# 1-Point QC Checks & AQS Data Handling

REGION 4 QUALITY ASSURANCE TRAINING

SEPTEMBER 17-19, 2019

ATHENS, GA

# Topics to Discuss

➢ **OAPQS Memo Refresher**

➢ Policy Updates

➢ Data Examples

➢ How we lookin'?

# 1-Point QC Checks & AQS Data Handling

- OIG Management Alert issued in February 2017
  - OIG found "variation" in data validation practices
    - Could impact data integrity
  - Memo issued as corrective action response
    - Initial release: August 2017
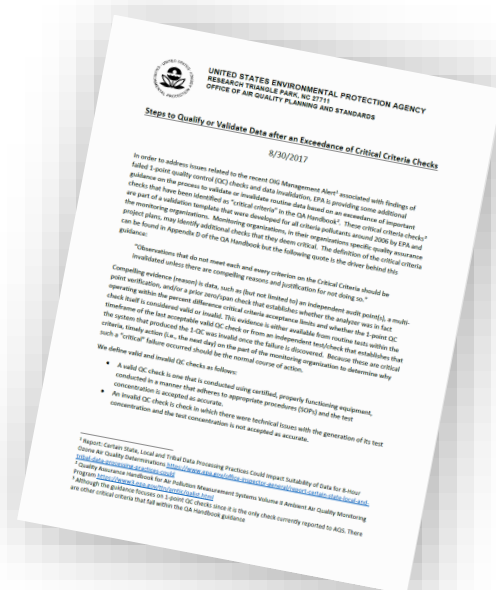    - Modified release: January 2018

# 1-Point QC Checks & AQS Data Handling

- Memo addresses
  - Critical criteria checks
  - Validity of checks
  - Compelling evidence
  - Data validation steps

# 1-Point QC Checks & AQS Data Handling



- Critical criteria checks
  - Identified in the QA Handbook
    - Included in validation templates
      - Zero, Precision, Span
      - Critical to precision and accuracy of dataset

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

# 1-Point QC Checks & AQS Data Handling

- Validity of checks
  - Valid check
    - Certified calibrator generating and delivering unaffected test concentrations utilizing proper procedure
    - Can pass or exceed acceptance criteria
    - Valid checks are to be reported
  - Invalid check
    - Calibration system uncertified or malfunctioning
      - Calibrator system failure, leaks, etc.
    - Operator does not follow SOP
    - Check results not reported
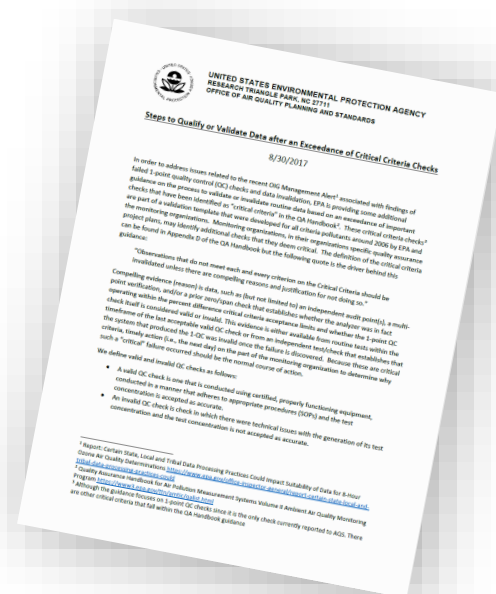
# 1-Point QC Checks & AQS Data Handling

- Compelling evidence
  - Data that establishes instrument performance or validity of check
    - Audits
    - Multi-point verification check
    - Zero/Span
    - Diagnostic data
  - All compelling evidence must be documented
  - Not all compelling evidence is reported to AQS
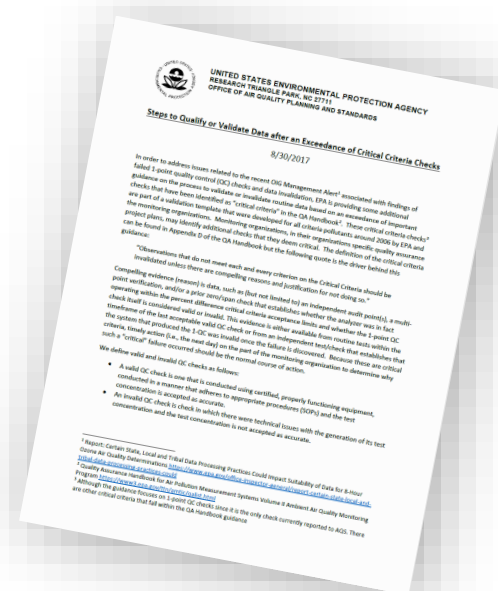
# 1-Point QC Checks & AQS Data Handling

