Why QC Program is Critical and Data Validation Templates

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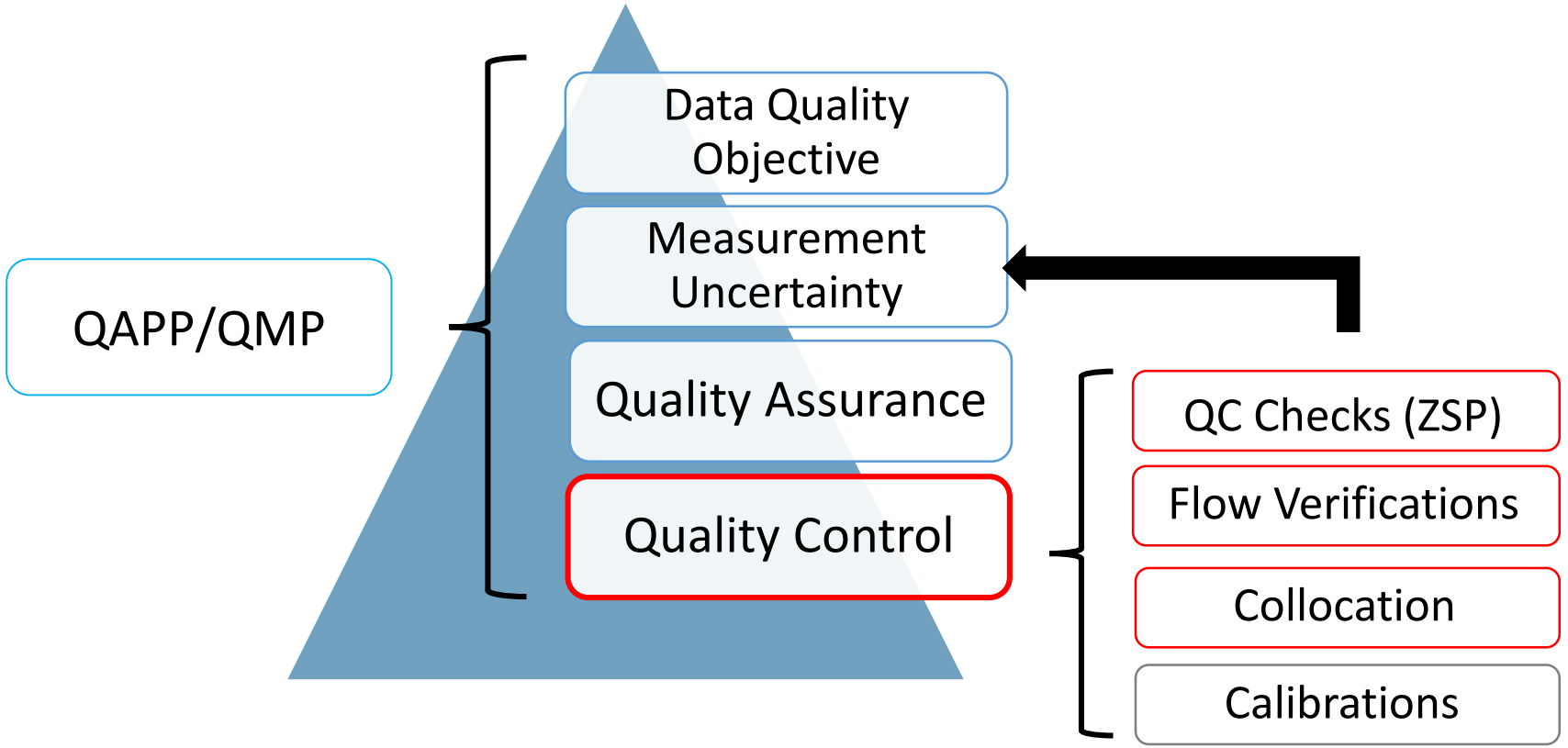
OVERVIEW

- Understanding Quality Control
- Data Validation Templates
- EPA Interpretation
- Available Resources
- Focus on O_3

