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Edgewood Chemical Biological Center's Forensic Analytical Laboratory Earns Top Grade in OPCW Proficiency Test

ABERDEEN PROVING GROUND, Md. – The U.S. Army Edgewood Chemical Biological Center (ECBC)'s Forensic Analytical Center continues to be a pioneer in the area of forensic analysis for monitoring the proliferation of weapons of mass destruction (WMD), as well as analysis of samples associated with possible terrorist attacks or breaches of security. The Treaty Laboratory at ECBC received an "A" grade in the latest international proficiency test (33rd OPCW IPT). Of the 12 labs worldwide that participated in the test, only two received an "A," and two laboratories received a "B," the minimum grade required for a laboratory to maintain their status as a designated laboratory.

The Organization for the Prohibition of Chemical Weapons (OPCW), an independent organization based in The Hague, The Netherlands, administers the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (CWC). The CWC is an arms control agreement that outlaws the production, stockpiling and use of chemical weapons. There are 189 member nations that have ratified the CWC. From these member nations, there are 21 OPCW designated laboratories worldwide. To maintain their status as an OPCW-designated laboratory, these laboratories must adhere to strict administrative guidelines, maintain accreditation by an internationally recognized organization, and successfully complete an international proficiency test annually.

ECBC's Forensic Analytical Center was the first U.S. laboratory to become a designated OPCW laboratory. They were given that status by the Director General of the OPCW in 1996. Although testing takes place on an annual basis, the total process takes place in a three-year timeframe. In order to maintain OPCW accreditation, laboratories must maintain a three-year rolling average of at least two "As" and one "B."

Currently, the ECBC Forensic Analytical Center is one of two OPCW designated laboratories in the United States; the other is at Lawrence Livermore National Laboratory in California. Treaty labs specialize in analysis of samples for chemical warfare agents, byproducts, precursors, and other compounds of interest. A designated laboratory volunteers to prepare challenging, realistic samples for other designated laboratories and candidate laboratories to analyze. A different designated laboratory evaluates the test reports prepared by the participating designated laboratories to validate their conclusions and recommend scoring to the Director General who issues the official scores. The participating laboratories have 15 calendar days from the time they receive the samples to complete the analysis and reporting required by the proficiency test. During the 33rd OPCW IPT, a designated lab from China prepared some extremely challenging samples, including a scheduled compound that did not exist in any databases. The

evaluation laboratory was the designated lab from Singapore. Despite the challenges, ECBC scientists proved again that they are worthy of top marks and can handle any real world situation.

“Since one of the compounds was not in our database, we had to combine data from multiple instruments to come up with a structure and then synthesize the chemical to confirm its identity,” said Alex Jestel, the chemist who led the proficiency test effort within ECBC’s Forensic Analytical Center.

“The goal of preparing the test is to replicate real world samples, however the labs preparing the samples know what compounds might hide or mimic reportable compounds, so the test samples are likely more difficult than real world samples. They want to make these tests as difficult as they can to ensure that we really can handle threats,” said Dr. Stan Ostazeski, Forensic Analytical Center Chief.

A couple of weeks before the official samples are released, the OPCW publishes a scenario with a couple of clues as to what the real test will be. Within the scenario, teams are informed on whether to expect soil, water, organic solvent, or surface material samples, and other minor clues that could be helpful with preparation. With that information, the team is able to get their processes in place and set up a “toolbox” that may best help them with the actual sample. Then, the real sample is released and the hard work really begins.

“During the 15 days of testing, we turn our conference room into a war room. We eat pizza and sweets, lock the gates and go to work. Essentially we live in the labs,” Dr. Ostazeski said. “All other work stops, unless something of national importance happens. Even if it does, that work must be done in parallel with the testing.”

When the testing begins one of the most important aspects is ensuring that scientists are reporting only information relevant to the OPCW and the scenario for the test. Reporting a compound that is not present in the sample or that is not relevant is considered a false positive and results in an automatic failure. Unlike some analyses, the scientists are locating and identifying unknown compounds as opposed to attempting to confirm the presence or absence of a known substance.

Sorting through the relevant and irrelevant materials requires teamwork. About 16 people are involved in the proficiency test. “When we come together for this testing, it is all hands on deck,” Dr. Ostazeski said. “It’s rare to find a team pulling together like this team does during the OPCW process.”

The cohesive teamwork and expert lab work is something to be admired. Sometimes representatives from the Federal Bureau of Investigation or the U.S. Navy come to observe the testing to see what they can learn from the process.

ECBC has prepared samples once and evaluated the test reports from other laboratories during proficiency tests four different times over the years, helping the scientists test their skills while seeing how other labs are performing.

“Conducting tests like these are critical for ECBC and for the nation,” said Dr. Ostazeski, “It brings sponsors with analytical needs to ECBC, and our A-grade offers confidence that we can successfully perform. Information like this is essential to our nation’s security.”

ECBC’s Forensic Analytical Center has been participating in handling environmental soil sample and biomedical samples such as urine and plasma. Additionally ECBC OPCW is prepared to accept and analyze samples from scenarios such as the recent situation in Syria, in which United Nation inspectors

would have been expected to collect environmental and biomedical samples for analysis.

For more information about ECBC, visit http://www.ecbc.army.mil/.

ECBC is the Army's principal research and development center for chemical and biological defense technology, engineering and field operations. ECBC has achieved major technological advances for the warfighter and for our national defense, with a long and distinguished history of providing the Armed Forces with quality systems and outstanding customer service. ECBC is a U.S. Army Research, Development and Engineering Command laboratory located at the Edgewood Area of Aberdeen Proving Ground, Maryland. For more information about the Edgewood Chemical Biological Center, please visit our website at http://www.ecbc.army.mil or call (410) 436-7118.

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