- Data validation steps
  - Changes to AQS
    - New null codes and qualifier flags
      - "EC" null code
        - Can replace ambient data when valid check "exceeds critical criteria"
        - Other codes can be used if better descriptor of scenario (e.g., AN or AS)
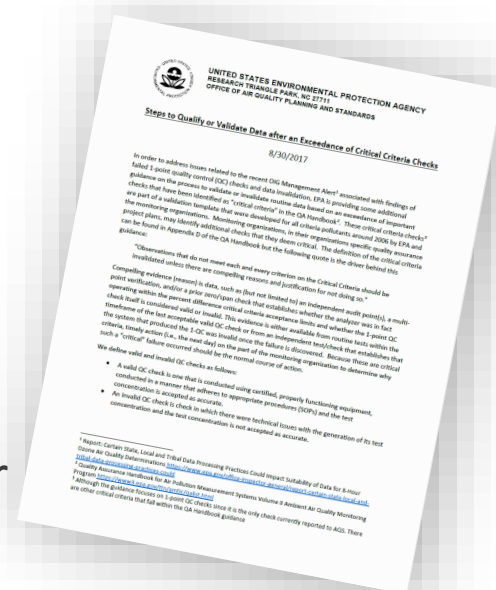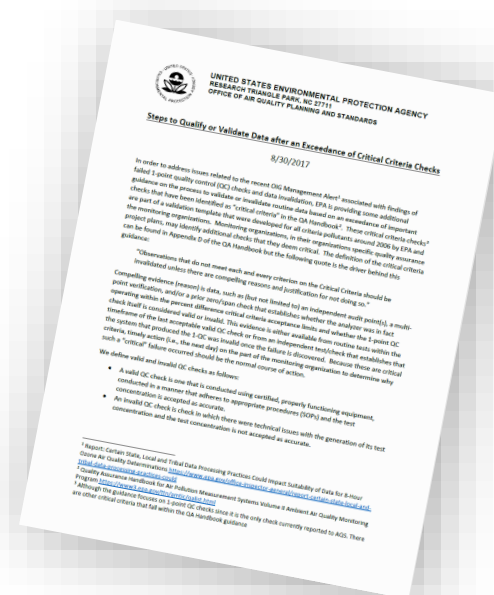
# 1-Point QC Checks & AQS Data Handling

- New null codes and qualifier flags (cont.)
  - "1V" (data was reviewed and validated) qualifier code
    - Combination of "1" (Deviation from a CFR/Critical Criteria requirement) and "V" (Validated Value)
    - Applied to ambient concentration data when compelling evidence exists

# 1-Point QC Checks & AQS Data Handling

- New null codes and qualifier flags (cont.)
  - "1C" (A 1-Point QC check exceeds acceptance criteria but there is compelling evidence that the analyzer data is valid) null code
    - Replaces invalid QC check results
      - This code is NOT meant to replace invalid ambient concentration data
    - Will count toward QC check completion
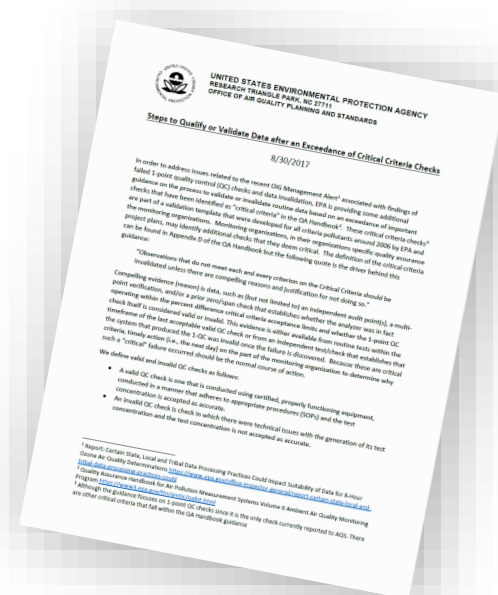
# 1-Point QC Checks & AQS Data Handling

- Additional changes to AQS
  - Compelling evidence documentation
    - Two methods available:
      - ***1. Free form comments***
        - Maintain raw data form
        - Short and concise
        - Desired method

# 1-Point QC Checks & AQS Data Handling

- Compelling evidence documentation (cont.)
  - ***2. AMP600 certification and concurrence***
    - AMP600 report modifications
    - Will identify QC exceedances
    - Check data handling
    - Not handled according to memo
    - Automatically flag data
    - Require compelling evidence
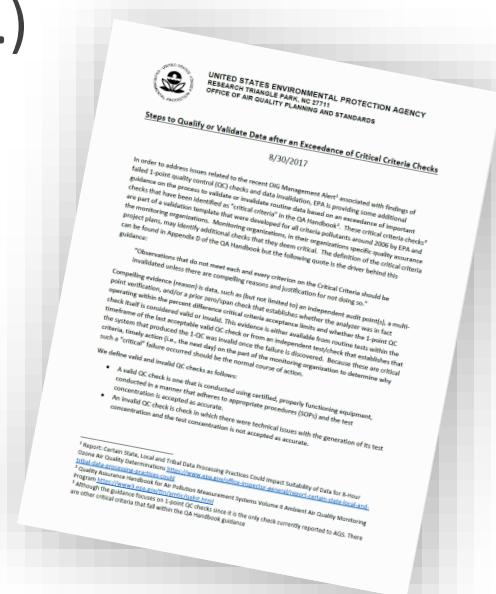
# Topics to Discuss

➢OAPQS Memo Refresher

➢**Policy Updates**

➢Data Examples

➢How we lookin'?

