SRRTTF Interpretation of Low Level PCB Data

Project Objectives and Impact on +Blank Correction Procedures

Quality Assurance Project Plans

- Data sets can be evaluated and interpreted many different ways
- The QAPP defines how data will be used and interpreted.
  - Project Objectives describe the question(s) to be studied.
  - Quality Objectives describe how the data will answer the question.
    - Accuracy (bias) (is it the right value?)
    - Precision (what is the certainty around the data point?)
    - Representativeness (is the sample representative of the system?)
    - Completeness (did we get all the data we expected?)
    - Comparability (can we compare our work with other studies?)
  - The QAPP sets the standard, but a “perfect study” is rare.

QAPP History 2014

Lab Request for Qualifications & Quotes (RFQQ)

- Align with Ecology requirements to the extent possible.
- Use labs already approved by Ecology.
- Use specifications that identify the laboratory qualifications and can be used to evaluate proficiency.
- Use flags and data acceptance criteria that are in line with Ecology.
- Permittees would like to review this against the permit QAPPS

QAPP/SAP

- Development January –July
- Multiple revision for public review
- 11 signatories (Task Force, agencies, contractors)
- March: the 3x blank criteria established.

Synoptic Study QAPP and Laboratory Blanks

Accuracy (bias)

Precision

Representativeness

Completeness

Comparability

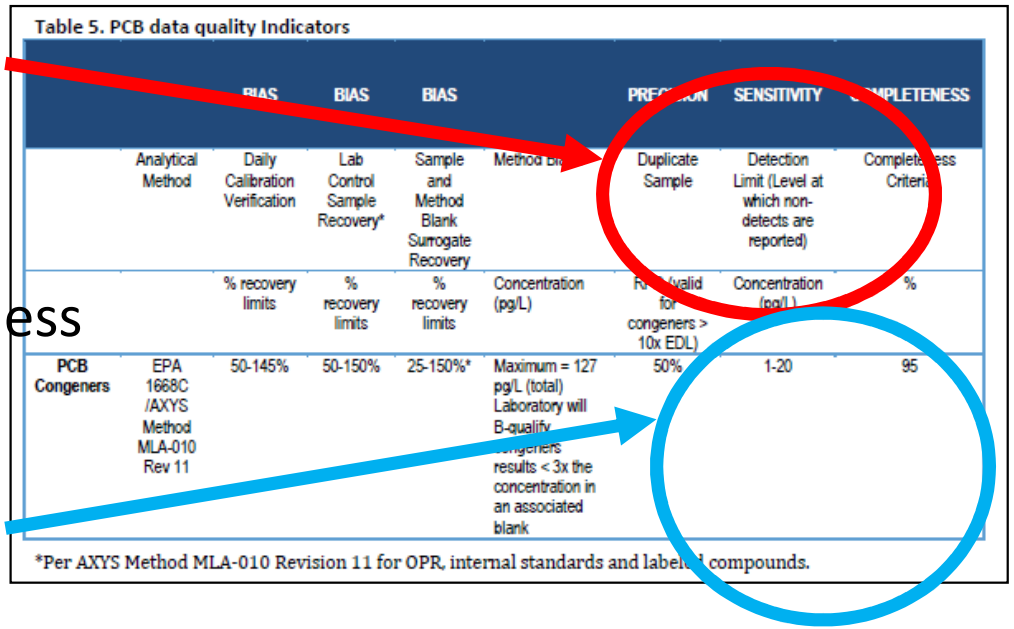


Table 5. PCB data quality Indicators

		BIAS	BIAS	BIAS		PRECISION	SENSITIVITY	COMPLETENESS
	Analytical Method	Daily Calibration Verification	Lab Control Sample Recovery*	Sample and Method Blank Surrogate Recovery	Method Bl	Duplicate Sample	Detection Limit (Level at which non-detects are reported)	Completeness Criteri
		% recovery limits	% recovery limits	% recovery limits	Concentration (pg/L)	Rel Invalid for congeners > 10x EDL)	Concentration (pg/L)	%
PCB Congeners	EPA 1668C /AXYS Method MLA-010 Rev 11	50-145%	50-150%	25-150%*	Maximum = 127 pg/L (total) Laboratory will B-qualify congeners results < 3x the concentration in an associated blank	50%	1-20	95

*Per AXYS Method MLA-010 Revision 11 for OPR, internal standards and label compounds.

Blanks

- Blanks are “clean” samples used to assess contamination.
  - Contamination can impact the ability to achieve quality objectives
- Types of blanks
  - Equipment and Trip Blanks (used to measure field contamination)
  - Method or Laboratory Blanks (used to measure laboratory contamination)
- Laboratory blanks are typically charted on statistical control charts
  - When a blank exceeds control limits, then the lab investigates and takes corrective action.
  - This is a normal aspect of laboratory quality assurance activities.

Method 1668

- Method 1668 measures PCBs at very low levels.
  - Different congeners can be seen in blanks than samples.

    "Method 1668 has a detection limit of 2 pg/L. But median levels of PCB in method and rinsate blanks can be has high as 50 pg/L." *(Greg Covallo, DWRBC)*

- Blank correction, or censoring, is used to address this conundrum.
  - Multiple methods exist to do this.
- The method used to "blank correct" depends on the study objectives.

Standard Method of Blank Correction

- Results considered to be non-detects (“U”) if the congener concentrations were less than [X] times the concentration in the laboratory method blank:

X = 0: Essentially uncorrected, all values reported.

X = 3 or 5: Used for identifying sources, **semi-quantitative analysis**.

