

TECHNICAL LIBRARY

January 11, 2008

Current Journal Contents
of the
OSM-WR Technical Library
1999 Broadway, Suite 3410
P.O. Box 46667
Denver, CO 80201-6667

This is the current compilation of the table-of-contents pages for journals received during the month of December in the Library. Individuals may have copies of specific articles by notifying the librarian either by phone, e-mail, or regular mail service. **(If you have more than one or two articles you want, please send a written or e-mail request.)**

Deborah K. McGinnis, Librarian
FAX (303) 844-1545

Tele: (303) 844-1436
E-mail: dmcginni@osmre.gov

OSM Library Catalog: <http://www.wrcc.osmre.gov/glas/>

NOTICE OF WARNING CONCERNING COPYRIGHT RESTRICTIONS

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted material.

Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specific conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

This institution reserves the right to refuse to accept a copying order if, in its judgment, fulfillment of the order would involve violation of copyright law.

"ENR"

November 26, 2007

Contents

Volume 259 ■ Number 19

RECEIVED

2007 DEC -3



COVER STORY

Sutter Health Is Lean

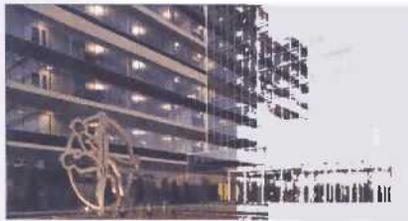
80 Team for nonprofit hospital builder cuts the waste from a \$5.5-billion capital program by morphing the model for project delivery.

Cover photo and photo right by Susan Lohwasser for ENR

SPECIAL REPORT

The Top Sourcebook

8 Corporate owners are beginning to understand the construction industry's problems are their concern, too.



Developers shifting gears. Page 37

- 32 Aviation: Increased traffic, outdated facilities drive airports' rush to upgrade
37 Developers: Developers shift to mixed-use, office projects in wake of housing dive
41 Water/Wastewater: Aging pipes and drought fuel growth
46 Education: Strong college and university market counters slowdown in K-12 projects
51 Health Care: New standards of patient care keep market booming
55 Highway/Transit: Record transportation funding spurs spike in bridge projects

NEWS

Buildings

Sustainability: Homebuilders' verification tool aims to audit green

71 Highways: Despite rocky history, Pennsylvania road will open

3 U.S. 1955 & 1956

72 Cranes: New state cracks down on operators that failed exam

Companies: Spanish giant set to expand in the U.S.

Power & Industrial

66 Transit: Chicago rail system on verge of collapse



Transit funding woes. Page 66

Gulf Coast facilities expand using construction skills

Control: Demonstration set for carbon capture on commercial scale

EPA

Update

Construction Week

Washington Observer

74 Resources

People

77 Construction Economics

Products

Pulse

93 Official Proposals (cont. on pp. 94-98)

100 Editorials

services call:

(877) 876-8208 or (515) 237-3651

GO TO ENR.COM FOR PREMIUM-PROTECTED ONLINE ACCESS.

Not getting ENR reader and News Alerts? Please call (877) 876-8208

enr.com/more/

ADDITIONAL CONTENT ONLINE

Engineering News-Record

The McGraw-Hill Companies

SERVING THE INDUSTRY SINCE 1874

N.Y. 10020. Founder: James H. McGraw (1860-1948). Executive, editorial, circulation, advertising offices: Two Penn Plaza, New York, N.Y. 10121-2298. Phone (212) 512-2000. Postmaster: Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Hightstown, NJ 08520. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123075673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DPGM Ltd., 2-7495 Bath Road, Mississauga, ON L4T 1L2. Email: enr.custserv@mcgraw-hill.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK Reg. ® in U.S. Patent Office. Copyright © 2007 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Robert J. Bahash, Executive Vice President and Chief Financial Officer; Kenneth W. Victor, Executive Vice President and General Counsel; Frank D. Pugmire, Senior Vice President, Treasury Operations. McGraw-Hill Construction:

(ENR) (Engineering News-Record), (ISSN 0891-9526) Published weekly except for one week in January, April, May, July, September, October and December. 46 weeks a year by The McGraw-Hill Companies, 1221 Ave. of the Americas, New York, N.Y. 10102. Founder: James H. McGraw (1860-1948). Executive, editorial, circulation, advertising offices: Two Penn Plaza, New York, N.Y. 10121-2298. Phone (212) 512-2000. Postmaster: Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Hightstown, NJ 08520. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123075673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DPGM Ltd., 2-7495 Bath Road, Mississauga, ON L4T 1L2. Email: enr.custserv@mcgraw-hill.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK Reg. ® in U.S. Patent Office. Copyright © 2007 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Robert J. Bahash, Executive Vice President and Chief Financial Officer; Kenneth W. Victor, Executive Vice President and General Counsel; Frank D. Pugmire, Senior Vice President, Treasury Operations. McGraw-Hill Construction: Norbert W. Young, Jr., FAIA, President; Howard Mager, Sr. VP, MH Construction; Nilo Ramos, Sr. Director, Finance. Where necessary, permission is granted by copyright owner for those registered with Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, www.copyright.com to photocopy any article herein for personal or internal reference use only for the flat fee of \$1.20 per copy for each article. ENR Construction Economics, Top Rankings and Sourcebooks available for a fee in downloadable PDF format at www.enr.com. Send payment to CCC, ISSN 0891-9526/92. Copying for other than personal or internal reference use without express permission of The McGraw-Hill Companies is prohibited. Write the editor to request such permission. Printed in the USA. Subscription rates for individuals in the field of the publication: U.S. and possessions, \$32 per year (single copies \$5 in U.S.); Canada and Mexico, \$39 per year; outside North America, \$195 per year. Please allow four to six weeks for shipment. Subscriber service: (877) 876-8208 or (515) 237-3651. For single copies, (212) 804-1634. Send all correspondence, notices and subscription orders to Fulfillment Manager, ENR, P.O. Box 5730, Hightstown, NJ 08520. If possible, attach address label from a recent issue. Please contact customer service to change your name or address. If the postal authority alerts us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Please allow a month for change of address to take effect. Classified advertising: Send ads to ENR, Classified Advertising, Two Penn Plaza, 9th floor, New York, NY 10121. Phone (212) 504-2815.

PHOTO LEFT: COURTESY OF ORPUS CORP. RIGHT BY TUDOR VAN HANFORD FOR ENR

RECEIVED

2007 DEC 10 AM 10:55

COVER STORY

OSM-WRO

► **Fast Forward** COLORADO

24 Construction team on long-planned DestinyUSA project in Syracuse, N.Y., rises to developer's challenge by embracing biodiesel, paperless document management and handheld data-collection devices in effort to drive waste from construction.

Cover photo by The Post Standard/Mike Greenlar; photo right by Tom Sawyer for ENR



NEWS

► **Environment**

10 Water Supply: Utilities tear low marks on compliance



Bone-dry. Page 10

11 Water Quality: EPA releases Hypoxia plan

15 Landfills: Methane gas to power New Hampshire campus

18 Levees: Levee school begins in Louisiana

► **Business & Economics**

12 Project Finance: Subprime meltdown has yet to scorch infrastructure funds

13 Companies: Kiewit seeks to terminate public financial disclosure

13 Acquisitions: Cerberus, United Rentals in court clash over merger terms

14 Labor: Sheet-metal and rail workers join forces as AFL-CIO union

► **Transportation**

14 Light Rail: North Carolina system opens

16 Foundations: Sinking approaches unsettle Delaware's bridge plans

20 Bridges: In Tallahassee redesign, steel makes the grade



It's a gasser. Page 15

DEPARTMENTS

5 Calendar

7 Construction Week

9 Washington Observer

22 Construction Economics

59 Products

60 Pulse

66 Official Proposals

67 Viewpoint

68 Editorials

► **For subscriber services call:**

(877) 876-8208 or (515) 237-3681

► **GO TO MY.ENR.COM FOR PASSWORD-PROTECTED ONLINE ACCESS.**

► **Not getting ENR Insider and News Alerts?** Please call (877) 876-8208

enr.com/more/

ADDITIONAL CONTENT ONLINE

Engineering News-Record

the McGraw-Hill Companies

SERVING THE INDUSTRY SINCE 1874

N.Y. 10620. Founder: James H. McGraw (1860-1948); Executive, editorial, circulation, advertising offices: Two Penn Plaza, New York, N.Y. 10119-2298. Phone (212) 512-2000. Postmaster: Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 518, Hightstown, N.J. 08520. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123075673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DPGM Ltd., 2-7496 Bath Road, Mississauga, ON L4T 1L2. Email: enr.custser@mcgraw-hill.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. ® U.S. Patent Office. Copyright © 2007 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Robert J. Banash, Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and General Counsel; Frank D. Penelope, Senior Vice President, Treasury Operations; McGraw-Hill Construction;

