The Quality Behind CASARM

Suzanne Procell, Dave Mau, Elaina Taylor, and Christine Davis

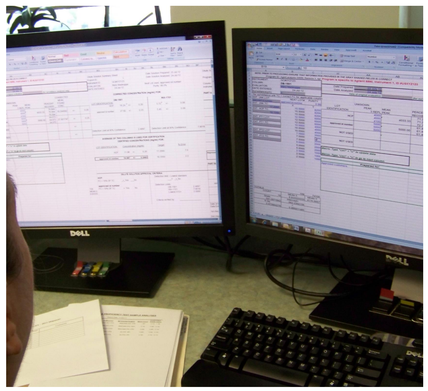
Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD

History

Chemical Agent Standard Analytical Reference Materials (CASARMs) are high purity, fully characterized chemical warfare agents that were originally produced in the 1980s to provide certified dilute standards for use in agent air monitoring at military storage depots. Today, they are also used for testing purposes and for research and development.

The CASARM Program

The CASARM Program, an ISO 9001:2008 certified program, is managed by DPI's CASARM Quality Assurance Team (CQAT). CASARM agents are stored at DPI's CTF. Surveillance analysis are performed periodically. The CASARM Committee has oversight of the CASARM Program. The Committee is made up of members from ECBC's three directorates along with a representative from the Medical Research Institute of Chemical Defense (MRICD), the Chemical Materials Agency (CMA) and the Assembled Chemical Weapons Alternatives (ACWA). The chief of the CQAT is the CASARM Administrator. A semi-annual Proficiency Test (PT) Program is administered by the CQAT. Under this program blind dilute chemical agent solutions are provided to CASARM customers who report results to the CQAT. The CQAT processes the submission and issues a report. Organizations use their PT results to objectively assess the reliability of the processes they use to generate data.



Approved for Public Release

Agents available for purchase under the CASARM Program:

- Neat agents: GA, GB, GD, GF, HD, HN1, HN3, L, VX
- Dilute agents: GA, GD, GF, HD, HN1, HN3, L (in Hexane); GB and VX (in IPA)

The Process for Making a CASARM

Under the CASARM Program, high purity chemical agents are procured by DPI's CQAT from R&T's Agent Chemistry Branch and from DPI's Chemical Transfer Facility (CTF). An initial purity analysis is performed by R&T's Forensic Analytical Branch and the results reported to the CASARM Committee. If the results indicate the purity is ≥95%, the newly analyzed lot is voted candidate CASARM status and full characterization analysis is performed which includes a NIST traceable analysis. Upon completion, the CASARM Committee reviews the results of the full characterization and votes whether the lot will acquire CASARM status. If the chemical agent is new to the CASARM repository, a stability study is performed and documented. All CASARM agent lots undergo periodic surveillance analysis to ensure their stability while being sold to and used by CASARM customers.

Neat CASARM

- Prepared via synthesis or purification of munitions grade chemical agent
- Purity must be ≥95%
- Status is voted by the CASARM Committee
- Undergoes full characterization that consists of:
  - Multi-nuclear Nuclear Magnetic Resonance Spectroscopy (NMR)
  - Gas Chromatography/Mas Spectroscopy Detector (GC/MSD)
  - Gas Chromatography/Thermal Conductivity Detector (GC/TCD)
- Analysis by an approved method that has a NIST traceable component tied to the chemical agent of interest.
- Stability is established and monitored periodically.
- CASARM agents are blanketed with an inert gas and stored at or below 4°C.
- A Certificate of Analysis is provided upon purchase.

Dilute CASARM

- Dilute CASARM solutions are prepared annually from neat CASARM and are analyzed by two certified methods.
- Stability is established up to 15 months for each agent/solvent combination.
- Calibration, Quality Check and Proficiency Test solutions are produced and maintained annually.
- Surveillance is performed approximately 9 months after production of the dilute solution.
- Dilute CASARM agents are blanketed with an inert gas and stored at or below 4°C.
- A Certificate of Analysis is provided upon purchase.

Why Use CASARM?

- Establishes documented traceability and measurement uncertainty as compared to a NIST standard via a Certificate of Analysis.
- Adds confidence to test results by:
  - Eliminating conflicts due to impurities present in challenge agent
  - Eliminating variability in data sets by providing long term availability of single CASARM lots thereby ensuring integrity and reproducibility of data.
  - Ensuring user has knowledge of purity, impurities and stability of the challenge agent.
- Surveillance analysis provides evidence that CASARM lots stored under proper conditions are maintaining purity.
- Successful participation in the PT program validates test processes and meets ISO 17025 proficiency criteria.

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.