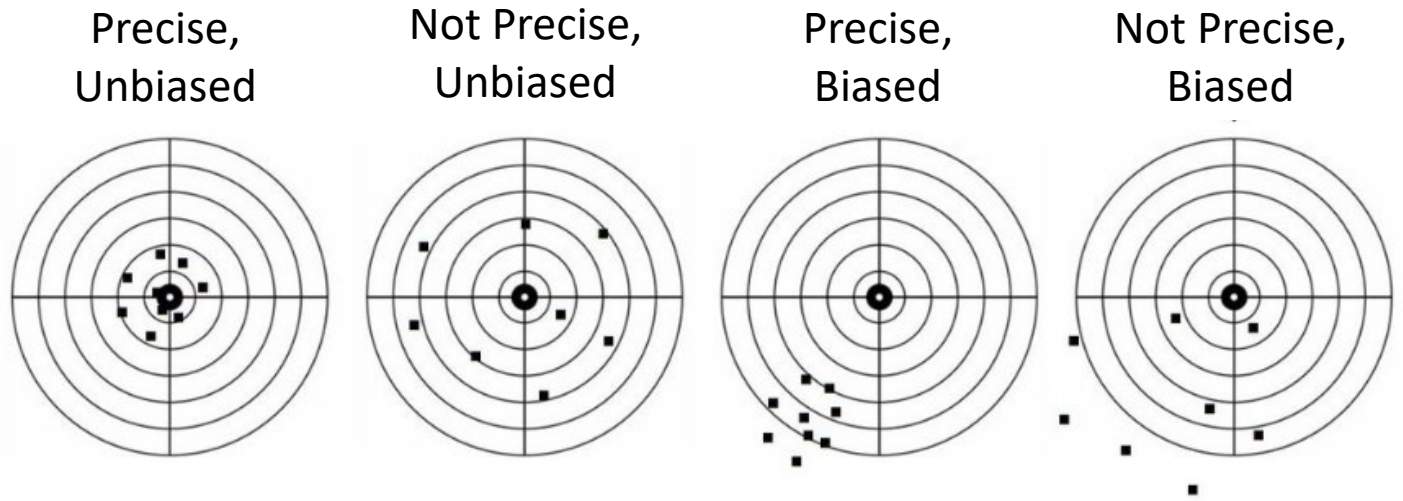
UNDERSTANDING QUALITY CONTROL



UNDERSTANDING QUALITY CONTROL

QC checks are critical in quantifying *Measurement Uncertainty,* directly affect data quality and EPA's ability to use data in regulatory decisions.

Measurement Uncertainty = Precision + Bias



MEASUREMENT UNCERTAINTY REQUIREMENTS

- For O_3, NO_2, SO_2, and CO 1-point QC checks are used to calculate both precision and bias on an annual basis.
- *new* OAQPS interpretation: % difference for each 1-point QC check must be ≤ the annual precision and bias criteria

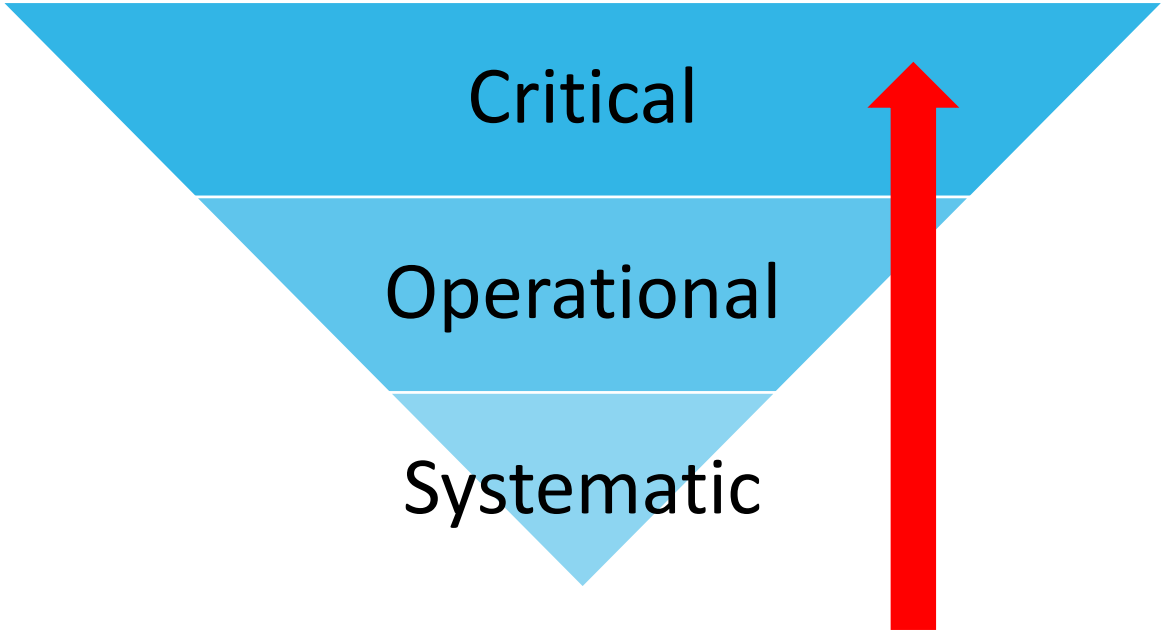
Pollutant	Precision	Bias
O_3	CV of 7% (upper 90% CL)	Absolute Bias of 7% (upper 95% CL)