ENR (Engineering News-Record), (ISSN 0891-9526) Published weekly except for one week in January, April, May, July, September, October and December; 46 weeks a year by The McGraw-Hill Companies, 1221 Ave. of the Americas, New York, N.Y. 10102. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123075673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DPGM Ltd., 2-7496 Bath Road, Mississauga, ON L4T 1L2. Email: enr.custser@mcgraw-hill.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. ® U.S. Patent Office. Copyright © 2007 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Robert J. Banash, Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and General Counsel; Frank D. Penelope, Senior Vice President, Treasury Operations; McGraw-Hill Construction;

Norbert W. Young, Jr., FAW, President; Howard Meger, Sr. VP, MH Construction; Nilo Ramos, Sr. Director, Finance. Where necessary, permission is granted by copyright owner for those registered with Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, www.copyright.com, to photocopy any article herein for personal or internal reference use only for the flat fee of \$1.20 per copy for each article. ENR Construction Economics, Top Rankings and Sourcebooks available for a fee in downloadable PDF format at www.enr.com. Send payment to CCC, ISSN 0891-9526/92. Copying for other than personal or internal reference use without express permission of The McGraw-Hill Companies is prohibited. Write the editor to request such permission. Printed in the USA. Subscription rates for individuals in the field of the publication: U.S. and possessions, \$82 per year (single copies \$5 in U.S.); Canada and Mexico, \$99 per year; outside North America, \$195 per year. Please allow four to six weeks for shipment. Subscriber service: (877) 876-8208 or (515) 237-3681. For single copies, (212) 904-4634. Send all correspondence, notices and subscription orders to Fulfillment Manager, ENR, P.O. Box 5730, Hightstown, NJ 08520. If possible, attach address label from a recent issue. Please contact customer service to change your name or address. If the postal authorities alert us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Please allow a month for change of address to take effect. Classified advertising: Send ads to ENR, Classified Advertising, Two Penn Plaza, 9th Floor, New York, NY 10119. Phone (212) 904-2815.

COVER STORY

► Around the Bases

28 Design-build joint venture proves nimble in using design-assist and 3D steel model to bring Washington, D.C.'s major league ballpark home in what could be a record pace.



Cover photo and photo right courtesy of Thornton Tomasetti Inc.

NEWS

► Buildings

10 Foundations: Pier pressure may make or break spire



Deep Foundations. Page 10

► Business & Economics

12 Corruption: New York City DOT officials nabbed for bribes

► Environment

13 Flood Protection: Louisiana risk model review shows need for clarity

14 Dams: Utility settles suits and claims in Taum Sauk collapse

► Power & Industrial

18 Powerplants: Changing economics improve plasma technology's outlook

► Transportation

12 Failures: Arizona bridge collapse will lead to new shoring rules

14 Lawsuits: PB-led design-CM team wins tough St. Louis rail dispute

16 Bridges: Moscow crossing sports innovative cable-stay span

18 Pipelines: Alaska gas-line bids bring some surprises at opening



Moscow's Unusual Arch. Page 16

DEPARTMENTS

5 Letters

7 Construction Week

9 Washington Observer

20 People

21 Resources

25 Construction Economics

53 Products

56 Pulse

61 Official Proposals (cont. on p. 62)

63 Viewpoint

64 Editorials

► For subscriber services call:

(877) 876-8208 or (515) 237-3681

► GO TO MY.ENR.COM FOR PASSWORD-PROTECTED ONLINE ACCESS.

► Not getting ENR Insider and News Alerts? Please call (877) 876-8208

enr.com/more/

ADDITIONAL CONTENT ONLINE

Engineering News-Record

McGraw-Hill Companies

SERVING THE INDUSTRY SINCE 1874

ENR (Engineering News-Record), (ISSN 0891-9526). Published weekly except for one week in January, April, May, July, September, October and December; 46 weeks a year by The McGraw-Hill Companies, 1221 Ave. of the Americas, New York, N.Y. 10020. Founder: James H. McGraw (1860-1948). Executive, editorial, circulation, advertising offices: Two Penn Plaza, New York, N.Y. 10121-2298. Phone (212) 512-2000. Postmaster: Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Hightstown, NJ 08520. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123075873. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DPGM Ltd., 2-7496 Beth Road, Mississauga, ON L4T 1L2. Email: enrsubscriptions@mcgraw-hill.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. © in U.S. Patent Office. Copyright © 2007 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw II, Chairman, President, and Chief Executive Officer; Robert J. Banash, Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and General Counsel; Frank D. Pellegrino, Senior Vice President, Treasury Operations. McGraw-Hill Construction: Herbert W. Young, Jr., FAIA, President; Howard Mager, Sr. VP., MH Construction; Nilo Ramos, Sr. Director, Finance. Where necessary, permission is granted by copyright owner for those registered with Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, www.copyright.com, to photocopy any article herein for personal or internal reference use only for the flat fee of \$1.20 per copy for each article. ENR Construction Economics, Top Rankings and Sourcebooks available for a fee in downloadable PDF format at www.enr.com. Send payment to CCC, ISSN 0891-9526/92. Copying for other than personal or internal reference use without express permission of The McGraw-Hill Companies is prohibited. Write the editor to request such permission. Printed in the USA. Subscription rates for individuals in the field of the publication: U.S. and possessions, \$82 per year (single copies \$5 in U.S.); Canada and Mexico, \$88 per year; outside North America, \$196 per year. Please allow four to six weeks for shipment. Subscriber service: (877) 876-8208 or (515) 237-3681. For single copies, (212) 904-4634. Send all correspondence, notices and subscription orders to Fulfillment Manager, ENR, P.O. Box 5730, Hightstown, NJ 08520. If possible, attach address label from a recent issue. Please contact customer service to change your name or address. If the postal authorities alert us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Please allow a month for change of address to take effect. Classified advertising: Send ads to ENR, Classified Advertising, Two Penn Plaza, 9th Floor, New York, NY 10121. Phone (212) 904-2815

"ENR"

RECEIVED

December 17, 2007

Contents

Volume 259 ■ Number 22

COST FORECAST

► Inflation Takes a Hit

25 The sub-prime mortgage crisis flooded the housing market, leveling prices, which knocked back inflation. ENR expects the credit crunch to spread in 2008, further dampening inflation. Globally, inflation is already easing in several nations.

Cover photo by Michael Moore; photo right by Angelle Bergeron for ENR



NEWS

► Buildings

10 Failures: Questions flourish as investigation into Florida garage collapse begins



Garage collapse, Page 10

► Equipment

12 Equipment: Chinese exhibition echoes country's work in progress

► Environment

17 Wastewater: Canada to tighten effluent standards

► Business & Economics

14 Companies: Skanska's Graham to resign as CEO

54 Workforce Solutions: Recruitment program along Gulf Coast shows results

► Transportation

14 Roads: Cianbro considers building \$1-billion Maine toll road

15 Rail: Backed by tax hike, transit takes off in Utah

16 Military Construction: Navy adopting electromagnetic aircraft launch system

18 Aviation: With passengers the goal, San Bernardino hurries terminal work



More new rails, Page 15

DEPARTMENTS

5 Online

7 Construction Week

9 Washington Observer

19 Construction Economics

45 Continuing Education

51 Products

52 Pulse

60 Official Proposals (cont. on pp. 61-62)

64 Editorials

► For subscriber services call:

(877) 876-8208 or (515) 237-3681

► GO TO MY.ENR.COM FOR PASSWORD-PROTECTED ONLINE ACCESS.

► Not getting ENR Insider and News Alerts? Please call (877) 876-8208

enr.com/more/

ADDITIONAL CONTENT ONLINE

Engineering News-Record

The McGraw-Hill Companies

SERVING THE INDUSTRY SINCE 1827

N.Y. 10020. Founder: James H. McGraw (1860-1948). Executive, editorial, circulation, advertising offices: Two Penn Plaza, New York, N.Y. 10121-2298. Phone (212) 512-2000. Postmaster: Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Harlan, IA 51593. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123079673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DPCM Ltd., 2-7496 Bath Road, Mississauga, ON L4T 1L2. Email: enr_custserv@csd.fulfillment.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. ® in U.S. Patent Office. Copyright © 2007 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Robert J. Bahash, Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and General Counsel; Frank D. Penglase, Senior Vice President, Treasury Operations. McGraw-Hill Construction:

ENR (Engineering News-Record), (ISSN 0891-9526) Published weekly except for one week in January, April, May, July, September, October and December; 46 weeks a year by The McGraw-Hill Companies, 1221 Ave. of the Americas, New York, N.Y. 10020. Founder: James H. McGraw (1860-1948). Executive, editorial, circulation, advertising offices: Two Penn Plaza, New York, N.Y. 10121-2298. Phone (212) 512-2000. Postmaster: Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Harlan, IA 51593. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123079673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DPCM Ltd., 2-7496 Bath Road, Mississauga, ON L4T 1L2. Email: enr_custserv@csd.fulfillment.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. ® in U.S. Patent Office. Copyright © 2007 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Robert J. Bahash, Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and General Counsel; Frank D. Penglase, Senior Vice President, Treasury Operations. McGraw-Hill Construction: Norbert W. Young, Jr., FAIA, President, Howard Mager, Sr. VP, MH Construction, Wilo Ramos, Sr. Director, Finance. Where necessary, permission is granted by copyright owner for those registered with Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, www.copyright.com, to photocopy any article herein for personal or internal reference use only for the flat fee of \$1.20 per copy for each article. ENR Construction Economics, Top Rankings and Sourcebooks available for a fee in downloadable PDF format at www.ENR.com. Send payment to CCC, ISSN 0891-9526/92. Copying for other than personal or internal reference use without express permission of The McGraw-Hill Companies is prohibited. Write the editor to request such permission. Printed in the USA. Subscription rates for individuals in the field of the publication: U.S. and possessions, \$92 per year (single copies \$5 in U.S.); Canada and Mexico, \$89 per year; outside North America, \$195 per year. Please allow four to six weeks for shipment. Subscriber service: (877) 876-8208 or (515) 237-3681. For single copies, (212) 904-4634. Send all correspondence, notices and subscription orders to Fulfillment Manager, ENR, P.O. Box 5730, Harlan, IA 51593. If possible, attach address label from a recent issue. Please contact customer service to change your name or address. If the postal authorities alert us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Please allow a month for change of address to take effect. Classified advertising: Send ads to ENR, Classified Advertising, Two Penn Plaza, 9th Floor, New York, NY 10121. Phone (212) 904-2815.

