August 11 was graduation day for students attending the National Geothermal Academy (NGA) on the Reno campus of the University of Nevada. After the ceremony, I talked with Jennifer Livermore at the reception—her quote is the title. We had met a few weeks earlier at the NGA module on geothermal power plants and she attended every other module, as well, calling her time at the NGA “… a complete whirlwind, an immersion in geothermal. I learned the terminology and know so much more about geothermal and drilling. The eight weeks were quite intense. I will be contacting the professors and my fellow students—and some are my friends for life. Everyone got along. It was just amazing.”

Fifty-four students (28% female), from 10 countries, were enrolled in the program, which began on June 20. Twenty-seven students—exactly one half—took all nine modules. The rest came and went, attending some modules and not others. But everyone had a strong academic background. In fact 21 of the NGA students are graduate students and 4 are undergraduates, 17 are working in industry, 7 in academia, and 5 in government.

Dr. Joe Moore, a co-instructor with Dr. Dave Blackwell on resource assessment and evaluation, returned to Reno on graduation day, when I asked about his 35 students. He said their questions had been great. His course included a field trip day and two evening sessions with microscopes. About half of the students were geologists and...
half engineers, and in his class the geologists and engineers worked together in small groups to help each other solve problems.

On the theory that power plants are an important topic not widely understood, I attended the first two days of the geothermal power plant course offered by Drs. Ronald DiPippo and Brian Anderson. On July 25 at 8:30 am, the professors with their colleagues on every geothermal topic. “Smart geothermal decisions,” he said, “are made when everyone talks together.”

Dr. DiPippo mentioned a crucial point about geothermal power plants. He said, “Nothing is more dangerous in geothermal than prematurely ordering the energy-conversion system.” He said a mentor at Brown University, Dr. Joseph Kestin, told him this 30 years ago and the maxim still holds true today—and still sometimes is ignored. For surprisingly, the inner workings of a geothermal power plant are very delicate—not as they may appear—and designed entirely around the geothermal fluids meant to run them.

Well fluid types, temperatures, pressures, and flow rates all determine the internal structure of the plant. Whenever power plants are designed and built without complete fluid data, and if it turns out the actual fluid data do not match the specifications used by the manufacturer, the results can range from disappointing to catastrophic. To generate electricity economically and efficiently, a geothermal power plant needs to have the fluids it was designed for.

Toni Boyd, an instructor from the GeoHeat Center at the Oregon Institute of Technology (OIT), came to Reno personally to take the NGA students to Klamath Falls to learn about low-temperature geothermal development. She said her OIT classes covered the whole gamut of direct use: heat pumps, greenhouses, agriculture, space heating, and district heating. At the Reno graduation ceremony, the students presented Toni with an NGA-engraved beer mug in appreciation of her efforts.

I spoke with Dr. Wendy Calvin, the NGA program director, on graduation day. She was happy but still facing a few weeks of wrap-up activities. Dr. Calvin said, “The NGA went really well. The students are beginning to appreciate the unique nature of their experiences. Now that they’ve survived—they are saying: yes, it actually was really good. The final student project has
made them focus on the geothermal areas they are heading toward. They all have stories to tell, and I hope we can do this again. Because we had such a tight timeline this first session, we didn’t have enough time for publicizing the program. I hope the applications can be sent out earlier next year,” she said.

Stanford professor Dr. Roland Horne taught the NGA reservoir engineering module and returned to Reno for the graduation ceremony. Asked to characterize the NGA, he said, “It is a brilliant success. The kids are totally engaged and really worked for the whole eight weeks. Many students are already significantly along a geothermal path and they all have established a geothermal foundation. The NGA should be continued as long as a demand exists for hiring the students.

“The strength of the program is that it is comprehensive, and this makes it unique in the US. The course materials in the NGA program are something no single professor or university could have presented, because every person and institution has different skill sets.

“It is important to note, as well, that half of the students came for separate pieces of the program. I wish something like the NGA had been available to me when I was 25 or even 45 years old. Clearly, the program itself wouldn’t be here without support from the US Department of Energy (DOE), and I believe the NGA needs a few more years of momentum to become self-sustaining,” he concluded.

A DOE grant of $995,000 was awarded to the University of Nevada, Reno, in March 2010 for...
Dr. Xiuhua Zheng, an NGA student from China, meets Charlene Wardlow at the graduation reception sponsored by Ormat Technologies, Inc. Dr. Zheng is a professor at China University of Geosciences in Beijing and has a doctorate in geological engineering. She has worked extensively to engineer and drill geothermal wells, including wells in Tibet. She plans to teach what she has learned at the NGA to professors in her university. Charlene Wardlow is Director of Business Development for Ormat Technologies, Inc.

The NGA, basically, is a consortium of leading geothermal schools, including Cornell University, the Oregon Institute of Technology, Southern Methodist University, Stanford University, the University of Utah, and others. The focus on geothermal science and technology was designed to bring students, professors, and industry professionals from around the country to Reno to learn about geothermal energy.

Throughout the sessions, students talked with industry representatives. These included Steve Hirsch from Geothermal Development Associates;
Industry collaboration ensures the inclusion of specific areas of geothermal expertise,” said Gina Tempel, Associate Dean for the College of Science at the University of Nevada, Reno. “We are training a US national-energy infrastructure to develop the country’s geothermal resources,” she concluded.