



Association of Environmental and Engineering Geologists

STUDENT NIGHT

Poster Presentations

A Brunton GEO Transit will be awarded to the best presenter

Silent Auction

Hosted by the Student Chapter of AEG

Homebrewed Beer

by AEG member Janine Weber

Abstracts:

Engineering Design Recommendations for Deep Water Wells for the Southern Black Hills Water Users District

Dustin Biondi, Kyle Davis, Jacob Dow, Darren Dyk, Evan Keffeler, Cliff Kling, Katrina Knodel, and Justine Miller – South Dakota School of Mines

An additional water supply of 500 gallons per minute was designed for the Southern Black Hills Water Users District. NE ¼ Sec. 32, T. 7 S., R. 6 E., Fall River County, South Dakota was chosen as the site to drill a well, based upon water quality, drilling depth, and geologic structure. A groundwater model of the area was developed, which predicted minimal artesian head reduction at a pumping rate of 500 gallons per minute with the predicted transmissivity value. A permit application was completed to demonstrate the availability of groundwater in the Madison aquifer at Section 32. A pumping test was designed to determine the aquifer characteristics in the area. The Madison aquifer is susceptible to contamination due to its high permeability and recharge from stream flow. A sampling plan for the first year was designed to meet state and federal regulations for drinking water quality. A total budget of \$868,500 was calculated for the project.

Abstracts continued on next page

MEETING DATE

FRIDAY
March 26th, 2010

TIME

5:45 p.m. Social Hour,
Silent Auction and
Poster Presentations
6:45 p.m. Dinner

LOCATION

Room 243
Berthoud Hall
Colorado School
of Mines
1516 Illinois St.
Golden, Co 80401
See Map Below

COST

\$25 Members
\$27 Non-members
Students Free

RESERVATIONS

meetings@aeqrms.org
or
<http://www.aegrms.org/RSVP.htm>

BY NOON,
TUESDAY
March 23rd

GIS and Web based Water Resources Management for Oil Shale Development in the Western United States, Stage I

Matthew D. Minnick and Wendy Zhou - Department of Geological Engineering, Colorado School of Mines

Development of oil shale resources in the western United States will require significant quantities of water for surface or in-situ retorting, reclamation, and associated economic growth. The Department of Energy (DOE) estimates the use of 105 to 315 million gallons (2.5 to 7.5 million barrels) of water per day for an oil shale industry producing 2.5 million barrels of oil a day. It is estimated that an additional 58 million gallons (1.4 million barrels) of water per day will also be needed to support the population growth and industry infrastructure. This three year project funded by the DOE focuses on the development of the oil shale bearing Green River Formation in the Piceance Basin of western Colorado. A Geographic Information Systems (GIS) based regional water resource infrastructure, and web-based data warehouse for storing, managing, analyzing, visualizing, and disseminating Piceance Basin oil shale data are being developed to address both water quantity and quality issues. The first stage of this project presented here focuses on data acquisition and storage in the form of the ESRI ArcHydro surface and groundwater data models to support the state of art ArcGIS Server Enterprise application and analytical modeling of the hydrologic systems. The ArcHydro database schema provides the structure for the coupling of both surface water and groundwater observational data along with output from numerical modeling to support dynamic analytical models to address water availability. This robust spatial relational model combined with customized data and analytical toolsets accessed via the web will provide the DOE with a dynamic water resource assessment and management tool that can be applied to other oil shale basins.

Lifespan of Horizontal Wick Drains

Kevin T. Mininger and Paul M. Santi – Department of Geological Engineering, Colorado School of Mines

Horizontal drains have been used since the 1930s to increase the stability of slopes by lowering the groundwater table. Since their inception many improvements have been made to the installation method and drain materials, including the development of horizontal wick drains. This new technique has proven effective at stabilizing slopes of fine grained soils, while being less expensive and faster to install than PVC pipe drains. Yet the adoption of this horizontal drain technique has been slow, in part due to uncertainty about the degree of clogging over long periods of time and when the drains may need to be replaced. To address these concerns, the reduction in flow rate compared to new drains was measured for exhumed wick drains that had been in the ground between one and 11 years. The results of this study suggest that within the range of soil conditions in which horizontal wick drains are likely to be used, drain failure due to clogging is not expected. Visual examinations suggest that these drains are not as prone to precipitant buildup as pipe drains. While soil particle buildup does occur, the non-woven filter fabric provides numerous potential flow paths allowing sufficient water to pass even when much of the filter is clogged. The degree of clogging that a drain experiences is affected by the properties of the surrounding soil. Drains in soils with 85 percent or greater fine grains exhibited a reduction in flow rate of up to 85 percent, while those in soils with 60 percent or less fines displayed a reduction of no more than 42 percent. Despite these levels of clogging, horizontal wick drains are able to transport at least two times more water than the soil will introduce, even under the most demanding scenario expected. The critical reduction in flow rate necessary to cause drain failure is greater than 99 percent in the majority of anticipated scenarios. Another outcome of this study is a chart used to select the proper drain spacing based on soil hydraulic conductivity and required drain length, in order to prevent exceeding the flow rate capacity of a drain.

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It's not too late to be a Student Night Sponsor! Student Night sponsorships help cover the cost of student dinners at student night and at section meetings, lodging for the SDSMT students who travel from Rapid City, outreach, and visiting speaker expenses. The sponsorship form is available on the [aegrms.org](http://www.aegrms.org) website at http://www.aegrms.org/2010_Student_Night_Sponsor_Form.pdf. Thank you in advance for your support.

Upcoming Meetings

April 8	AEG-RMS Section Meeting Speaker: Mike West , Michael W. West & Associates Topic: TBD	CSM Berthoud Hall
May 13	AEG-RMS Section Meeting & Family Night Speaker: Vince Matthews, Colorado Geological Survey Topic: TBD	CSM Berthoud Hall

MEMBER NEWS AND OTHER EVENTS

31st Annual Short Course on Grouting Fundamentals and Current Practice: Colorado School of Mines, Golden CO June 7-11, 2010

The Colorado School of Mines is hosting the 31th annual short course on Grouting Fundamentals and Current Practice. This course covers injection grouting as a method to improve soil settlement and strength characteristics, and to decrease permeability of soil and rock masses. Major topics covered include properties of cementitious and chemical grouts, procedures for cement and chemical grouting, field monitoring and verification, grouting rock under dams, grouting of rock anchors and micropiles, deep mixing, jet grouting, diaphragm walls, compaction grouting, slab jacking, structural grouting, and grouting for underground structures. Included in the curriculum is a field demonstration of compaction and permeation grouting, flow of ultrafine cement, grout mixing, use of cellular concrete in annular grouting, overburden drilling, grouting of rock anchors, and use of packers.

For detailed course information and registration, visit:

http://outreach.mines.edu/cont_ed/grouting/index.html

For technical info, contact Scott Kieffer: kieffer@tugraz.at

Dinosaur Ridge Needs Volunteers for Boy Scout Day!

DATE: Saturday May 1st

TIME: 9:00 am-3:00pm

Location: Dinosaur Ridge, Morrison, Colorado

Dinosaur Ridge is looking for volunteers for Boy Scout Day at Dinosaur Ridge! We need scientists and engineers to help Boy Scouts earn badges in geology.

Volunteers needed for 2.5 hour blocks or a 5 hour day! (lunch included for full day help)

Come share your passion for Science with Boy Scouts and their families! Do you like the great outdoors? Do you love working with Students? Volunteer today!

Contact Clare Marshall – dinodiscovery@dinoridge.org

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