PHOTO LEFT: COURTESY OF JACKSONVILLE FIRE AND RESCUE DEPT. RIGHT: COURTESY OF SALT LAKE CITY COMMUTER RAIL CONSTRUCTORS

Geobiology

Volume 5, Issue 4, December 2007

RECEIVED
2007 DEC 14 AM 11: 01
DENVER, COLORADO

Editorial

- 303 The End-Permian mass extinction – how bad did it get?

P. B. Wignall

Original Articles

- 311 The age of Rubisco: the evolution of oxygenic photosynthesis

E. G. Nisbet, N. V. Grassineau, C. J. Howe, P. I. Abell, M. Regelous and R. E. R. Nisbet

- 337 Neoproterozoic ‘snowball Earth’ glaciations and the evolution of altruism

R. A. Boyle, T. M. Lenton and H. T. P. Williams

- 351 The Precambrian emergence of animal life: a geobiological perspective

*E. Gaidos, T. Dubuc, M. Dunford, P. McAndrew, J. Padilla-Gamiño,
B. Studer, K. Weersing and S. Stanley*

- 375 Transition metal abundances in microbial carbonate: a pilot study based on *in situ* LA-ICP-MS analysis

B. S. Kamber and G. E. Webb

- 391 Isotopic and chemical investigations of Fe (III) reduction by *Shewanella putrefaciens* strain 200R

T. A. Gebrehiwet and R. V. Krishnamurthy

- 401 Exopolymeric substances of sulfate-reducing bacteria: Interactions with calcium at alkaline pH and implication for formation of carbonate minerals

O. Braissant, A. W. Decho, C. Dupraz, C. Glunk, K. M. Przekop and P. T. Visscher

- 413 Biomarkers at the microscopic range: ToF-SIMS molecular imaging of Archaea-derived lipids in a microbial mat

V. Thiel, C. Heim, G. Arp, U. Hahmann, P. Sjövall and J. Lausmaa

- 423 Molecular characterization of microbial communities in deep coal seam groundwater of northern Japan

S. Shimizu, M. Akiyama, T. Naganuma, M. Fujioka, M. Nako and Y. Ishijima

- 435 Biosignatures present in a hydrothermal massive sulfide from the Mid-Atlantic Ridge

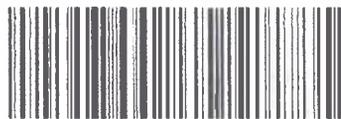
M. Blumenberg, R. Seifert, S. Petersen and W. Michaelis

Volume contents

Information on this journal can be accessed at www.geobiol.com
For Earth Sciences News from the Geological World, visit www.earthpages.com



**Blackwell
Publishing**



1472-4677(200712)5:4;1-J



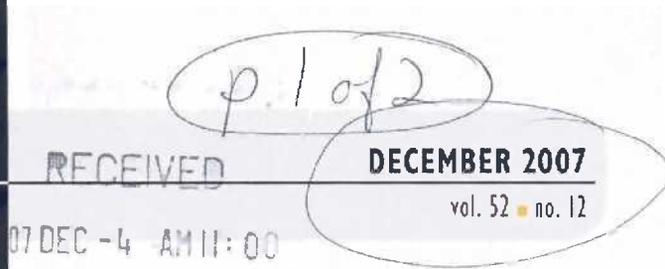
**Blackwell
Synergy**

This journal is available online at Blackwell Synergy. Visit www.blackwell-synergy.com to search the articles and register for table of contents e-mail alerts.

GEOTIMES

PUBLISHED BY THE AMERICAN GEOLOGICAL INSTITUTE

HIGHLIGHTS 2007



FEATURES

24 A CHANGING CLIMATE

First, Margaret Leinen sits down with *Geotimes* to discuss some of the big climate topics of the year, such as how the release of the Intergovernmental Panel on Climate Change's Fourth Assessment Report is changing the political and scientific landscape. Then we take a look at the question of regulating carbon dioxide and fuel efficiency standards. Finally, we examine the famous faces of climate change.

Plus! Glacial melting, icebergs providing nutrients, scientists competing for climate prizes and more climate stories

30 ENERGY SHIFTS

Perhaps no two fields are more linked than climate and energy in the big stories of 2007, as evidenced by our discussion with Truman Semans about how the business world is getting involved in the climate and energy debate, and our look at how Congress seeks to link the two issues.

Plus! Peak ethanol, the new precious metals, standardizing oil and gas reserves and more energy stories

36 HAZARDS

As man meets nature in the built environment, disaster often occurs, as we discuss with Scott Burns. Such disaster includes the massive wildfires in Greece and California, the floods in the American Midwest and England and the drought in the American South. Additionally, Kevin Trenberth gives us a look at the growing discussion of "geoengineering" Earth to our benefit.

Plus! Earthquakes, mud volcanoes, tsunami legislation and other hazards stories

42 DEEP EARTH

This year, much research has been published on everything from new seismological techniques to seeing Earth's inner structure to defining the core-mantle boundary, as Rob van der Hilst and Guy Masters tell *Geotimes*.

Plus! Early Earth research, finding Tibet's missing anchor, drilling the San Andreas Fault and more deep Earth stories

47 PLANETARY EXPLORATION

Arguably two of the biggest space stories this year were the ongoing search for water on Mars and figuring out what's going on with our sun: Richard Zurek tells *Geotimes* about Mars, and Dan Baker speaks solar.

Plus! Twelve months of Hubble discoveries, other planets' cores, the latest on Saturn and its moons and other space stories

54 ANCIENT LIFE

Genetics stole some of the paleontology spotlight this year. *Geotimes* talked with Ian Barnes about using DNA to learn more about extinct creatures. And Olaf Bininda-Emonds and John Wible detail the latest thinking in mammalian evolution.

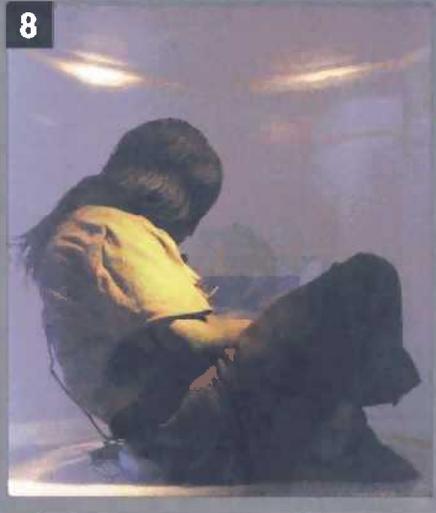
Plus! *Homo* finds, dinosaur discoveries and more paleontology stories

ON THE COVER

Background cover image is of the Ross Sea in Antarctica, by Mike Usher, courtesy of the National Science Foundation. Solar panel photo courtesy of DOE/NREL, credit — Beck Energy. Other individual images are credited in each story.

p. 2 of 2

8



Copyright Museo de Arqueologia de Alta Mancia

8 NEWS

- Mummy hair tells gruesome story
- Climate spawned mass migration from Africa
- Hobbit or not: All in the wrists
- Water problems ahead if ethanol continues to expand
- Toothy duck-billed dinosaur found
- Lassoing an asteroid
- Loma Prieta not from a weak fault?
- Birthing the Sierra Nevada
- Argon's gassy ride to the atmosphere
- Forecast: Methane drizzle over Xanadu
- Analyzing volcanic ash risk
- Fore-arc basins may forecast earthquakes
- ENSO lengthens the days of our lives
- Birth of a planet
- It's a small world
- New biofuel on the rise in Mali
- Mineral resource of the month: niobium (columbium)

13



FEMA News Photo

VIEWS

7 A COMMENT ON ...

Geoscience and International Decisions on Adapting to Climate Change
Should we or shouldn't we try to develop strategies to enhance societal resilience to climate change? That is the question.
Nathan Hultman

84 GEOLOGIC COLUMN

Underground Coal Mining Health and Safety: A View From the Inside
In August, Americans were transfixed by the coal mining disaster in Utah. In the wake of the disaster, questions have been asked about mine safety and education.
George Luxbacher

64 GEOMARKETPLACE
65 CLASSIFIEDS: Career opportunities

DEPARTMENTS

4 FROM THE MANAGING EDITOR

6 LETTERS: Perspectives From Readers

22 WHERE ON EARTH?

59 GEOMEDIA

- MUSEUMS:** Blending of Art and Science
- PRODUCTS:** Holiday Gifts for Geologists
- BOOKS:** Holiday On the Shelf
- MAILING:** A Scientific Way to Mail Your Holiday Cards

81 BENCHMARKS

December 22, 1938: The coelacanth is alive!

