PFAS Data Validation: A Technical Perspective

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Background/Objectives. Over the past 30 years, the Environmental Protection Agency (EPA) and the Department of Defense (DoD) with on-going research and investigations have identified a variety of emerging contaminants; each presenting a unique set of challenges and impacts. A current significant group of contaminants that have been identified are per- and polyfluoroalkyl substances (PFAS). As testing for these contaminants expands to include matrices not encompassed under current EPA methods, laboratories have been confronted with either modifying published methods, developing internal matrix-specific analytical procedures or using procedures that comply with Table B-15 in the DoD Quality Systems Manual (QSM). Data validation has become a critical component of the EPA and DoD data usability assessment process. In the evolution of data validation, several guidance documents have been produced, including the EPA National Functional Guidelines (NFGs) developed for the EPA Contract Laboratory Program (CLP) and the DoD Data Validation Guidelines. This presentation will highlight the current status of guidelines and data validation processes used to evaluate PFAS analytical data and observed results relative to these guidelines.

Approach/Activities. This presentation will summarize PFAS data packages submitted by multiple laboratories over several years. The analytical methods referenced in the data packages vary between published EPA methods, laboratory-modified published methods, internal matrix-specific analytical procedures, and procedures compliant with Table B-15 in the DoD QSM. Method variations will be tabulated in a manner such that the impacts on data quality may be viewed from a variety of matrices including soil, drinking water, groundwater, wastewater, and biota.

Results/Lessons Learned. The evolution of PFAS methods for non-drinking water matrices has significantly impacted data quality over time. EPA Methods 533 and 537 have been modified by most laboratories and these method modifications were examined closely in terms of their relationship to data quality. The findings showed interesting results especially when assessed in conjunction with the DoD QSM requirements. Although the isotope dilution technique has become the preferred method of choice, the speaker will highlight pitfalls and shortcomings identified during the data validation process.

Additionally, the lack of appropriate quality control data as well as incomplete laboratory deliverables results in the most significant pitfalls during the validation process. Several quality control requirements must be present to assure data meet the needs of its intended use; however items are often omitted in the data package. The following list of common omissions and data issues will be summarized and discussed.

1. A tune check is not provided with mass calibration
2. Standards don’t contain branched and linear isomers when required
3. The target analyte list differs from that in the project’s Quality Assurance Project Plan
4. Analyte concentrations are not associated with the proper internal standard
5. Requirements in the DoD QSM are not met
6. Analytical results for soils are reported on a wet weight basis versus dry weight basis
7. Data from “before” and “after” manual integration are not provided