



*Natural building blocks for quality of life*

## SME/NSSGA Student Design Competition

March 29, 2010

During the fall semester of the 2009/2010 academic year, interested schools from around the globe were given 3 weeks to complete Phase I of the SME/NSSGA 2009-2010 Student Design Competition, a two-phase academic event focused on actual data from a mining company. This year Phase I required students to create a purchase price and terms of acquisition for a surface quarry. Detailed mine planning, plant layout, equipment purchases, and blast design were to be included in the project.

The top six teams were announced in January of 2010: University of Nevada Reno's Sudden Peak Mining; Virginia Tech's New River Aggregates. Penn State's Penn State Mining Company; Montana Tech's Team Agg-celent; South Dakota School of Mines and Technology's Consulting Group 3; and University of Utah's DMC Engineering.

These six teams met in Phoenix, Arizona, for Phase II of the Competition. For 36 hours these consulting groups worked tirelessly to create a presentation to a "board of directors" (our judges' panel) detailing acquisition conditions and purchase price for a surface quarry, along with safe design and mitigation measures to carry out operations and address increases in production. AggFlow, Rocscience (*Dips, Swedge, RocPlane, and Slide* were provided), and various mine design/CAD software was used to devise the solutions. With no communication to the outside world and only their personal experience and research to rely upon, all six teams delivered strong and well-thought-out proposals.

The third place team at this year's competition was South Dakota School of Mines and Technology's Consulting Group 3. Their presentation was well-prepared and easily understood by a wide audience, and their pit wall stability mitigation was discussed in superb technical detail. "Going into the Student Design Competition, I had no idea what to expect... [It] turned out to be one of the most valuable experiences I have had in my college career," says team member Megan Buurma. Congratulations to all the members: Megan Buurma, Kori Clyde, Alex Ferguson, Ernest Lau, Nathan Swanson, and Jennifer Ward.



*SDSMT defending their work to the judges' panel*

Coming in second was University of Nevada Reno's Sudden Peak Mining. The proposal was strong, and each member of the team exhibited cool professionalism in their presentation. Their defense to



*Students from UNR thanking the judges*

the judges' panel was strong as well.

"This was my third (and final) year competing in the second phase of the competition. In the past three years the design problem, which was great to begin with, has gotten exponentially better. Two aspects of this year's competition really stick out in my mind; the quarry acquisition assessment and the rock mechanics problem. Both were really great additions. The competition organizers do a really great job of setting up problems that are not only challenging at a college level but also relevant at a professional level. There are a lot of aspects of aggregates, and mining in general, that I've

learned while participating in the competition," states senior Brandon MacDougall. Congratulations to the members: Brandon MacDougall, Clay Armstrong, Alex Hatt, Barret Loehden, Jared Sylvester, and Drew Wheeler.

But only one company wins on bid day. Congratulations to the Virginia Tech's New River Aggregates! "The best part about this competition to me was the element of competition itself. Knowing that it was my team against everyone else was very motivating..." says team member Phyllip Bowers. Their proposal incorporated a well-rounded presentation incorporating safe slope stability, plant layout, reclamation plan, economic sensitivity analysis, and a range of proposed bid prices for the board to choose from with the resulting returns and value associated."

The most challenging part of the Student Design Competition was coordinating all of the problems that each member was tackling and ensuring that all aspects of the problem were addressed. Also, completing the slope stability analysis in phase 2 was very challenging because we had to teach ourselves how to use several new programs on the spot in a small time span to address all slope stability issues for the site..." says member William Hutchins. Congratulations to each of the team's members: Phyllip Bowers, Benjamin Fahrman, Scott Hutchins, William Rose, Daniel Sadtler, and Susanne Underwood.



Virginia Tech presenting their proposal

This year's competition may be over, but plans are already in the works for next year's problem. We hope to see diverse and innovative ideas next year, and we encourage any and all students to consider participation. When asked to give advice to next year's teams, the participants gave the following responses:

- "The SME student design competition will change every year, the next generation of participants will face new challenges that must be overcome...embrace the opportunity to challenge yourself." –*Phyllip Bowers, Virginia Tech.*
- "...no matter the outcome of the competition this is a great opportunity to make connections with industry leaders and be part of a fun experience that will perpetuate your career. The purpose behind the competition is to build relationships and learn how to collaborate with different personalities. These are the things that you cannot be taught in a classroom, but through experience and this competition embodies that idea." –*Nancy Tracy, Montana Tech.*
- "Do it. The experience and exposure to a real mining scenario, along with the industry knowledge and contacts you gain from such a unique project as this competition, are invaluable." –*Scott Hutchins, Virginia Tech.*
- "This year's Design Competition was a great experience that was definitely different from years past... For the students next year, the only advice I can give is good luck, work hard and enjoy the experience." –*Dan Sadtler, Virginia Tech.*



Teams presenting and defending Phase II solutions, from left to right: University of Utah, Montana Tech, Penn State

The Student Design Competition Committee would like to thank all of the teams for participating. They all put in a tremendous amount of effort and addressed all aspects of mining, from financial analysis to reclamation, pit and plant design to justification for selection, sensitivity analysis to blast design. Their experience just in participating shows their passion for this industry.

Thank you to our judges who put in hours of reviewing papers, created constructive comments to help each team learn, and ran the open forum for the teams who did not make the top 6 – your expertise and passion is invaluable to these students.

The Student Design Competition Committee would also like to extend our thanks to the sponsors. Without their support, none of this would be possible.

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See the photos of the Judges' Table and the winning schools on the next page.



*Judges' Table from left to right:  
Bob Archibald, Brendan Fisher, Deb Keeland Eric Achelpol, Robert Meyers, Kwame Awuah-Offei*



*First Place Team: **Virginia Tech** - 'New River Aggregates' - from left to right  
front row: Dr. Erik Westman, Susie Underwood, Scott Hutchins, Ben Fahrman, Phyllip Bowers, Ricky Rose,  
Dan Sadtler, Dr. Greg Adel; back row of classmates: Laird Horigan, Jeff Kerr, Andrew Calhoun*



*Second Place Team: **University of Nevada Reno** - 'Sudden Peak Mining' - from left to right:  
Advisor Pierre Mousset-Jones, Drew Wheeler, Jared Sylvester, Brandon MacDougall,  
Clay Armstrong, Barret Loehden, Alex Hatt*



*Third Place Team: **South Dakota School of Mines and Technology** - 'Consulting Group 3'  
from left to right: Kori Clyde, Megan Buurma, Ernest Lau, Nathan Swanson, Alex Ferguson,  
Jennifer Ward, with SDC Chair Brady Johnson*