82 DOWN TO EARTH WITH...

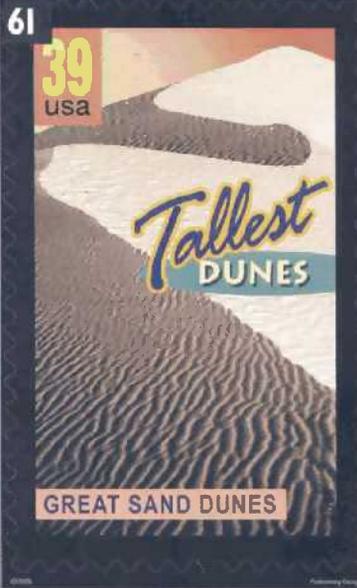
2008 Congressional Science Fellows

81



Hans Frickel/Max-Planck Institute

61

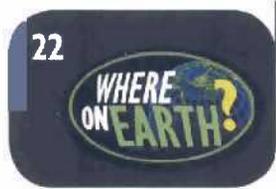


© USFS. Used with permission. All rights reserved.

Want to attend a geoscience meeting? Visit the online Calendar at calendar.agiweb.org

ON THE WEB AT www.geotimes.org

22



P. 1 of 2

GOVERNING

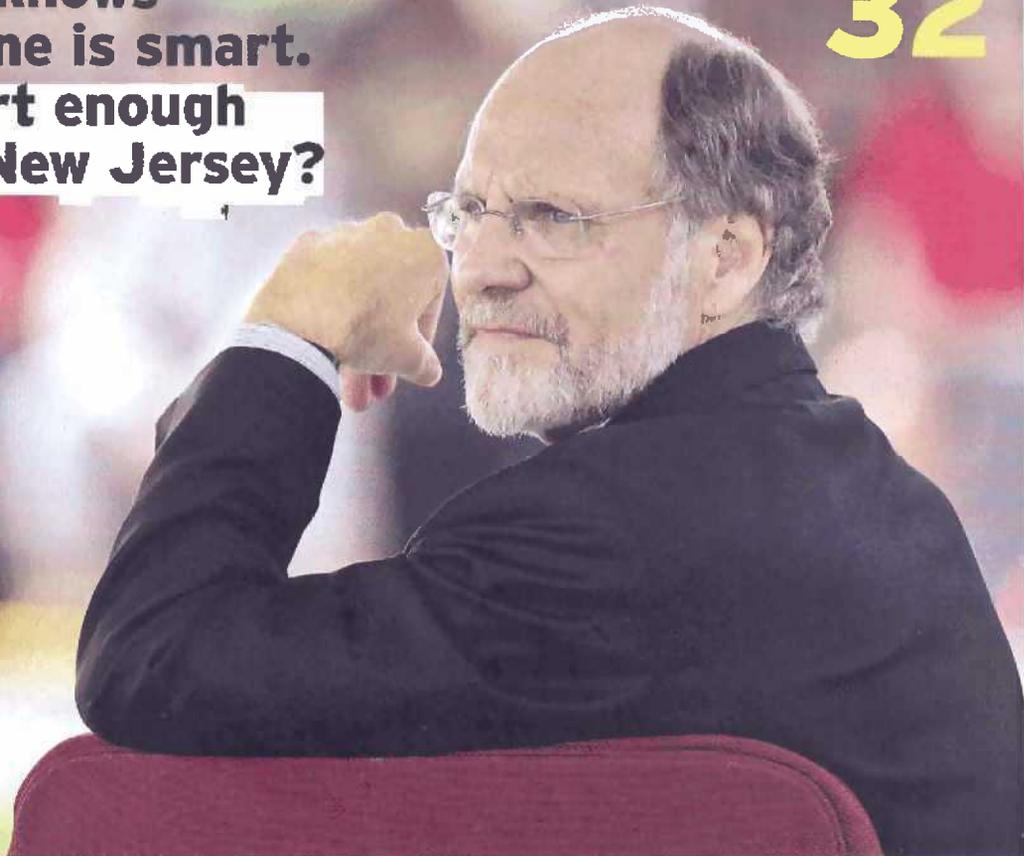
RECEIVED

www.governing.com

OSM-WRCC
DENVER, COLORADO

32

**Everyone knows
Jon Corzine is smart.
Is he smart enough
to repair New Jersey?**



AP IMAGES

Features

24 Local Warming

It's too late to stop climate change. What we can do is plan for it.
By Christopher Swope

32 Tougher Work Than Wall Street

Jon Corzine worked miracles at Goldman Sachs. Doing it in Trenton is a different story. *By Alan Greenblatt*

40 Healthy Handouts

Borrowing a page from private health insurers, state Medicaid programs are testing the wellness waters.
By Josh Goodman

44 Digital-Age Digs

As public interest in cultural heritage grows, archaeologists are using both traditional and high-tech tools to discover the past. *By Ellen Perlman*

48 In the Green

When it comes to housing, affordable and sustainable really can go together.
By Zach Patton

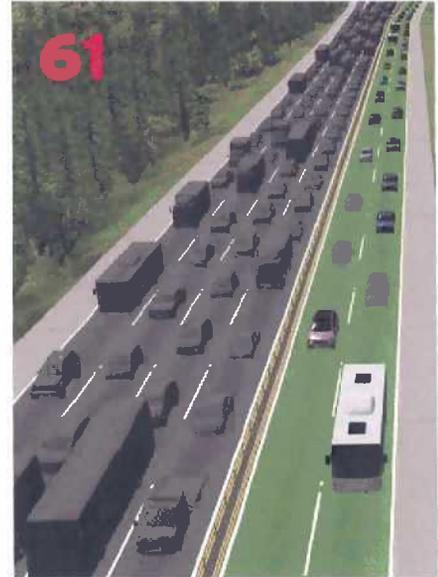
GLIMPSE

68 Boarding Call

Airports are opening kennels that are fit for Fideaux.
By Zach Patton

GOVERNING

The Magazine of States and Localities



Up Front

- 8 Publisher's Desk**
- 11 Assessments**
Alan Ehrenhalt on the movement to limit jury awards.
- 14 Dialogue**
Letters from readers.
- 17 Observer**
Taxi meters in D.C., changing pension systems, and government-press relations.
- 19 Urban Notebook**
Parks for sale, performance non-measurement, and the car-sharing merger.
- 21 Player**
Steve Beshear: Evening star.
- 22 Potomac Chronicle**
None of the 2008 presidential candidates is talking about the big issues of federalism.

The Business of Government

LEAD STORY

- 55** A comparison of public- and private-sector benefits shows that government workers do have an advantage.

MANAGEMENT

- 56 Briefing:** Savings from early-retirement offers can be elusive.

ECONOMIC DEVELOPMENT

- 57** William Fulton on retaining industrial land in the new economy.

FINANCE

- 58 Briefing:** Growth in state tax collections is weak by historical standards.

TECHNOLOGY

- 60 Tech Talk:** Ellen Perلمان on "twittering" in the public sector.
- 61 Briefing:** Virginia mulls infrared scans to verify humans are in the HOT lanes.

HEALTH

- 62 Briefing:** Minnesota cracks down on gifts to doctors from drug companies.

TRANSPORTATION

- 63** Alex Marshall on the resurgence of streetcars in urban mass transit systems.

ENVIRONMENT

- 64** Tom Arrandale on regional fights over large-scale wind farms.

