

# Biological Background Standards for Calibration and Validation of BW Detectors

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**Need** Ambient biological background standards do not exist today for calibrating and cross-validation testing BW detectors, decontamination methods, etc. Pre-field testing of detectors for false positives and interferences is arbitrary and ad hoc, contributing to uncertainties in interpreting results from field trials such as those held periodically at Dugway Proving Grounds as well as uncertainties in anticipating how detectors will perform in new environments. It is a well-established principle that reliable analytical methods require periodic validation using standards. In the case of instrumentation for detection of BW agents, this standards capability simply is not available.



**Solution** The final product will be a suite of characterized representative reproducible standard solutions for use by BW detector community. These standards will allow for quantification of false positives and when used in spiked samples provide information on detector accuracy irrespective of detection method. This allows cross-validation and tracking of instrument sensitivity. These standards will not be dependent on planned detection method (i.e. only PCR, only MS, etc). This will be a set of physical standards provided to the BW community. We envision a suite of biostandards representing typical ambient backgrounds for venues such as urban office buildings, agricultural operations, industrial manufacturing operations, and so forth. The necessary and sufficient suite of standards is yet to be defined.

Each standard will consist of a stable lyophilized cocktail of microorganisms and other chemical constituents that are representative of the particular venue. No BW agents or simulants will be included (although they could be added by the user at the time of use). The standard will be characterized in terms of many fundamental parameters such as DNA sequences; classical taxonomy; UV, IR, and fluorescence spectra; mass spectra; immunology, particle size; and so forth, so as to be applicable to a wide variety of current, emerging, and yet-to-be-built detectors. Protocols will be provided for reconstitution and use of the biostandards with detectors. These biostandards will be made available to persons working in detector development and testing, especially at the pre-field stage. In the longer term, we envision that the biostandards will become routine elements of instrument calibration and testing for QA/QC purposes.

**Approach** We will collaborate with the threat analysis community to select a suite of venues, such as sports arenas, restaurants, and so forth. Existing biological background characterization data will be used insofar as possible (CDC, ECBC, DOE/CBNP, etc.). However, it is likely that some venues of interest do not yet have adequate background biological characterization, and we will need to develop the baseline by sampling and analysis.



Formulation and characterization of the various cocktail standards will be carried out at ORNL, the University of Nevada at Las Vegas, and elsewhere, according to special expertise required. Protocols for reconstitution and challenges to detectors (e.g., aerosols) will be developed, tested, and demonstrated. Finally, the biostandard products will be tested and evaluated by several groups at places such as the DOE laboratories, ECBC, and Dugway Proving Grounds.

