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Announcing the 4th Collaborative Materials Exercise (CMX-4) of the Nuclear Forensics International Technical Working Group (ITWG)

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The Nuclear Forensics International Technical Working Group (ITWG) is a forum for informal technical collaboration among official nuclear forensics practitioners who share a common interest in preventing illicit trafficking of nuclear and radioactive materials out of regulatory control. Together, this community of scientists, law enforcement personnel, and regulators work to advance the best practices of nuclear forensics largely through the participation in a series of Collaborative Materials Exercises (CMX), formerly known as Round Robin exercises.

The ITWG Exercise Task Group (ETG) is responsible for facilitating Collaborative Materials Exercises (CMXs). These exercises are designed as learning experiences rather than performance tests for the scientific community by following several basic principles. First, each CMX is executed using well-characterized materials of a known history and origin and are taken from specific process locations within the nuclear fuel cycle. These "real world"materials are used as the basis of exercise materials, as opposed to laboratory-generated pure phase certified reference materials, in order to fully consider the potential significance of process-derived heterogeneities and characteristics suggestive of the material history. Second, the ITWG ETG also assumes participating laboratories maintain their own analytical procedures and quality assurance and control programs. And finally, while it is the goal of the ITWG ETG to produce a publically available summary of the major outcomes from each exercise, explicit results reported by individual laboratories are held in confidence and only revealed at the discretion of each laboratory.

To date, the ITWG has carried out three Collaborative Materials Exercises with the fourth (CMX-4) scheduled to begin on 15 September 2014 and end on 14 November 2014. This exercise will be the second in a series of paired-comparison exercises in which two or more material samples are distributed to each participating laboratory for analyses and subsequent comparison. In addition to categorizing these samples, and in order to support law enforcement investigation, participating laboratories will be asked to include or exclude individual samples from one another based upon sample characteristics. Distinguishing characteristics of these materials may include isotopic abundance, chemical form, trace element content, morphological characteristics, or other measureable features. Conventional forensic analysis (e.g., fingerprints, DNA, or tool marks) of evidence contaminated with nuclear and/or radioactive materials, while an important consideration during the investigation of radiological crime scenes, will be excluded from this particular exercise in order to focus on the development of robust nuclear forensic techniques and methods designed to characterize nuclear or radioactive materials.

The primary goal of CMX-4 is to improve international technical capabilities, cooperation, and communication in the event of a nuclear material security incident through identifying and sharing best practices concerning nuclear forensic protocols, procedures, analytical techniques, and interpretational methods.

Five objectives have been identified for the laboratories participating in CMX-4. These include:
1. Assess the ability for rapid nuclear detection techniques to adequately categorize low-enriched uranium (LEU)
2. Explore the capabilities and limitations of Bulk Analysis
3. Exploit material characteristics other than isotopic abundances
4. Apply nuclear forensic evidence to identify a facility of origin
5. Utilize the Graded Decision Framework (GDF) to comprehensively report findings

A summary of the CMX-4 scenario will be provided along with important information for representatives of laboratories interested in participating in the materials exercise.

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