# Critical Criteria Checks: Policy Update

- Clarifications from OAQPS (June 2019)
  - *1. Valid ambient concentration data; Valid QC data*
    - Report the ambient concentration and QC data to AQS "as is"
    - QC check will be counted towards completeness and precision/bias statistics

# Critical Criteria Checks: Policy Update

- ## *2. Invalid ambient concentration data; Valid QC data*
  - Invalidate ambient concentration data in AQS with appropriate null code(s)
  - Report the QC data to AQS "as is"
  - QC check will be counted towards completeness, but it will NOT be counted in precision/bias statistics
  - Reference Scenario #1 in the policy memo

# Critical Criteria Checks: Policy Update

- ***3. Valid ambient concentration data; Invalid QC data***
  - Report the ambient concentration data, qualified as needed
  - Report the "1C" null code in place of the QC check in the AQS QA transaction
  - The "1C" code will be counted towards completeness, but it will NOT be counted in precision/bias statistics
  - Reference Scenario #2 in the policy memo

# Critical Criteria Checks: Policy Update

- **4. Invalid ambient concentration data; Invalid QC data**
  - Invalidate ambient concentration data in AQS with appropriate null code(s)
  - Report the "1C" null code in place of the QC check in the AQS QA transaction
  - The "1C" code will be counted towards completeness, but it will NOT be counted in precision/bias statistics
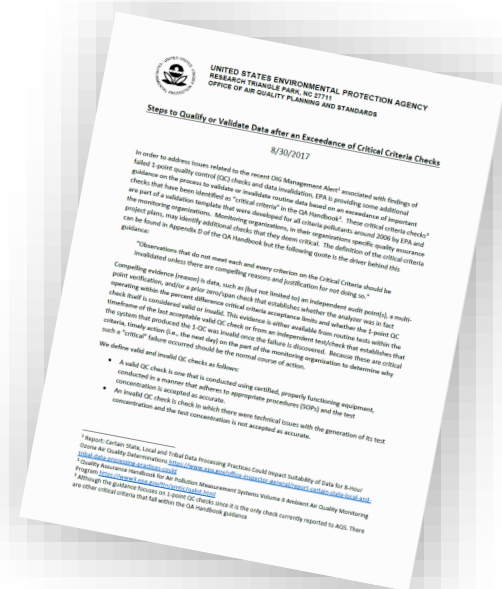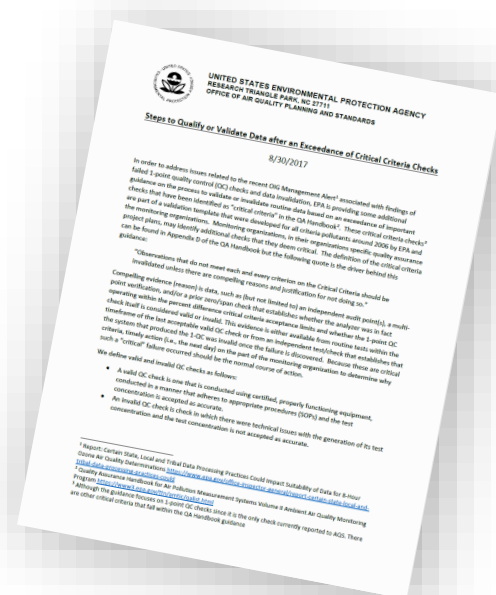
# Critical Criteria Checks: Policy Update

- Clarifications from OAQPS for PM checks (June 2019)

  - ***1. Invalid ambient concentration data; Valid QC data***

    - Invalidate ambient concentration data in AQS with appropriate null code(s)

    - Report the QC data to AQS "as is"
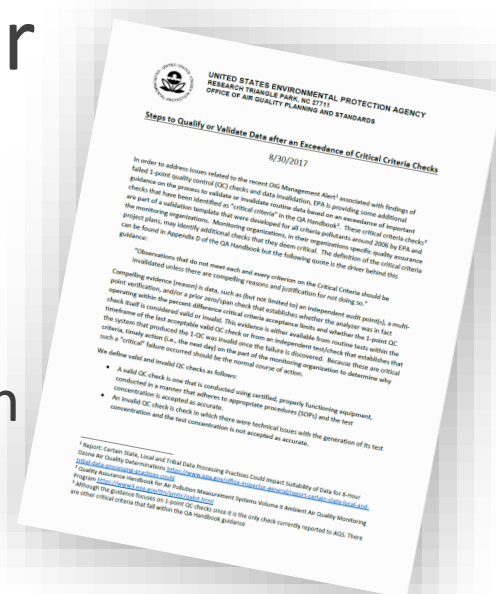
# Critical Criteria Checks: Policy Update