Contents

DECEMBER 2007 VOL 39 NO 21

Government Executive



STEPHEN WEBSTER

p. 1 of 2

FEATURES

Running the Light 22

The Bush administration has used its traffic-light system to rate agency management since 2001. Now we evaluate the president's progress.
By Brittany Ballenstedt, Robert Brodsky, Gautham Nagesh, Elizabeth Newell and Alyssa Rosenberg

Managing Technology 2008 32

Get ready for tougher privacy rules, an Internet overhaul, more procurement oversight, and a focus on health data and tighter security.
By Jill R. Aitoro

Technology Rush 40

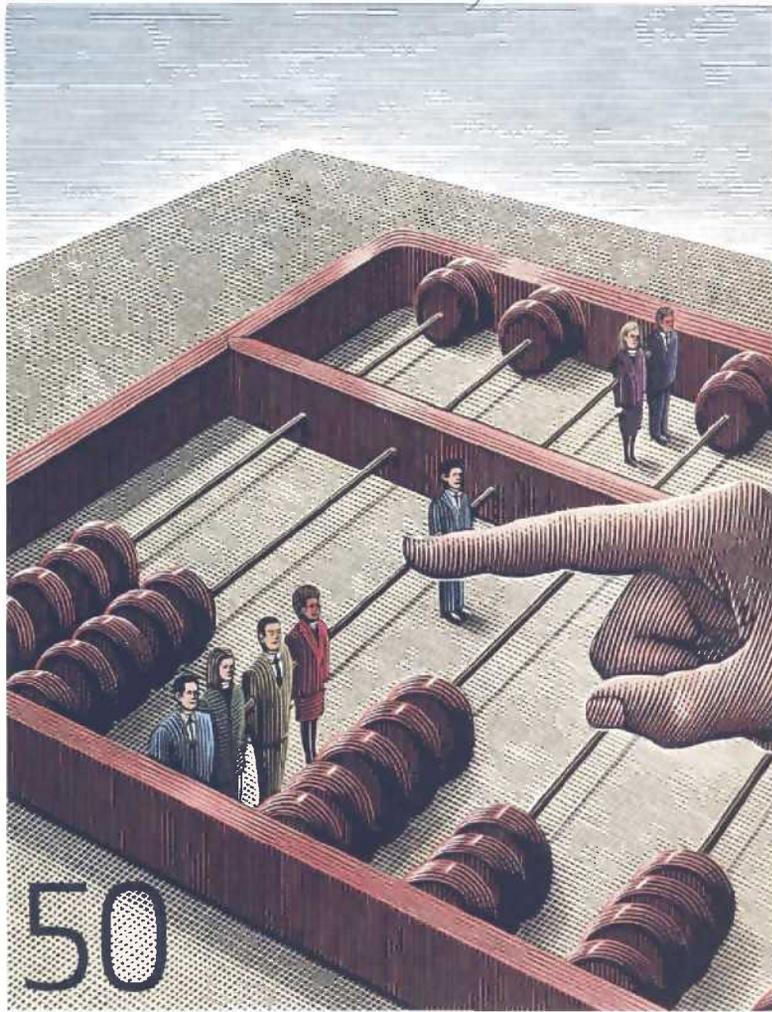
Just because it blows you away on screen doesn't mean it will help attract, hire and train the employees your agency needs.
By Brittany Ballenstedt and Alyssa Rosenberg

COVER STORY
BY BRITNEY BALLENSTEDT
AND ALYSSA ROSENBERG
ILLUSTRATION BY RYAN ELLER

Cover illustration by Ryan Eller

(cont.)

p. 2 of 2



NEWS+ANALYSIS

After Blackwater 9

There are few options if the besieged security contractor is phased out of Iraq.
By Robert Brodsky

The Letter of the Law 14

DHS might have funded shared services illegally by pooling earmarked funds.
By Elizabeth Newell

In Love and War 16

Divorce rates actually decline with deployments, study shows.
By Greg Grant

Recovery Architect 18

A Texas banker takes on the aftermath of the country's greatest national disasters.
By Katherine McIntire Peters

Vetting Veterans 20

Advocacy groups fear that disability changes could skew compensation for service-related injuries.
By Bob Brewin

ADVICE+DISSENT

Keeping It Real 47

Managing Technology More and more agencies have hopped on the blogging bandwagon. From concept to execution, here's how they did it.
By Jill R. Aitoro

Spy Management 2.0 49

Intelligence File Rather than control private agents, why not act like them?
By Shane Harris

Dollars and Census 50

Political World The national head count is about more than people—it's also about federal money and power.
By Charles Mahtesian

IN EVERY ISSUE

Editor's Notebook 6

We give our own grades to President Bush's management record.



16



47

TOP TO BOTTOM: CORBIS; DEAN J. KOEPLER/AP; MICHAEL MORGENTHAU

(Abstracted/Indexed in: Chemical Abstracts; Current Contents Physical, Chemical and Earth Sciences; Geo Abstracts; PASCAL/CNRS; PROMIS; and the Science Citation Index. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®)

Research Papers

Inter-laboratory comparison II: CO₂ isotherms measured on moisture-equilibrated Argonne premium coals at 55 °C and up to 15 MPa
 A.L. Goodman, A. Busch, R.M. Bustin, L. Chikatamarla, S. Day, G.J. Duffy, J.E. Fitzgerald, K.A.M. Gasem, Y. Gensterblum, C. Hartman, C. Jing, B.M. Krooss, S. Mohammed, T. Pratt, R.L. Robinson Jr., V. Romanov, R. Sakurovs, K. Schroeder and C.M. White 153

Use of laser ablation ICP-MS to determine trace element distributions in coals, with special reference to V, Ge and Al
 D.A. Spears, A.G. Borrego, A. Cox and R.M. Martinez-Tarazona 165

The Abnormal Condition Analysis used to characterize weathered discard coals
 N.J. Wagner 177

Cleats and their relation to geologic lineaments and coalbed methane potential in Pennsylvanian coals in Indiana
 W. Solano-Acosta, M. Mastalerz and A. Schimmelmann 187

Swelling-induced volumetric strains internal to a stressed coal associated with CO₂ sorption
 C.Ö. Karacan 209

Development and application of reservoir models and artificial neural networks for optimizing ventilation air requirements in development mining of coal seams
 C.Ö. Karacan 221

Organic geochemistry and petrology of barren and Mo–Ni–PGE mineralized marine black shales of the Lower Cambrian Niutitang Formation (South China)
 B. Kříbek, I. Sýkorová, J. Pašava and V. Machovič 240

Trace elements in the Goze Delchev coal deposit, Bulgaria
 G.M. Eskenazy and Y.S. Stefanova 257

Mineral and inorganic chemical composition of the Pernik coal, Bulgaria
 M.G. Yossifova 268

Fossil fuel energy resources of Ethiopia: Coal deposits
 A. Wolela 293

Interpretation of carbon dioxide diffusion behavior in coals
 N. Siemons, K.-H.A.A. Wolf and J. Bruining 315

Book Review
 Inventing pollution: Coal, smoke, and culture in Britain since 1800 325

RECEIVED
 2007 DEC 10 AM 10:58
 COMPTON
 DENVER, COLORADO



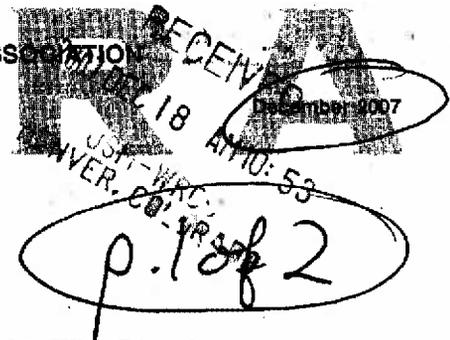


TABLE OF CONTENTS

TECHNICAL PAPERS

Modeling Parent and Metabolite Fate and Transport in Subsurface Drained Fields With Directly Connected Macropores
- *Garey A. Fox, George J. Sabbagh, Robert W. Malone, and Ken Rojas*.....1359

Estimating Evapotranspiration and Seepage for a Sinkhole Wetland From Diurnal Surface-Water Cycles
- *A. Jason Hill and Vincent S. Neary*.....1373

Water Quality Changes as a Result of Coalbed Methane Development in a Rocky Mountain Watershed
- *Xixi Wang, Assefa M. Melesse, Michael E. McClain, and Wanhong Yang*.....1383

Application of the Indicators of Hydrologic Alteration Software in Environmental Flow Setting
- *Ruth Mathews and Brian D. Richter*.....1400

Water Mass Balances for the Solaire and the 2020 Tower: Implications for Closing the Water Loop in High-Rise Buildings
- *Uta Krogmann, Clinton J. Andrews, Mookhan Kim, Gregory Kiss, and Clare Miflin*.....1414

Evaluation of Three Watershed-Scale Pesticide Environmental Transport and Fate Models
- *Ronald Parker, J. G. Arnold, Michael Barrett, Lawrence Burns, Lee Carrubba, S. L. Neitsch, N. J. Snyder, and R. Srinivasan*.....1424

Longitudinal-Vertical Hydrodynamic and Turbidity Simulations for Prediction of Dam Reconstruction Effects in Asian Monsoon Area
- *Jung Hyun Choi, Seon-A. Jeong, and Seok Soon Park*.....1444

Trace Metal Concentrations in an Intensive Agricultural Watershed in British Columbia, Canada
- *Ione M. Smith, Ken J. Hall, Les M. Lavkulich, and Hans Schreier*.....1455

Effects of Riparian Areas, Stream Order, and Land Use Disturbance on Watershed-Scale Habitat Potential: An Ecohydrologic Approach to Policy
- *Paul Ekness and Timothy Randhir*.....1468

A Sediment Budget for an Urbanizing Watershed, 1951-1996, Montgomery County, Maryland, U.S.A.
- *Nicholas E. Allmendinger, James E. Pizzuto, Glenn E. Moglen, and Mikolaj Lewicki*.....1483

Approaches to Evaluate Water Quality Model Parameter Uncertainty for Adaptive TMDL Implementation
- *Craig A. Stow, Kenneth H. Reckhow, Song S. Qian, Estel Conrad Lamon III, George B. Arhonditsis, Mark E. Borsuk, and Dongil Seo*.....1499

Review of Urban Stormwater Quality Models: Deterministic, Stochastic, and Hybrid Approaches
- *Christopher C. Obropta and Josef S. Kardos*.....1508

Upland Controls on the Hydrological Functioning of Riparian Zones in Glacial Till Valleys of the Midwest
- *P. Vidon and A. P. Smith*.....1524

(cont.)