CV - Coefficient of Variation, CL - Confidence Limits

DATA VALIDATION TEMPLATES

QA Handbook for Air Pollution Measurement Systems, Volume II, EPA-454/B-17-001, January 2017

- Section 3: Data Quality Objectives
- *Appendix D; Measurement Quality Objectives and Validation Templates*



Increasing Risk of Data Invalidation

CRITICAL CRITERIA (OZONE EXAMPLE)

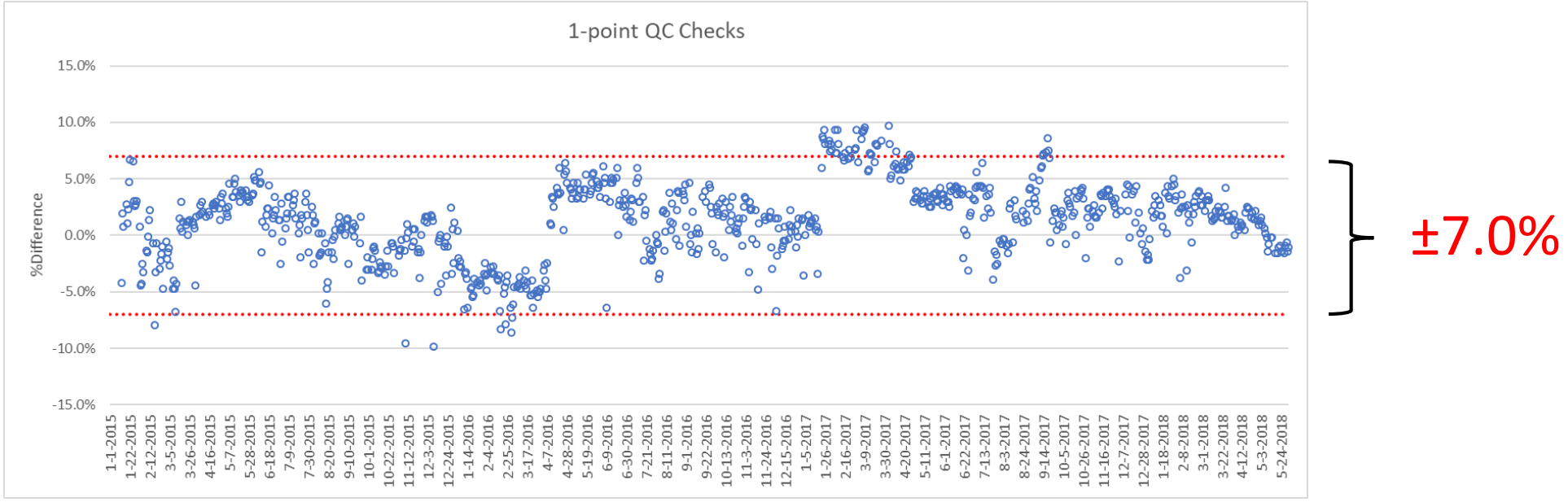
"Observations that do not meet each and every criterion on the Critical Criteria [table] *should be invalidated* unless there are compelling reasons and justification for not doing so."