- ## *2. Invalid PM QC data*
  - ### Do NOT report the QC data to AQS
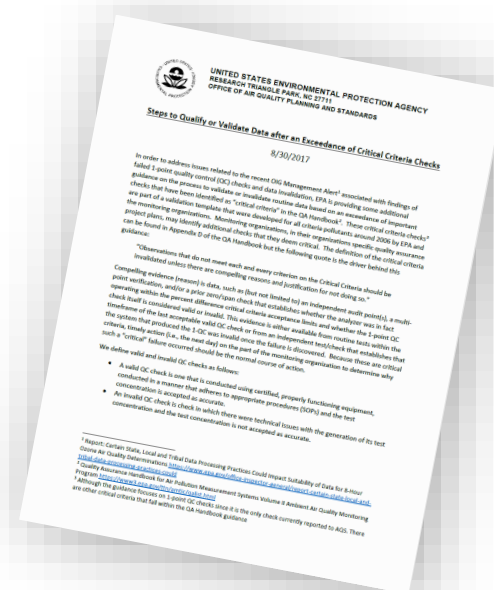
# Topics to Discuss

➤OAPQS Memo Refresher

➤Policy Updates

➤**Data Examples**

➤How we lookin'?

# Example #1

A local agency completes automated nightly zero/span/precision checks (ZSPs) of their O3 monitors during the 2300 hour.

On March 30, the automated precision check (1-pt QC) exceeded the <±7.1% difference acceptance criteria in the agency's QAPP (-8.6%).

The site operator visited the site the following day and completed a manual ZSP of the monitor. Allowing sufficient time for the monitor to stabilize for each concentration, the 1-pt QC exceeded acceptance criteria once again (-7.1%).

# Example #1

Given the results of both the automated and manual 1-pt QCs, and no evidence of QC system malfunction, the agency determined that both checks should be considered **valid**.

Consequently, the agency decided to handle associated data in the following ways:

◦ Invalidate the data collected by the monitor ***back to the March 29 passing 1-pt QC*** (-5.7%) and ***forward to the site operator's recalibration of the monitor on March 31***

◦ The concentration data is invalidated with the "**EC**" (Exceeds Critical Criteria) null code in AQS

◦ Upload the results of both 1-pt QCs to AQS

# Example #1 (Timeline)

**Routine concentration data invalid**

3/29 (Auto QC check passes)

3/30 (Auto QC check exceeds acceptance criteria)

3/31 (Manual QC check exceeds acceptance criteria)

3/31 (Monitor recalibrated)

QC results uploaded to AQS
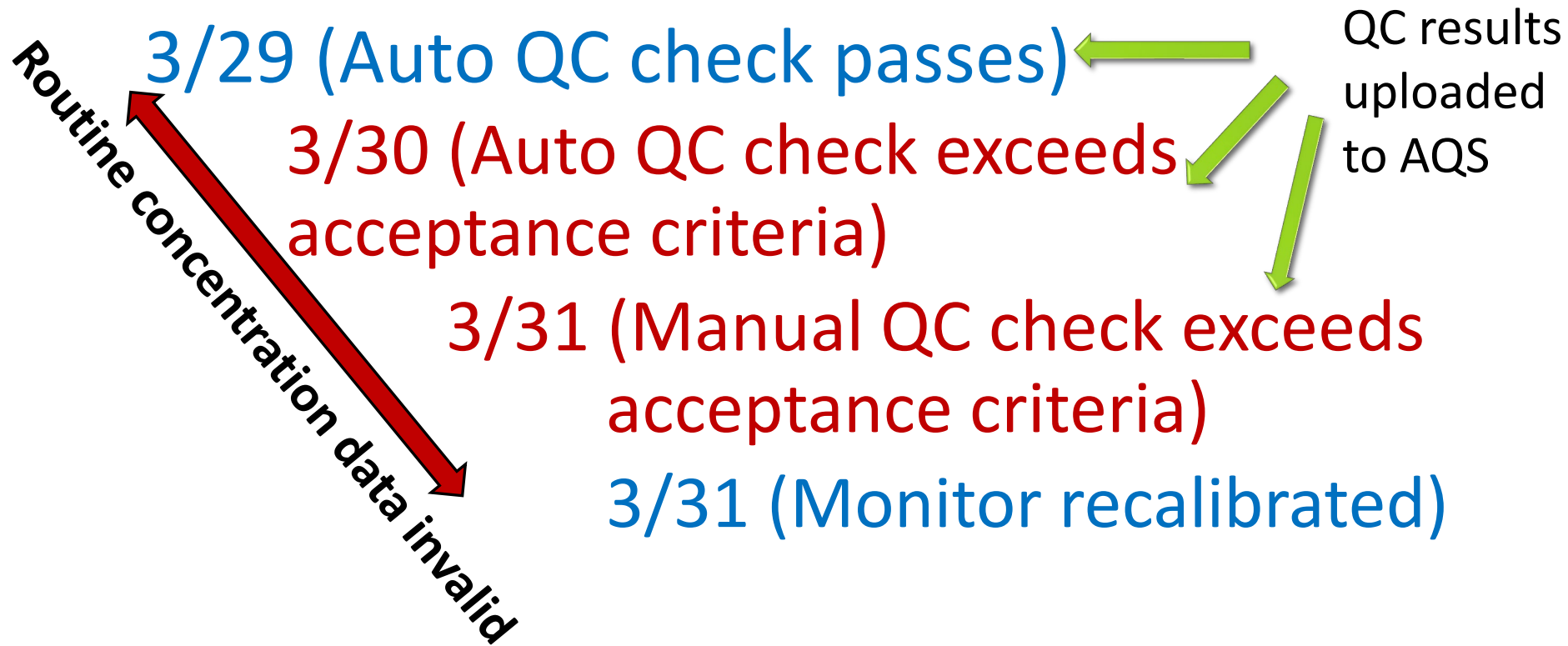
# Example #1 (Summary)