Impacts of Residential Development on Humid Subtropical Freshwater Resources: Southwest Florida Experience
- Robert G. Maliva and Karl P. Hopfensperger1540

Climatic Fluctuations and Forecasting of Streamflow in the Lower Colorado River Basin
- Blakemore E. Thomas.....1550

Conservation-Induced Wastewater Flow Reductions Improve Nitrogen Removal: Evidence from New York City
- Kurt Paulsen, Jeffrey Featherstone, and Sean Greene1570

Automated Algorithms for Heuristic Base-Flow Separation
- Stuart S. Schwartz1583

Evaluation of Rio Grande Management Alternatives Using a Surface-Water/Ground-Water Model
- Laura Jean Wilcox, Robert S. Bowman, and Nabil G. Shafike1595

TECHNICAL NOTE

Revisiting the Thornthwaite and Mather Water Balance
- Peter E. Black1604

TITLE INDEX TO VOLUME 43-20071606

AUTHOR INDEX TO VOLUME 43-20071616

Land and Water

THE MAGAZINE OF NATURAL RESOURCE MANAGEMENT AND RESTORATION

Volume 51, Number 6

November/December 2007

Cover Story

Cover photo courtesy of Prairie Restoration, Inc.

Features

STREAMBANK STABILIZATION

- 6 Grand River Bank Stabilization – Applying Soft Engineering at a Large Scale

GEOMEMBRANES

- 10 Anaerobic Digester Provides Ideal Application for EPDM Geomembrane

EROSION & SEDIMENT CONTROL

- 15 Hydromulch Passes Test for Steep Slope Stabilization with the North Carolina DOT
by Jill Paack

VEGETATION MANAGEMENT

- 19 Salvation on the Sandbars: Invasive Vegetation Destroys Habitat

STREAM RESTORATION

- 24 Caltrans' Commitment to Water Quality
by Katherine Brown and Joanne LaFave

GEOGRIDS

- 30 County Gains Major Savings Using Geogrids
by Sara Gerland and Tanya Higdon

STORMWATER MANAGEMENT

- 34 Implementing Low Impact Development in a Rural County
by Chris Landgraf, George Hornewood, AICP, Rodney Hathaway and Jon Buede, PhD.

PRAIRIE RESTORATION

- 39 Prairie Restoration Projects Mimic "Back in the Day"

WETLANDS

- 43 Cooperation Wins for Wal-Mart and West Lafayette
by Bob Oertel

SOIL AMENDMENTS

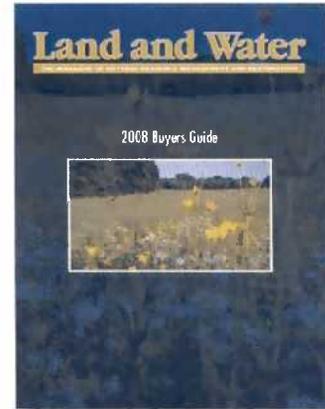
- 47 Know the Ground Rules for Intelligent Use of Fertilizers

LAND IMPROVEMENT CONTRACTORS OF AMERICA

- 49 Recycling Concrete and Asphalt
by Bob Oertel

52 BUYERS GUIDE

Land and Water presents its sixteenth Buyers Guide, the most comprehensive erosion control and water management product directory in the industry of natural resource management. The alphabetical COMPANY LISTINGS, beginning on page 53, will provide you with information on address, phone, fax, internet, as well as the company's services and products available. The CLASSIFICATIONS, beginning on page 78, reflect the wide range of products and services these companies provide.



2008 Buyers Guide

STAFF

Kenneth M. Rasch
President/Owner

Jane Rasch
Vice President/Owner

Amy Dencklau
Publishing Editor
landandwater@frontiernet.net

Shanna Egli
Assistant Editor
lweditor@frontiernet.net

Martha Steinkamp
Circulation Manager
lwsub@frontiernet.net

Emily Jones
ESCN News Coordinator
escn_news@frontiernet.net

Jennifer Beahler
Accounting
lwacct@frontiernet.net

Bob Oertel
Contributing Writer

Issy Weaver
Photographer

SALES

Gail Henry
Account Executive
russell2@lvcta.com
phone: 515-548-3872,
or 515-576-3191

Teri Jackson
Account Executive
JacksonBDH@mchsi.com
phone: 866-270-5444,
or 515-576-3191

Departments

- 5 Tell It Like It Is
- 91 Equip Board
- 92 Index to Past Articles
- 94 Advertiser's Index

Land and Water (ISSN 0192-9453) is published bimonthly by Land and Water, Inc., 320 A Street, P.O. Box 1197, Fort Dodge, IA 50501-0925. Telephone (515)576-3191, Fax (515)576-2606. *Land and Water* is edited for contractors, engineers, architects, government officials and those working in the field of natural resource management and restoration from idea stage through project completion and maintenance. Subscription rates: One year - \$29.00; Two years - \$35.00; Three years - \$50.00. Foreign - add \$12.00 per year. All non-paid subscriptions are mailed on a rotating basis to receive occasional copies at Fort Dodge, Iowa and at additional mailing offices. No part of this publication may be reproduced without the written consent of the publisher. *Land and Water* assumes no responsibility for statements expressed by contributors.

RECEIVED
2007 DE
SERVER, C... JR
Mining
ENGINEERING
A PUBLICATION OF SME
VOL. 59, NO. 12 DECEMBER 2007

COVER STORY



CONTENTS —

Nanotechnologies have the potential to change entire industries, including the use of mineral commodities. But there are potential health and environmental concerns that still need to be addressed, page 23. Cover design by Johanna McGinnis, Media Manager. Cover photo courtesy of Sandia National Laboratories, SUMMITT Technologies.

Copyright 2007 by the Society for Mining, Metallurgy and Exploration, Inc. All rights reserved. MINING ENGINEERING (ISSN 0026-5187) is published monthly by the Society for Mining, Metallurgy, and Exploration, Inc., at 8307 Shaffer Parkway, Littleton, CO, 80127-4102. Phone 1-800-763-3132 or 303-973-9550. Fax: 303-973-3945 or e-mail: sme@smanet.org. Website: www.smonet.org. Periodicals postage paid at Littleton, CO and additional mailing offices. Canadian post publications mail agreement number 0688688. POSTMASTER: Send changes of address to MINING ENGINEERING, 8307 Shaffer Parkway, Littleton, CO, 80127-4102. Article copies and back issues available on microfilm or microfiche from Linda Hall Library in Kansas City, Mo. Printed by Cummings Printing Co.

FEATURE ARTICLES

23
Nanotechnology — an emerging technology
David Buckingham

30
National Mining Hall of Fame celebrates its 20th anniversary in style
William Gleason

33
Research priorities in exploration, mining and processing: an interim report from the SME Research Council
Lee W. Saperstein

TECHNICAL PAPERS
(peer-reviewed and approved)

41
Back injury control measures for manual lifting and seat design
S. Gallagher and A.G. Mayton

50
Cable shovel health and longevity in formation excavation
S. Frimpong and Y. Li

TUNNELING & UNDERGROUND CONSTRUCTION

16
Tunnel Demand Forecast

19
Tunneling under glaciers: Galore Creek Mine access tunnel, British Columbia
D. Brox, P. Procter, C. Venne, F. Groleau, D. Lepinay, A. Argus, L. Frost, R. Anderson and M. Miniely

29
Preliminary design of the Caldecott fourth bore
B.B. Thapa, M.T. McRae and J.V. Greunen

DEPARTMENTS

- 4** The drift of things
- 6** President's page
- 7** Mineral economics and finance
- 10** Washington survey
- 13** Industry newswatch
- 40** New media
- 57** New products
- 59** Coming events
- 61** SME Foundation
- 67** Fine grind
- 68** Obituaries
- 69** Personal news
- 70** Rock in the box
- 71** In the aggregate
- 83** Professional services
- 87** 2007 ME index
- 112** Index of advertisers

Reproduction: More than one photocopy of an item from SME may be made for internal use, provided fees are paid directly to the Copyright Clearance Center, 27 Congress St., Salem, MA, 01970, USA. Phone 978-750-8400, fax 978-750-4470. Any other form of reproduction requires special permission from, and may be subject to fees by SME. SME is not responsible for any statements made or opinions expressed in its publications. Member subscription rate included in dues. Nonmember subscription rate, \$245; in Europe, \$275. Single copies \$25. July director issue, \$150.

