Anthrax clean-up by mother-daughter team

October 26 2010, By Linda A. Lucchetti

Alison Burklund discusses her project, "Finding the Optimal Decontamination Method for Bacillus Anthracis Spores in a Contaminated Drinking Water System," at the 2009 Tri-Valley Science and Engineering Fair where she placed first in the biochemistry category.

Alison Burklund has a collection of ribbons and awards that she's picked up for her outstanding projects at the Tri-Valley Science and Engineering Fair, a collection that began when she was in the eighth grade.

But this year, Burklund, now a senior at the Athenian School in Danville, wanted to try her hand at something different. Being passionate about her science studies, she decided to write an article for a science journal.

Burklund's mother, Ellen Raber, the deputy program director for Counterterrorism within the Global Security Principal Directorate, liked

the idea and not only was supportive, but offered to co-author the article.

The mother and daughter team recently saw their study entitled, "Decontamination Options for Bacillus anthracis-Contaminated Drinking Water Determined from Spore Surrogate Studies," published in the October issue of Applied and Environmental Microbiology.

Raber and Burklund's research analyzed and tested five chemicals that could potentially be used to wipe out *Bacillus anthracis* spores in a large public water system without posing health risks or damaging the environment.

The basis for the article came from Burklund's participation last March in the Tri-Valley Science and Engineering Fair, where she placed first in the biochemistry category with her project, "Finding the Optimal Decontamination Method for *Bacillus anthracis* Spores in a Contaminated Drinking Water System."

"She is really interested in this topic and this year wanted to take it to a higher level in a scientific paper," Raber said about her daughter.

Since anthrax spores are able to survive for many years in the environment as well as in water and require harsh disinfectants to neutralize, the team was looking for something that was more environmentally friendly and could potentially be used on a large scale.

After studying three of five chemicals that were determined to be 100 percent effective: hydrogen peroxide, sodium hypochlorite and Dichlor, they determined that Dichlor, commonly used to treat swimming pools, which had not previously been tested as an anthrax decontaminant, proved to be the best option, based on safety and environmental concerns.

"There is no one feeling to describe how I felt when the paper was accepted for publication - a culmination of hard work and enduring days in the lab finally paid off," Burklund said. "I was able to prove the validity of my research to the entire scientific world, which was something I had always dreamed of doing."

Raber said she is extremely proud of her daughter's hard work and initiative. "She did all the laboratory experiments herself, wrote the first draft of the paper and continued to learn and improve in her ability to do top quality scientific research," she said. "I hope she will have the opportunity to present this work at a conference in the near future."

"Working with my mom was interesting," Burklund adds. "We are two very opinionated individuals who both are only satisfied with the highest caliber of work. Our two strong personalities were bound to conflict at times. However, overall our relationship was strengthened through hours of late night discussions, detailed data analysis, and seemingly endless revisions."

Burklund currently plans to pursue biochemical engineering in college. She is fascinated by the biochemical reactions that form the basis of all life. She wants to further pursue her interest in biochemistry and find a pragmatic application for her research that could potentially ensure public safety on a large scale or even assist in environmental efficiency.

Provided by Lawrence Livermore National Laboratory