**March 29**
- Auto 1-pt QC passes (-5.7%d)

**March 30**
- Auto 1-pt QC exceeds acceptance criteria (-8.6%d)

**March 31**
- Manual 1-pt QC exceeds acceptance criteria (-7.1%d)
- Monitor recalibration

**Checks are valid**

**Data invalidated ("EC") from 3/29 1-pt QC until 3/31 monitor recalibration**

**All 1-pt QC check results uploaded to AQS**

# Example #2

A state agency completes automated zero/precision checks (ZPs) of their SO2 monitors from 12:45-1:15 AM on a weekly basis.

On August 14, the automated precision check (1-pt QC) exceeded the <±10.1% difference acceptance criteria in the agency's QAPP (-12.9%).

The site operator visited the site two days later and completed a manual ZP of the monitor. Allowing sufficient time for the monitor to stabilize for each concentration, the 1-pt QC passed (-5.7%).

While on site, the site operator noticed that the datalogger programming did not allow the August 14 1-pt QC sufficient time to stabilize (i.e., the 1-pt QC concentration did not stabilize prior to the datalogger initiating a zero concentration phase).

# Example #2

Given the information available, the agency determined that the August 14 automated 1-pt QC should be considered **<span style="color:red">invalid</span>** because the check was not allowed to stabilize and, thus, produced a concentration not truly representative of the monitor's calibration.

Consequently, the agency decided to handle associated data in the following ways:

◦ Upload the collected concentration data with no further qualification (the August 14 1-pt QC did not produce a representative assessment of the monitor's calibration)

◦ Upload the "**<span style="color:red">1C</span>**" null code (A 1-Point QC check exceeds acceptance criteria but there is compelling evidence that the analyzer data is valid) in place of the August 14 1-pt QC results to AQS in the QA transaction

◦ Upload the results of the manual August 16 1-pt QC to AQS

# Example #2 (Timeline)

8/14 (Auto QC check invalid)

*Routine concentration data valid*

8/16 (Manual QC check passes)

QC results uploaded to AQS

"1C" uploaded to AQS in QA transaction in place of invalid 1-pt QC

# Example #2 (Summary)

**August 14**
◦ Auto 1-pt QC fails (-12.9%d)

**August 16**
◦ Manual 1-pt QC passes (-5.7%d)

**August 16 Troubleshooting**
◦ 8/14 auto 1-pt QC not allowed sufficient time to stabilize

**Concentration data uploaded "as-is"**

**8/14 check is invalid; "1C" null code uploaded to AQS in the QA transaction in place of the QC check results**

**Lack of 8/14 check stability documented as compelling evidence to retain concentration data**

**8/16 check is valid; results uploaded to AQS**

# Example #3

A local agency NO2 monitor is audited annually by the state.

On July 24, the state agency completed a performance audit (APE) of the monitor, which yielded acceptable results (% differences ranged from -11% to -13%) within the <±15.1% difference acceptance criteria in the agency's QAPP.

# Example #3

The local agency completes automated zero/precision/span checks (ZPSs) of their NO2 monitor during the hours of 0300 and 0400 on alternating nights.

On July 25, the precision check (1-pt QC) exceeded the <±15.1% difference acceptance criteria in the agency's QAPP (-16%).

The site operator visited the site on July 26 and completed a manual ZPS of the monitor. Allowing sufficient time for the monitor to stabilize for each concentration, the 1-pt QC exceeded acceptance criteria once again (-16%).

# Example #3

Given the results of both the automated and manual 1-pt QCs, and no evidence of QC system malfunction, the agency determined that both checks should be considered **valid**.

