

Southwest The Complete Hydrologic Resource HYDROLOGY

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Hydrology of
Mine Pit Lakes

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Southwest The Complete Hydrologic Resource HYDROLOGY

A bimonthly trade magazine for hydrologists, water managers, and other professionals working with water issues.



From the Editor

From the Editor

We are pleased by the enthusiastic comments, new subscriptions, and new advertisers that came in response to our second issue, and we thank you all.

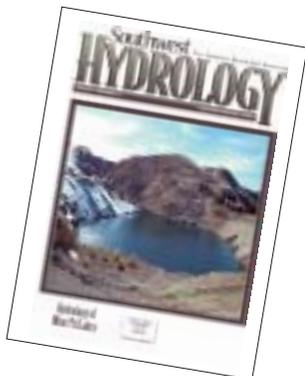
Our cover section for this issue considers the question: what is the hydrology of a very large hole in the ground? Hard-rock mine pits are typically large and bound by metals- and sulfide-rich rock. While some already have lakes in them, many more will develop lakes once mining stops. No consensus exists about what to do with them or how they will all turn out decades from now. Should specific standards exist just for mine pit lakes? Can we manage them in perpetuity? How good are the models? Can we predict water quality far into the future? Even if you don't regularly work on mining-related issues (perhaps especially if you don't), I think you'll find it interesting to read through these perspectives and consider the questions generated by these lakes.

In our next issue, we'll be switching gears again and looking at Natural Resource Damage Assessments. In general, appraisals assess the value of damage to a natural resource, such as ground- or surface water, and determine appropriate compensation - not always in terms of dollars but more frequently in terms of equivalent resources. Such assessments usually involve lawyers and economists, but hydrologists play a big role as well. Find out more in November.

Thanks to everyone (listed on the opposite page) who contributed to this issue, with special appreciation to our feature authors, including Glenn C. Miller, who also loaned us his collection of pit-lake slides. As always, I encourage your news, ideas, and comments.

Betsy Woodhouse
Editor

Cover: The Aurora Partnership pit lake in Mineral County, western Nevada. Photograph by Glenn C. Miller.



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CORRECTION

In the article "States Move Forward to Meet New Arsenic Standard" (pages 18-19 of May/June 2002 Southwest Hydrology), Nevada was mistakenly identified as being the only state besides New Mexico to sue the EPA over the new 10 ppb arsenic standard. In fact, Nebraska and New Mexico are the only states to do so.

The Hydrology of Mine Pit Lakes

If you ever have the opportunity to visit a world-class, open-pit mine, do it. Whether horrified or proud, there's no substitute for looking into a 1,500-foot deep, two-mile long, man-made abyss to grasp the magnitude of human industriousness. Most of the large mines extend below the water table and will eventually fill with groundwater to form pit lakes. About forty pit lakes are expected to form in Nevada, predicted to range in size from mere puddles up to 400,000 acre-feet; and there may be another couple dozen that will form in other states across the Southwest. If you believe the groundwater models, most of these will be terminal basins – net sinks that pull in groundwater from all sides, evaporatively concentrating solutes in the lake. No need to rush, of course, because these pit lakes are expected to remain for thousands of years. This, of course, is the problem.

– *Houston Kempton, Integral Consulting, Inc., Boulder, CO*

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Terry Braun

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Lee C. Atkinson, Ph.D.

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16 Precious Metals Pit Lakes Controls on Eventual Water Quality

Glenn C. Miller, Ph.D.

The chemistry of a pit lake reflects the groundwater conditions prior to mining and reactions in the rock surrounding the lake. The water quality will determine the future use of the lake, as well as its effects on the aquifer, wildlife, and ecosystems.

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James R. Kuipers, P.E.

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Joanna Moreno and Peter Sinton

Models are used to support management decisions and help with regulatory evaluations. What approaches are used to model pit lakes? Case studies from Australia and the United States are presented.

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Alison Bolen

The long-term environmental impacts of pit lakes are still unknown, yet regulators are moving forward to manage the impending hazards and potential benefits of these massive, man-made lakes.

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Houston Kempton

As many large open-pit mines approach closure, the challenge is to develop an affordable framework for long-term, pit-lake management that protects the environment and advances environmental science.

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- Watershed Restoration
- Tracking Ancient Waters
- Desalination

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Editorial Contribution
Southwest Hydrology welcomes contributions of news, project summaries, product announcements and items for The Calendar. Send submissions to Southwest Hydrology, PO Box 65690, Tucson, AZ 85728; or email to mail@swhydro.com.

Visit www.swhydro.com for additional guidelines for submissions.

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