1) Requirement (O_3)	2) Frequency	3) Acceptance Criteria	Information /Action
CRITICAL CRITERIA-OZONE			
Monitor	NA	***Meets requirements listed in FRM/FEM designation***	1) 40 CFR Part 58 App C Sec. 2.1 2) NA 3) 40 CFR Part 53 & FRM/FEM method list
One Point QC Check Single analyzer	***Every 14 days***	< ±7.1% (percent difference) or < ±1.5 ppb difference whichever is greater	1 and 2) 40 CFR Part 58 App A Sec. 3.1 3) Recommendation based on DQO in 40 CFR Part 58 App A Sec. 2.3.1.2. QC Check Conc range 0.005 - 0.08 ppm and 05/05/2016 Technical Note on AMTIC
Zero/span check	Every 14 days	Zero drift < ± 3.1 ppb (24 hr) < ± 5.1 ppb (>24hr-14 day) Span drift < ± 7.1 %	1 and 2) QA Handbook Volume 2 Sec. 12.3 3) Recommendation and related to DQO

OMG - QC CHECKS !!!

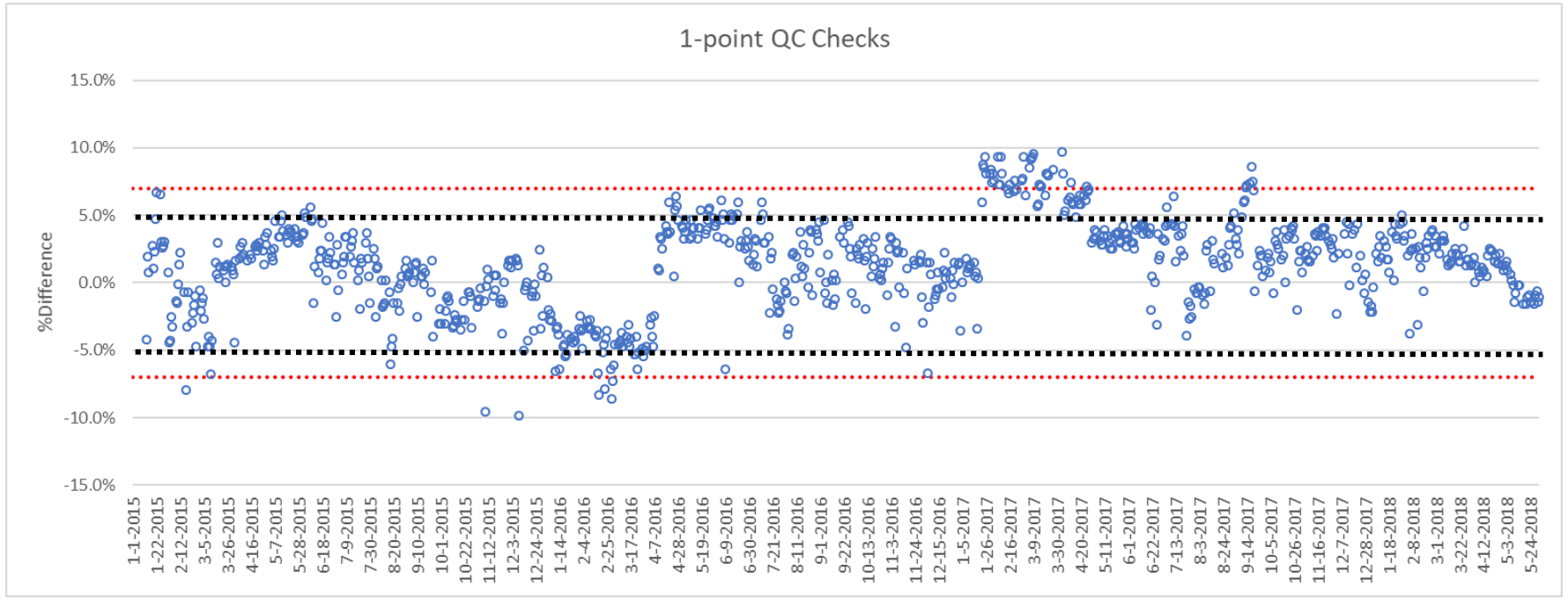
EPA INTERPRETATION OF CRITICAL CRITERIA

- Generally, if critical criteria are *not* met, then the data is *invalid*
- In some instances, *compelling evidence* may be used to justify the validity of the data.
- EPA recommendation: *DO NOT EXCEED CRITICAL CRITERIA*



