



News Release

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ECBC Engineers Lead Army in Improving Obscuration Capabilities for the Warfighter

ABERDEEN PROVING GROUND, Md. – Engineers from the U.S. Army Edgewood Chemical Biological Center (ECBC) are leading a cutting-edge effort to improve the defensive obscuration capabilities for Warfighters.

The Improved Visual Obscuration program is aimed at improving the state of the art in obscuration (screening smoke) technology for the Warfighter. The program is also an excellent example of synergy and cooperation within the obscuration community, including specialized groups within ECBC, as well as between the Army Research, Development, and Engineering Command (RDECOM) and its other research, development and engineering centers (RDECs).

The legacy obscurants of choice for production of defensive smoke screens have been those that are hygroscopic (moisture-retaining) and based on white or red phosphorus or hexachloroethane (HC). These materials gather atmospheric moisture to increase “yield” and, therefore, screening power. However, the zinc chloride produced by the AN-M8 HC Screening Smoke Grenade has serious health consequences for the Warfighter, including edema of the lungs and possibly death when used in confined spaces. A few years ago, there was great concern based on exposures that occurred during training in a military operation urban terrain (MOUT) environment. It was ultimately decided that the hygroscopic AN-M8 hand grenade would no longer be procured, and that the former M83 Practice Grenade would be reclassified as a tactical grenade. The M83 contains smoke formulations based on common sugar and terephthalic acid, which does not present the same level of toxicity as the HC smoke composition; however, the trade-off is that the M83 provides significantly less screening power than the AN-M8 since it does not react with atmospheric moisture. Additionally, using phosphorus-based obscurants creates its own challenges: they can act as an incendiary agent, causing fires in dry vegetation or other similar materials in the field, and they also produce phosphoric acids, which are corrosive and irritating to the Warfighter.

The obscuration community took this challenge as an opportunity to develop a safer, less toxic, and less incendiary alternative to these legacy obscurants that could also perform better and produce more defensive coverage for the Warfighter than the legacy HC Screening Smoke Composition. To tackle the challenge, ECBC’s Obscuration and

Nonlethal Engineering (ONE) Branch and Pyrotechnics and Explosives Branch have partnered with the ECBC R&T Directorate's Smoke and Target Defeat Branch to develop and test formulations that could be used in both close combat (grenade) ammunition systems, as well as combat ammunition (projectile and mortar) systems. Formulations developed by the RDECOM Armament Research, Development and Engineering Center (ARDEC), as well as other government agencies and contractors, will also be included in the evaluation. The Smoke and Target Defeat Branch is funding the majority of the effort and is managing the overall project to ensure that all candidate smokes are evaluated equally. Field testing and evaluation of the alternatives is now underway at the Edgewood Area of Aberdeen Proving Ground. The major sponsor is the PM-Close Combat Systems at PEO Ammunition, and there are other PMs who have a vested interest in the outcome of the testing.

The Pyrotechnics and Explosives Branch is contributing several custom formulations for testing. The formulations vary in chemical composition and type and amount of smoke produced. "ECBC has separate facilities to model smoke behavior before it is ever blended, to actually blend candidate compositions to support the models, to test those compositions in an enclosed chamber and to make full scale devices for testing in an outdoor environment. These pieces come together to form a picture of the true behavior of a smoke candidate," explained Joseph Domanico, Senior Engineer for Pyrotechnics and Explosives for ECBC and ECBC's Ammunition Control Officer.

Domanico pointed out that there are several candidate formulations that stress low toxicity but produce less than satisfactory smoke; and there are candidates that produce voluminous quantities of smoke and have lower toxicity than the HC smoke composition, but are not completely non-toxic. "The real challenge is to find a suitable smoke grenade to improve what is available for today's complex battlefield," said Domanico. "The Rules of Engagement determine if and how a Soldier can use smoke and under what circumstances. Our ultimate goal with this program is to equip our Warfighters with a modern smoke device that will be usable under a maximum number of scenarios, that will be relatively safe for the Soldiers as well as civilians in the area, and will also be cost effective for the Army to field and sustain."

The ONE Branch is contributing subject matter expertise, technical data management and test planning and execution to the program. Since several formulations will be tested, a weighted scoring matrix has been devised to compare the performance measurements and human and environmental toxicity levels of each formulation, in order to provide a clear assessment of the possibilities. "While increased safety is the primary goal, our efforts are also aimed at producing performance that is much better than terephthalic acid (TA), while being as close to the performance of HC and phosphorus-based smokes as possible," explained Kevin Fritz, Chief of the ONE Branch. "The goal is to develop a new type-classified item that is the best possible product for the Warfighter to use in a MOUT environment."

Following the testing, the next step will be to use the weighted test scoring matrix to completely evaluate the merits of the candidate smoke compositions on several levels,

including quantity of smoke produced, human and environmental toxicity, cost and method of manufacture, and safety and training for use by the Warfighter. Then the best possible candidate will move forward in the development cycle.

“ECBC’s leadership in this test program is made possible by the collaboration between the ONE Branch and the Pyrotechnics and Explosives Branch and with the R&T Directorate, as well as with the various RDECs, in both the development of the candidate obscurants and in actual testing phase,” said Nino Bonavito, Chief of the Pyrotechnics and Explosives Branch. “The broader benefits for the Army include a much faster and more economical assessment and acquisition cycle that leverages resources across the Directorate, the Center, and RDECOM.”

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) 436-1159.

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