PAY DIRT

MAGAZINE

A Voice For Western Mining Since 1938

October 2007

Cover Story: Augusta to go ahead with Rosemont 2

Mining in the West 5

Processing is under way again at Sterling's Sunshine mill • Lisbon Valley moving more ore to leach heaps to get more copper • Shoshone's Lakeview mill is back in operation • Mesquite is on schedule for January production • Atlanta studies parallel leaching, milling circuits • PolyMet boosts reserves by 51% at NorthMet

Energy 13

Denison gets permits for Tony M uranium mine in Utah • Growth in coal use high and will keep on going • Strathmore is moving ahead with partners on several uranium properties • Curtiss-Wright inks deal for Chinese nuclear reactor parts

Governments and Mining 15

NMA urges prompt, but sensible, reform of Mining Law • Mining Association places advertising reminders

Environment 16

Peabody wins 5 or 10 OSM awards for mine reclamation • Two other Western mines also win OSM awards

The Business of Mining 17

Barrick offers \$10 million for tool to "unlock" Veladero's silver • Mercator finds outlet for upcoming molybdenum output • Canyon seeking best way to develop its gold • FCX nets \$620 million from sale of wire and cable business • Kinross, Goldcorp swap assets in Canada, Chile • P&M Coal, Molycorp become Chevron Mining • Higher costs for Newmont in Nevada

Ad Index, 5; Mexico, 7; Canada, 8; Chile, 9; Latin America, 11; Western Briefs, 12; Companies & Markets, 20; Directory, 22; Supplying the Mines, 23; Low Grade, 24

On the Cover

Augusta Resource Corp. has gotten a positive feasibility study on its Rosemont property in southern Arizona and its board has given a go-ahead for development. To ensure that travelers along Route 83 won't have to look at a mining operation, it has planned its waste piles along the eastern boundary of the mine, giving them a gentle 3-1 slope that can easily be turned into grazing land for cattle already living on the property. That way, all that will be seen is typical southern Arizona rangeland.

PAY DIRT

Magazine

RECEIVED C. Epler
Publisher and Editor

2007 DEC 10 AM 10:57

GSM-WFCS
DENVER, CO 80202
Frank Barco
Publisher

Gary Dillard
Editor

Dan Eyde • Ted Eyde
George Leaming
Clarence Ellis
Chug-A-Lug
Correspondents

Frank Barco
Production Manager

Lupe A. Silva
Production Staff

Caryl L. Larkins
Advertising Sales/Circulation

Mary Farrington
Office Staff

Doug Harris
Maintenance Manager

PAY DIRT (USPS 424-000)

P.O. Drawer 48, Copper Queen Plaza
Bisbee, AZ 85603

(520) 432-2244; FAX (520) 432-2247

E-mail: paydirt@cablone.net

PAY DIRT is published monthly by
Copper Queen Publishing Co. Inc.

Subscription Rates

Single copy	\$ 3.00
One year	\$30.00
Two years	\$55.00
Three years	\$75.00

Canadian subscriptions add \$20.00 per year;
foreign subscriptions add \$50.00 per year

Advertising Rates

For information call (520) 432-2244

Periodical postage paid at Bisbee, AZ 85603

Postmaster: Please send Form 3579 to:

PAY DIRT, P.O. Drawer 48, Bisbee, AZ 85603

Rangelands



Volume 29 No. 6
December 2007

Published bimonthly

February, April, June, August, October, December

Copyright 2007 by the Society for Range Management

EDITOR-IN-CHIEF

Gary Frasier

7820 Stag Hollow
Loveland, Colorado 80538
(970) 663-3094
E-Mail: gfrasier@aol.com

MANAGING EDITOR

Erica Goodoff

Allen Press Publishing Services
810 East 10th Street
Lawrence, Kansas 66044
(785) 843-1234 ext. 251
E-Mail: egoodoff@allenpress.com

BOOK REVIEW EDITOR

Jan Wiedemann

4000 Stony Creek Lane
College Station, Texas 77845
E-mail: read.books@verizon.net

RANGELANDS STEERING COMMITTEE

Ed Fredrickson – Chair

Sandy Wyman – Chair-Elect

Robbie Baird LeValley

Dave Bradford

Kim McReynolds

Jennifer Pluhar

Gustavo Quintana-Martinez

Lisa Schmidt

RANGELANDS EDITORIAL BOARD

Kim McReynolds, Wilcox, Arizona – Chair

Jerry Barker, Boulder, Colorado – Chair-Elect

Jon Bates, Burns, Oregon

James Brunner, Medford, Oregon

Jay Davison, Fallon, Nevada

Jerry Dodd, Lawton, Oklahoma

Deb Frasier, Benkelman, Nebraska

Michael Frisina, Butte, Montana

Kimberly Haile, Bryan, Texas

Bruce Healy, Tynan, Texas

Lynn Huntsinger, El Cerrito, California

Dustin Johnson, Burns, Oregon

John Mitchell, Fort Collins, Colorado

Tom Monaco, Logan, Utah

Marilyn Samuel, Lehigh Acres, Florida

Ed Smith, Minden, Nevada

Jim Thorpe, Newkirk, New Mexico

Jan Wiedemann, College Station, Texas

Lori Ziegenhagen, Burns, Oregon

RANGELANDS (ISSN 0190-0528) is the official publication of the Society for Range Management (SRM) and is published bimonthly in February, April, June, August, October, and December. Publishing services are provided by Allen Press Publishing Services, 810 East 10th Street, Lawrence, Kansas 66044. SRM members receive *Rangelands* as a benefit of membership. Calendar-year subscription prices are \$125.00–185.00 for institutions. Additional surface charges may apply to subscribers located outside of the USA. The online version of *Rangelands* can be found online at www.srmjournals.org. Subscriptions, changes of address, and requests for missing issues should be sent to Allen Press Association Management, P.O. Box 7065, Lawrence, Kansas 66044.

Editorial correspondence should be addressed to Gary Frasier, 7820 Stag Hollow, Loveland, Colorado 80538. Page proofs should be returned to the Managing Editor, Erica Goodoff, 810 East 10th Street, Lawrence, Kansas 66044.

PERIODICALS POSTAGE paid at Denver, Colorado, and additional offices.

POSTMASTER: Address service requested to *Rangelands*, PO Box 7065, Lawrence, Kansas 66044.

PRINTED IN USA

Columns

- 2 **Frasier's Philosophy**
Gary Frasier

Feature Articles

- 4 **What's Limiting: Quality or Quantity?**
Robert K. Lyons and Richard V. Machen
- 8 **Cattle, Browse, and Range Health**
Robert K. Lyons and Jerry W. Stuth
- 12 **A Physiological Basis for Controlling Leafy Spurge on Nebraska Rangeland**
Rob Mitchell, Corey Moffet, and Ron Sosebee
- 15 **Cheatgrass and Grazing Rangelands**
James A. Young and Charlie D. Clements
- 21 **Dutchwoman Butte Revisited**
Jim Sprinkle, Mick Holder, Chas Erickson, Al Medina, Dan Robinett, George Ruyle, Jim Maynard, Sabrina Tuttle, John Hays, Jr., Walt Meyer, Scott Stratton, Alix Rogstad, Kevin Eldredge, Joe Harris, Larry Howery, and Wesley Sprinkle
- 35 **Setting the Record Straight: A Response to "Sage-Grouse at the Crossroads"**
J. W. Connelly, C. E. Braun, M. A. Schroeder, and C. A. Hagen
- 40 **Which Direction Is Forward: Perspectives on Rangeland Science Curricula**
T. L. Thurow, M. M. Kothmann, J. A. Tanaka, and J. P. Dobrowolski
- 52 **The SRM Spring 2007 Membership Survey**
SRM Staff
- 57 **An Interview with Dr Elisabeth Huber-Sannwald**
Susan R. McGuire
- 59 **Essays of a Peripheral Mind**
K. M. Havstad

Departments

- 61 **Listening to the Land**
- 63 **Browsing the Literature**
- 66 **Highlights, *Rangeland Ecology & Management*, November 2007**
- 69 **Book Review**
- 70 **Index for 2007**

Front and Back Cover: Animal watering area on Zambezi river plain, near Victoria Falls, Zimbabwe. Photo by Gary Frasier.

Restoration Ecology

Volume 15, Number 4, December 2007

THE JOURNAL OF THE SOCIETY FOR ECOLOGICAL RESTORATION INTERNATIONAL

Cover: Assisted natural regeneration (ANR) restoration site in Bohol, Philippines, after grass pressing. Natural woody regeneration has been uncovered and released from grass competition to accelerate forest succession. Photo taken by Charles Dugan. See related article by Shono et al. on pages 620-626.