EPA RECOMMENDATIONS

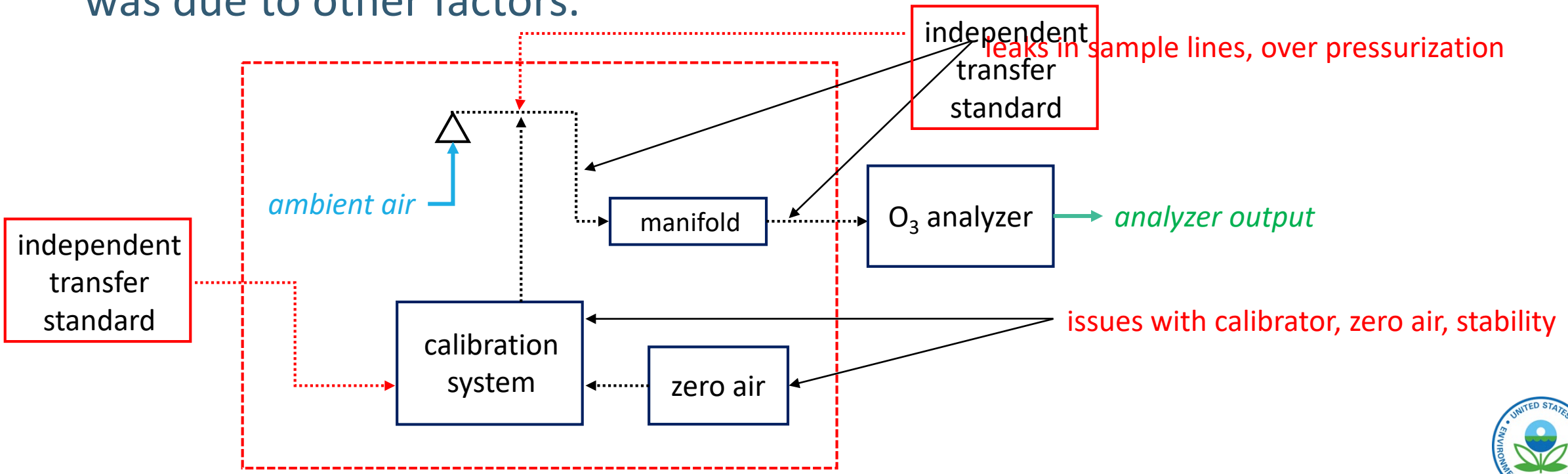
- Implementation of Warning or Action Limits < Critical Criteria
- Increase frequency of zero, span, precision checks
- Daily data review