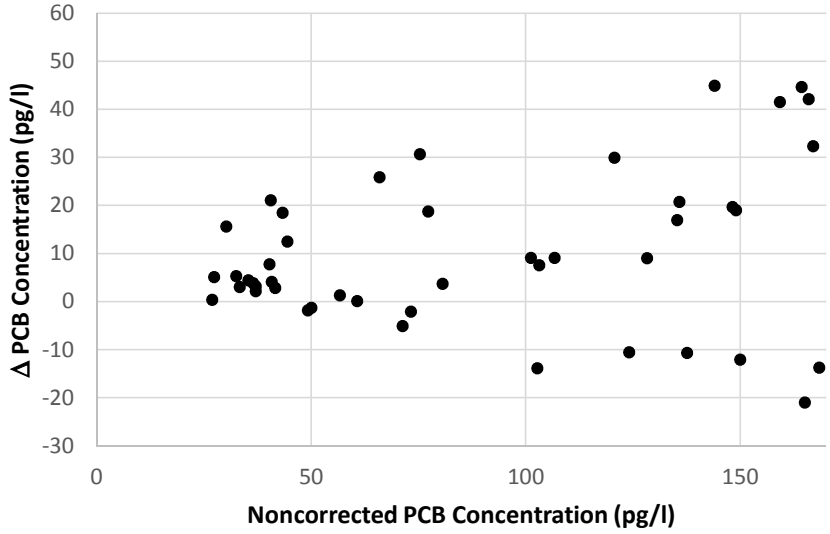
Some **false positives** may result.

X = 10: highest level of certainty that the **quantified** congeners are in the sample. Some congeners may be censored.

LimnoTech evaluated other blank correction procedures.

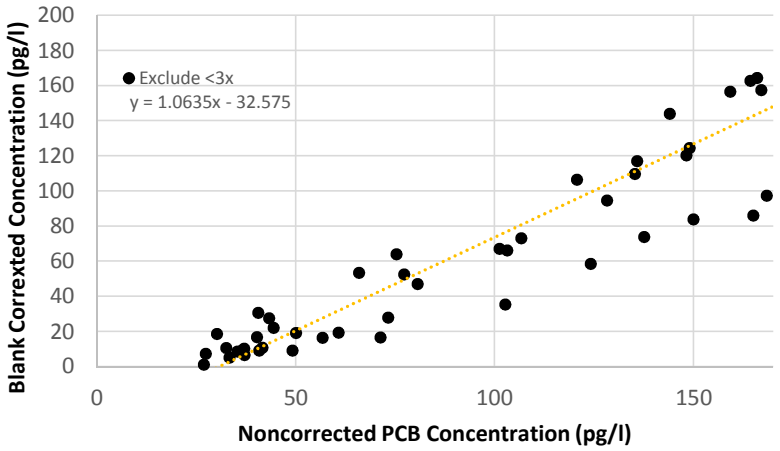
Uncertainty Due to Blank Correction

- Difference in results between alternative blank correction methods



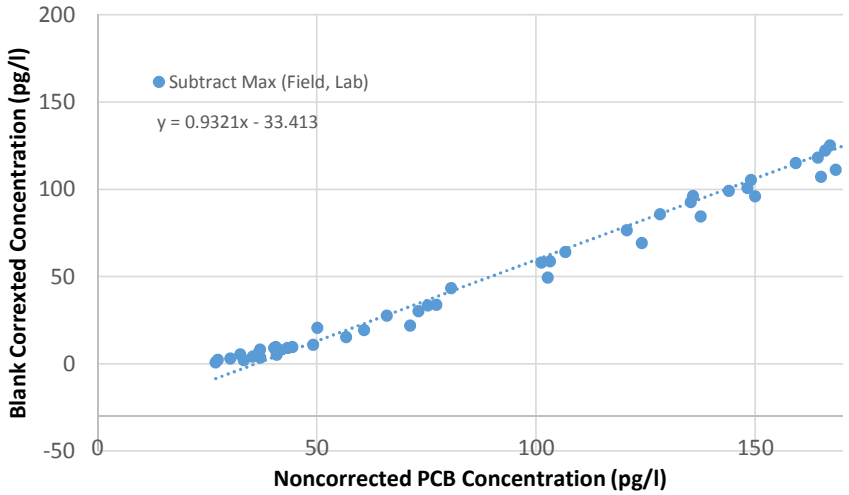
Uncertainty Due to Blank Correction

- Comparison between QAPP blank corrected and uncorrected concentrations



Uncertainty Due to Blank Correction

- Comparison between subtraction blank corrected and uncorrected concentrations



Considerations for Comparability

- Method of analysis and comparability of laboratories
- Suite of congeners included in the analysis
- Data evaluation against QAPP
  - Is the data of adequate quality (meets measurement quality objectives?)
  - Suitability of the blank correction procedure (qualitative vs. quantitative)
  - Is the data suitable (does it meet the Quality Objectives?)
  - Does the data set answer the study objectives?
    - Environmental study, clean up, environmental assessment, source identification
- Use different blank corrections procedures and evaluate impact on conclusions: uncertainty analysis

Recommendations

- Establish protocol for archiving data (raw lab data plus lab blanks)
- Identify study objectives in the QAPP
- Identify blank correction procedure needed to achieve those objectives
- Do an uncertainty analysis to evaluate if the blank correction procedure used makes a difference in the conclusions
- Include discussion of blank correction procedure in report
- Continue to use the 3x procedure for source identification studies
  - Same data may need to be reevaluated if used for another purpose