Contents

p. 1 of 2

- EDITORIAL 597 **Restoration Ecology: Are We Making an Impact?** R. J. Hobbs
- EDITORIAL OPINION 601 **You Can't Not Choose: Embracing the Role of Choice in Ecological Restoration**, S. K. Allison
- OPINION ARTICLE 606 **Biodiversity and the Heterogeneous Disturbance Regime on Military Training Lands**, S. D. Warren, S. W. Holbrook, D. A. Dale, N. L. Whelan, M. Elyn, W. Grimm, and A. Jentsch
- REVIEW ARTICLES 613 **Two-Sided Edge Effect Studies and the Restoration of Endangered Ecosystems**, C. R. Fonseca and F. Joner
- 620 **Application of Assisted Natural Regeneration to Restore Degraded Tropical Forestlands**, K. Shono, E. A. Cadaweng, and P. B. Durst
- RESEARCH ARTICLES 627 **Effectiveness of Turf Stripping as a Measure for Restoring Species-Rich Fen Meadows in Suboptimal Hydrological Conditions**, D. Van der Hoek and M. M. P. D. Heijmans
- 638 **Recipient Environment More Important than Community Composition in Determining the Success of an Experimental Sponge Transplant**, E. L. Johnston and G. F. Clark
- 652 **Restoration of Prairie Community Structure and Ecosystem Function in an Abandoned Hayfield: A Sowing Experiment**, B. L. Foster, C. A. Murphy, K. R. Keller, T. A. Aschenbach, E. J. Questad, and K. Kindscher
- 662 **Selective and Non-Selective Control of Invasive Plants: The Short-Term Effects of Growing-Season Prescribed Fire, Herbicide, and Mowing in Two Texas Prairies**, M. T. Simmons, S. Windhager, P. Power, J. Lott, R. K. Lyons, and C. Schwope
- 670 **Short Term Response of Land Birds to Ponderosa Pine Restoration**, W. L. Gaines, M. Haggard, J. F. Lehmkuhl, A. L. Lyons, and R. J. Harrod
- 676 **Vegetation Control Treatments to Favor Naturally Regenerated *Betula alleghaniensis* Saplings Following Seed-Tree Cut: Sapling Monitoring Two Years after Treatment**, D. Bouffard, P. Nolet, S. Delagrance, F. Lorenzetti, and S. Yamasaki

RECEIVED
NOV 26 AM 11:03
ENVIRONMENTAL SCIENCE CENTER
UNIVERSITY OF CALIFORNIA

Restoration Ecology Vol. 15, no. 4 (Dec. 2007)

p. 2 of 2

- 688 **Manipulating the Quantity, Quality, and Manner of C Addition to Reduce Soil Inorganic N and Increase C4:C3 Grass Biomass**, J. S. Bleier and R. D. Jackson
- 696 **Common and Uncommon Understory Species Differentially Respond to Restoration Treatments in Ponderosa Pine/Douglas-Fir Forests, Montana**, E. K. Dodson, K. L. Metlen, and C. E. Fiedler
- 709 ***Polytrichum strictum* as a Nurse-Plant in Peatland Restoration**, E. V. G. Groeneveld, A. Massé, and L. Rochefort
- 720 **Estimating the Effect of Cropland to Prairie Conversion on Peak Storm Run-off**, P. J. Gerla
- 731 **Responses to Riparian Restoration in the Spring Creek Watershed, Central Pennsylvania**, R. F. Carline and M. C. Walsh
- 743 **Wetland Creation, Restoration and Conservation. The State of the Science**, Editor: W. J. Mitsch, Reviewer: H. Čížková
- 745 **The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration**, Editors: S. Jose, E. J. Jokela, D. L. Miller, Reviewer: P. Z. Fulé
- 747 **Return to the River: Restoring Salmon to the Columbia River**, Editor: R. N. Williams, Reviewer: R. Hilborn
- 749 **Author Index**

BOOK REVIEWS

INDEX

Restoration Ecology

Volume 15, Number 4, December 2007

Supplement

THE JOURNAL OF THE SOCIETY FOR ECOLOGICAL RESTORATION INTERNATIONAL

Cover: Fourteen-year-old restored jarrah forest in Western Australia. The foreground and middleground show forest restored after Alcoa's bauxite mining; unmined jarrah forest appears in the background. Photo taken by John Koch, July 2006.

Contents

p. 1 of 2

SUPPLEMENT:
ECOSYSTEM RESTORATION
FOLLOWING BAUXITE
MINING IN THE
JARRAH FOREST OF
WESTERN AUSTRALIA

- S1 **Jarrah Forest Ecosystem Restoration: A Foreword**, D. T. Bell and R. J. Hobbs
- S3 **Bauxite Mining Restoration by Alcoa World Alumina Australia in Western Australia: Social, Political, Historical, and Environmental Contexts**, J. H. Gardner and D. T. Bell
- S11 **Alcoa's Mining and Restoration Process in South Western Australia**, J. M. Koch
- S17 **Restoring Jarrah Forest Trees after Bauxite Mining in Western Australia**, J. M. Koch and G. P. Samsa
- S26 **Restoring a Jarrah Forest Understorey Vegetation after Bauxite Mining in Western Australia**, J. M. Koch
- S40 **Hydrology and Bauxite Mining on the Darling Plateau**, J. T. Croton and A. J. Reed
- S48 **Development of a Winged Tine to Relieve Mining-Related Soil Compaction after Bauxite Mining in Western Australia**, J. T. Croton and G. L. Ainsworth
- S54 **Regolith Strength, Water Retention, and Implications for Ripping and Plant Root Growth in Bauxite Mine Restoration**, G. A. Kew, F. C. Mengler, and R. J. Gilkes
- S65 **Root Architecture of Jarrah (*Eucalyptus marginata*) Trees in Relation to Post-Mining Deep Ripping in Western Australia**, C. Szota, E. J. Veneklaas, J. M. Koch, and H. Lambers
- S74 **Beneficial Soil Microorganisms of the Jarrah Forest and Their Recovery in Bauxite Mine Restoration in Southwestern Australia**, D. A. Jasper
- S85 **Minimizing the Spread of a Soil-Borne Plant Pathogen during a Large-Scale Mining Operation**, I. J. Colquhoun and N. L. Kerp
- S94 **Return of Ecosystem Function to Restored Bauxite Mines in Western Australia**, C. D. Grant, S. C. Ward, and S. C. Morley
- S104 **Invertebrates and the Restoration of a Forest Ecosystem: 30 Years of Research following Bauxite Mining in Western Australia**, J. D. Majer, K. E. C. Brennan, and M. L. Moir

RECEIVED
AM11-03
02/27/08

Restoration Ecology Vol. 15, no. 4 Supplement
(Dec. 2007)

p. 2 of 2

- S116 **Vertebrate Fauna Recolonization of Restored Bauxite Mines—Key Findings from Almost 30 Years of Monitoring and Research,**
O. G. Nichols and C. D. Grant
- S127 **Fire and Silvicultural Management of Restored Bauxite Mines in Western Australia,** C. D. Grant, M. A. Norman, and M. A. Smith
- S137 **Synthesis: Is Alcoa Successfully Restoring a Jarrah Forest Ecosystem after Bauxite Mining in Western Australia?**
J. M. Koch and R. J. Hobbs

SOIL SCIENCE

An Interdisciplinary Approach to Soils Research

RECEIVED

2007 DEC 26 AM 11:04

UNIVERSITY OF COLORADO

DECEMBER 2007

CONTENTS

Vol. 172 No. 12

- SOIL CARBON SEQUESTRATION TO MITIGATE CLIMATE CHANGE AND ADVANCE
FOOD SECURITY 943
R. Lal, R. F. Follett, B. A. Stewart, and J. M. Kimble
- HUMANITY'S TRANSFORMATION OF EARTH'S SOIL: PEDOLOGY'S NEW FRONTIER 957
Daniel deB. Richter Jr.
- OBSERVATIONS OF MAGNETITE DISSOLUTION IN POORLY DRAINED SOILS 968
David A. Grimley and Nancy K. Arruda
- EVALUATION OF ADDED NITROGEN INTERACTION EFFECTS ON RECOVERY
EFFICIENCY IN IRRIGATED COTTON 983
E. Randall Norton and Jeffrey C. Silvertooth
- WATER TREATMENT RESIDUALS AMENDED SOILS RELEASE MN, NA, S, AND C 992
Jeffrey M. Novak, Ariel A. Szogi, Donald W. Watts, and Warren J. Busscher
- BROILER LITTER RATE EFFECTS ON NUTRIENT LEACHING FROM SOIL UNDER
PASTURE VEGETATION IN THE OZARK HIGHLANDS 1001
*Amanda L. Pirani, Kristofor R. Brye, Brian E. Haggard, Tommy C. Daniel,
and John D. Mattice*
- AGGREGATE FORMATION IN CHLORITIC AND SERPENTINITIC ALPINE SOILS 1019
Gloria Falsone, Luisella Celi, and Eleonora Bonifacio