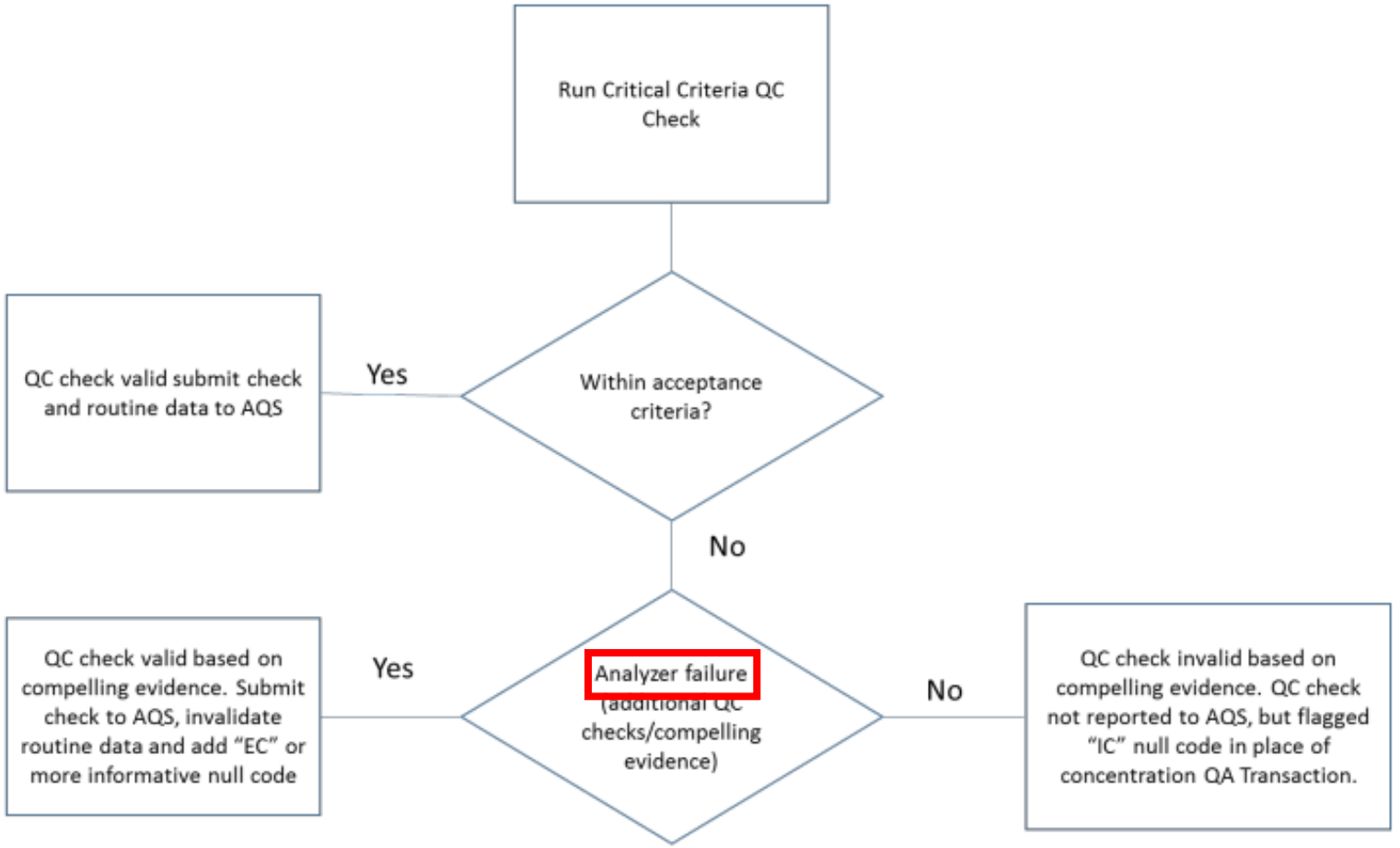
±5%

WHAT TO DO IF CRITERIA ARE NOT MET

- In some instances, if there is *compelling evidence*, data not meeting critical criteria may be considered valid.
- Must show analyzer was operating appropriately and failure of the criteria was due to other factors.



FLAGGING IN AQS



EPA Technical Memo; *Steps to Qualify or Validate Data after an Exceedance of Critical Criteria Checks, January 2018.*

OPERATIONAL & SYSTEMATIC CRITERIA

Operational	Systematic
"*may be* cause for invalidation…[data] is *suspect unless other quality control information demonstrates otherwise*"	"*do not usually impact the validity of [the data]*"
Shelter Temperature	Completeness
Audits (Annual PE & NPAP)	Residence Time
Calibrations	Sample Line Material
Zero Air Verification	Appendix E Siting Criteria
Transfer Standard Certification/Verification	Annual Precision and Bias

SUMMARY

- QC checks are the foundation of understanding data quality, which is why they are *critical criteria* in the Validation Templates
- Agencies should implement procedures to keep results of QC checks within the specified limits.
- Note *new* process for AQS flagging and data interpretation.
- Do not forget: operational and systematic criteria are equally important!!