiration Assessment, Nevada*—Executed a study to evaluate changes in basin-wide evapotranspiration from mine dewatering and infiltration by ground-truthing and processing Landsat Thematic Mapper imagery. Thematic Mapper imagery was processed according to vegetation reflectance and published estimates of evapotranspiration rates to estimate basin-wide water loss.

*Development of a Basin-Wide Hydrologic Budget, Nevada*—Performed a basin-wide hydrologic budget for a hydrostratigraphic basin in north-central Nevada. The budget was used to assess baseline conditions and to provide constraints on numerical model calibration.

## **PUBLICATIONS**

Reimus, P., G. Pohll, T. Mihevc, J. Chapman, M. Haga, B. Lyles, S. Kosinski, R. Niswonger, and P. Sanders. 2003. Testing and parameterizing a conceptual model for solute transport in fractured granite using multiple tracers in a forced-gradient test. *Water Resour. Res.* 39(12):1356.

Kosinski, S. 2002. Effective porosity estimation from tracer testing in low-permeability fractured rock. M.S. Thesis. University of Nevada, Reno, NV.

Carroll, R., T. Mihevc, G. Pohll, B. Lyles, S. Kosinski, and R. Niswonger. 2000. Project SHOAL area tracer test experiment. DRI Pub. No. 45177. November 2000.

### **PRESENTATIONS/POSTERS**

Kolm, K., S. Kosinski, and D. Mixon. 2010. Conceptual site models for sustainable management of groundwater resources (in preparation). Oral presentation. Abstract from the fall meeting of the Geol. Soc. of America, Denver, CO. October 31–November 3, 2010.

Kosinski, S., G. Pohll, and P. Reimus. 2000. A Monte Carlo analysis of the effects of fracture network statistics on two-well tracer tests. Oral presentation. Abstract from the fall meeting of the Geol. Soc. of America, Reno, NV. November 13–18, 2000.

Kosinski, S., and C. Carlson. 1997. Groundwater-pond interaction in a non-tidal wetland: hydrogeological approach. Poster presentation. Presented at the 51st Annual Eastern Colleges Science Conference; Central Connecticut State University, New Britain, CT. April 12, 1997.