The agency also decided that there is sufficient compelling evidence to retain the concentration data collected between the most recent passing July 23 1-pt QC and the July 24 APE. This data is qualified with the "**1V**" (Data reviewed and validated) qualifier code in AQS to indicate that there is sufficient compelling evidence to accept some data between the July 25 exceedance of acceptance criteria and the most recent valid 1-pt QC on July 23.

# Example #3

Consequently, the agency decided to handle associated data in the following ways:

- Invalidate the data collected by the monitor ***back to the July 24 APE*** and ***forward to the site operator's recalibration of the monitor on July 26*** with the "**EC**" null code in AQS

- The concentration data between the passing July 23 1-pt QC and the July 24 APE is qualified with the "**1V**" qualifier code in AQS; the agency decides and **documents** that the APE provided sufficient compelling evidence that the monitor's calibration was within acceptance criteria at the time of the APE

- Upload the results of all 1-pt QCs to AQS

# Example #3 (Timeline)

7/23 (Auto QC check passes)

*Routine concentration data qualified "1V"*

7/24 (APE passes)

7/25 (Auto QC check exceeds acceptance criteria)

7/26 (Manual QC check exceeds acceptance criteria)

7/26 (Monitor recalibrated)

*Routine concentration data invalid*

QC/QA results uploaded to AQS

# Example #3 (Summary)

July 23
- Auto 1-pt QC passes (-14%d)

July 24
- APE passes (-11 to -13%d)

July 25
- Auto 1-pt QC exceeds acceptance criteria (-16%d)

July 26
- Manual 1-pt QC exceeds acceptance criteria (-16%d)
- Monitor recalibrated

**Data qualified ("1V") from the passing 7/23 1-pt QC until the 7/24 APE**

**Data invalidated ("EC") from the 7/24 APE until the 7/26 monitor recalibration**

**All 1-pt QC/APE results are valid and uploaded to AQS**

**APE documented as compelling evidence to retain data from 7/23 to 7/24**

# Example #4

A state agency completes automated zero/precision/span checks (ZPSs) of their SO2 monitor during the 0300 hour every two weeks.

On January 3, the automated precision check (1-pt QC) exceeded the <±10.1% difference acceptance criteria in the agency's QAPP (-21.4%).

# Example #4

The site operator visited the site the next day and completed a manual ZPS of the monitor. Allowing sufficient time for the monitor to stabilize for each concentration, the 1-pt QC exceeded acceptance criteria once again (-20%).

Following this check, the site operator completed some troubleshooting while on site. He determined that the analyzer housing for the particulate filter was not properly sealed; the operator had documented replacement of this filter on December 22.

Immediately after tightening the particulate filter housing, the site operator completed another ZPS, and the 1-pt QC passed at -2.9%.

# Example #4

Given the information available, the agency determined that the automated January 3 and the first manual January 4 1-pt QCs should be considered **valid** because the calibration system was functioning properly and the check was completed according to SOP.

The agency also decided that there is sufficient compelling evidence to retain the concentration data collected between the most recent passing December 20 1-pt QC and the December 22 analyzer filter replacement. Since there was no bracketing check available to validate the data, the agency qualified such data with the "**1V**" qualifier code in AQS.

# Example #4

Consequently, the agency decided to handle associated data in the following ways:

- Upload the concentration data between the passing December 20 1-pt QC and the December 22 filter replacement qualified with the "**1V**" qualifier code in AQS

- Invalidate the data (e.g., "BJ" (Operator Error)) collected by the monitor ***back to the December 22 particulate filter replacement*** and ***forward to the site operator's tightening of the analyzer's particulate filter housing and subsequent 1-pt QC on January 4***

- Upload the results of the January 3 & 4 1-pt QCs to AQS

# Example #4 (Timeline)

QC results uploaded to AQS

12/20 (Auto QC check passes)

*Routine concentration data qualified "1V"*

12/22 (Analyzer leak created)

1/3 (Auto QC check exceeds acceptance criteria)

1/4 (Manual QC check exceeds acceptance criteria)

1/4 (Leak eliminated; Manual QC check passes)

Routine concentration data invalid

QC results uploaded to AQS

# Example #4 (Summary)

**December 20**
- Auto 1-pt QC passes (0%d)

**January 3**
- Auto 1-pt QC exceeds acceptance criteria (-21.4%d)

**January 4 (#1)**
- Manual 1-pt QC exceeds acceptance criteria (-20%d)

**January 4 Troubleshooting**
- 12/22 analyzer particulate filter replacement created an analyzer leak. The leak was then corrected

**January 4 (#2)**
- Manual 1-pt QC passes (-2.9%d)

**Data qualified ("1V") from the 12/20 QC check until the 12/22 filter replacement**

**Analyzer leak/filter replacement documented as compelling evidence to retain data from 12/20 to 12/22**

**Data invalidated ("BJ") from the 12/22 filter replacement until the leak was corrected**

**1/3 and 1/4 (#1 & #2) QC check results reported to AQS**

# TSA Example: "1C" Reporting

| Method of Collection and Analysis | | | INSTRUMENTAL | | | ULTRA VIOLET ABSORPTION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Site/Poc. | Method | Assess Date | Number | Assess Conc. | Monitor Conc. | % Diff | Unit Abbr. | Valid | Null Code | Comments |
| | 087 | 2017- 07- 10 | 1 | | | | ppb | Y | 1C | |
| | 087 | 2018- 08- 27 | 1 | | | | ppb | Y | 1C | |
| | 087 | 2016- 03- 07 | 1 | 101 | 100 | - 1 | ppb | Y | | |
| | 087 | 2016- 03- 14 | 1 | 101 | 96 | - 5.0 | ppb | Y | | |
| | 087 | 2016- 03- 21 | 1 | 101 | 101 | 0 | ppb | Y | | |
| | 087 | 2016- 03- 28 | 1 | 102 | 100 | - 2.0 | ppb | Y | | |
| | 087 | 2016- 04- 04 | 1 | 101 | 101 | 0 | ppb | Y | | |
| | 087 | 2016- 04- 11 | 1 | 101 | 100 | - 1 | ppb | Y | | |
| | 087 | 2016- 04- 18 | 1 | 101 | 101 | 0 | ppb | Y | | |
| | 087 | 2016- 04- 25 | 1 | 101 | 101 | 0 | ppb | Y | | |
| | 087 | 2016- 05- 02 | 1 | 101 | 100 | - 1 | ppb | Y | | |
| | 087 | 2016- 05- 09 | 1 | 101 | 100 | - 1 | ppb | Y | | |

***AQS QA Transactions (below) associated with the boxed transactions in the AMP251 (above)***

```
QA|I|1-Point QC|xxxx|xx|xxx|xxxx|44201|1|20170710|1|087|008|||1C|
QA|I|1-Point QC|xxxx|xx|xxx|xxxx|44201|1|20180827|1|087|008|||1C|
```

# TSA Example:
# 1-pt QC free-form comments

| 087 | 2017-04-05 | 1 | 70 | | 75 | 7.1 | ppb | Y | wrong intercept used in calculation |
|-----|------------|---|----|--|----|-----|-----|---|-------------------------------------|
| 087 | 2017-05-03 | 1 | 69 | | 75 | 8.7 | ppb | Y | wrong intercept used in calculation |
| 087 | 2017-05-22 | 1 | 69 | | 75 | 8.7 | ppb | Y | wrong intercept used in calculation |
| 087 | 2017-05-26 | 1 | 70 | | 75 | 7.1 | ppb | Y | wrong intercept used in calculations |

### *AQS QA Transactions (below) associated with the transactions in the AMP251 (above)*

```
QA|I|1-Point QC|xxxx|xx|xxx|xxxx|44201|1|20170405|1|087|008|75|70||wrong intercept used in calculation
QA|I|1-Point QC|xxxx|xx|xxx|xxxx|44201|1|20170503|1|087|008|75|69||wrong intercept used in calculation
QA|I|1-Point QC|xxxx|xx|xxx|xxxx|44201|1|20170522|1|087|008|75|69||wrong intercept used in calculation
QA|I|1-Point QC|xxxx|xx|xxx|xxxx|44201|1|20170526|1|087|008|75|70||wrong intercept used in calculations
```

# TSA Example:
# Invalid Concentration Data ("EC")

MONITOR TYPE: SLAMS

COLLECTION AND ANALYSIS METHOD: (087) INSTRUMENTAL ULTRA VIOLET ABSORPTI

PQAO:

REPORT FOR: APRIL 2017

DURATION: 1 HOUR

UNITS: Parts per million

MIN DETECTABLE: .005

**4/5/17: 7.1% difference**

| HOUR | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY | 0000 | 0100 | 0200 | 0300 | 0400 | 0500 | 0600 | 0700 | 0800 | 0900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 |
| 1 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 2 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 3 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 4 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 5 | EC | EC | EC | EC | EC | EC | EC | EC | AX | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 6 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 7 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY | EC | EC | EC | EC | EC |
| 8 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 9 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 10 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 11 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 12 | EC | EC | EC | EC | EC | EC | EC | EC | AX | .045 V | .052 V | .055 V | .056 V | .058 V | .058 V | .059 V | .060 V | .061 V | .055 V | .052 V | .053 V | .053 V | .052 V | AY |
| 13 | .047 V | .043 V | .038 V | .036 V | .037 V | .035 V | .036 V | .027 V | .032 V | .043 V | .046 V | .055 V | .061 V | .063 V | .064 V | .065 V | .066 V | .066 V | .065 V | .064 V | .065 V | .059 V | .053 V | AY |
| 14 | .052 V | .044 V | .041 V | .034 V | .033 V | .032 V | .028 V | .022 V | .023 V | .037 V | .054 V | .063 V | .066 V | .073 V | .074 V | .075 V | .075 V | .073 V | .066 V | .059 V | .061 V | .061 V | .056 V | AY |
| 15 | .053 V | .048 V | .046 V | .042 V | .042 V | .039 V | .039 V | .032 V | .034 V | .032 V | .045 V | .049 V | .052 V | .054 V | .054 V | .056 V | .057 V | .055 V | .055 V | .052 V | .051 V | .052 V | .052 V | AY |
| 16 | .052 V | .051 V | .049 V | .048 V | .046 V | .042 V | .038 V | .038 V | .039 V | .046 V | .047 V | .048 V | .049 V | .051 V | .049 V | .050 V | .050 V | .051 V | .050 V | .048 V | .047 V | .045 V | .044 V | AY |
| 17 | .038 V | .036 V | .037 V | .032 V | .032 V | .028 V | .023 V | .021 V | .017 V | .020 V | .029 V | .038 V | .043 V | .048 V | .052 V | .053 V | .045 V | .039 V | .032 V | .029 V | .025 V | .024 V | .019 V | AY |
| 18 | .019 V | .024 V | .023 V | .028 V | .028 V | .026 V | .029 V | .029 V | .029 V | .030 V | .027 V | .027 V | .028 V | .029 V | .036 V | .037 V | .037 V | .037 V | .038 V | .037 V | .033 V | .027 V | .025 V | AY |
| 19 | .017 V | .015 V | .017 V | .017 V | .017 V | .017 V | .018 V | .020 V | .022 V | .027 V | .031 V | .036 V | .040 V | .045 V | .050 V | .048 V | .048 V | .047 V | .044 V | .040 V | .039 V | .041 V | .037 V | AY |
| 20 | .027 V | .022 V | .017 V | .015 V | .010 V | .018 V | .014 V | .012 V | .015 V | .025 V | .027 V | .035 V | .045 V | .046 V | .047 V | .048 V | .047 V | .045 V | .043 V | .044 V | .042 V | .037 V | .041 V | AY |
| 21 | .036 V | .029 V | .024 V | .023 V | .022 V | .024 V | .025 V | .024 V | AX | .029 V | .041 V | .052 V | .048 V | .043 V | .035 V | .034 V | .032 V | .032 V | .030 V | .021 V | .018 V | .027 V | .028 V | AY |
| 22 | .020 V | .028 V | .032 V | .030 V | .024 V | .025 V | .021 V | .019 V | .022 V | .020 V | .024 V | .028 V | .033 V | .037 V | .043 V | .040 V | .034 V | .037 V | .029 V | .029 V | .040 V | .048 V | .044 V | AY |
| 23 | .032 V | .028 V | .027 V | .024 V | .021 V | .023 V | .021 V | .022 V | .022 V | .022 V | .024 V | .028 V | .029 V | .029 V | .030 V | .031 V | .030 V | .029 V | .027 V | .024 V | .024 V | .023 V | .023 V | AY |
| 24 | .024 V | .024 V | .023 V | .022 V | .021 V | .024 V | .023 V | .025 V | .028 V | .029 V | .032 V | .035 V | .034 V | .038 V | .040 V | .039 V | .037 V | .032 V | .031 V | .031 V | .030 V | .026 V | .026 V | AY |
| 25 | .028 V | .025 V | .017 V | .015 V | .015 V | .013 V | .004 V | .010 V | .011 V | .018 V | .028 V | .032 V | .036 V | .037 V | .038 V | .040 V | .041 V | .040 V | .038 V | .039 V | .038 V | .031 V | .031 V | AY |
| 26 | .024 V | .020 V | .017 V | .010 V | .008 V | .006 V | .007 V | .006 V | AX | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 27 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 28 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 29 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 30 | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | EC | AY |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |

# TSA Example:
# Invalid Concentration Data ("EC")



MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (087) INSTRUMENTAL ULTRA VIOLET ABSORPTI
PQAO:

REPORT FOR: MAY 2017

DURATION: 1 HOUR
UNITS: Parts per million
MIN DETECTABLE: .005

**5/3/17: 8.7% difference**

**5/22/17: 8.7% difference**

**5/26/17: 7.1% difference**

# Topics to Discuss

➢OAPQS Memo Refresher

➢Policy Updates

➢Data Examples

➢**How we lookin'?**

# Important Things to Note

Document your decisions
- Maintain detailed records for future review
- Free-form comments in AQS
- AMP600 changes

Prompt response to field issues
- If no investigation is completed as a result of a QC check that exceeds acceptance criteria, the check should be considered valid and associated data invalidated

# Important Things to Note

- Valid and properly nullified QC data in AQS will be counted toward completeness statistics

- Valid QC data in AQS associated with invalidated concentration data will not be included in aggregate precision/bias statistics

- Report all valid checks (40 CFR Part 58, Appendix A, Section 5.1.1)

# Questions? Comments? Concerns?

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