# Quality Assurance Considerations for Continuous Monitoring

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# Terms & Conditions: Integrated Grants Management System

QA System mandatory for all agreements & applies to all data operations

Ensures data quality & quantity to support its intended use

Approved QA documents are required prior to initiating work

QA documents must be reviewed annually

# Where do QAPPs Fit in the Overall EPA Quality System?

**Quality Management Plans (QMPs)**
*organization's QS, structure & responsibilities*


**Program Quality Assurance *Project* Plans (QAPPs)**
*QA/QC & technical activities for projects*


**Standard Operating Procedures (SOPs)**
*project and program activities*

# When do I Need a QAPP?

## When do I Need a QAPP

- If there is collection of environmental data
- If environmental data is being presented to EPA for use
- If EPA funds are being used to generate data
- If you are using existing data for a new purpose

# One size does not fit all

EPAs Quality System uses a GRADED APPROACH with the level of quality depending on

- Importance & intended use of information
- Availability of resources
- Unique needs of participating organizations
- Consequences of potential decision errors

# Once the QAPP has been developed…

- Organizations' internal QAPP review
- Obtain approval from within the organization
- Send to CBPO Point of Contact (Project Officer or QA Coordinator)
- QAPP will be forwarded to Regional EPA QA Team for review and final approval

# EPA QA Timeframes

| | |
|---|---|
| Initial Review | • 45 days for EPA review |
| Conditionally Approved | • Typically, 30 days |
| Resubmittal Review | • 15 days for EPA review |

# Data Quality Objectives Process

- Clarifies projective objectives
- Defines appropriate data needs
- Specifies level of potential decision errors


**ALL DQO STEPS ARE ITERATIVE**

# Performance Checks and Acceptance Criteria

| | Performance Checks | Acceptance Criteria |
|---|---|---|
| Precision | Comparison of readings from deployed sonde against new sonde and discrete sonde when switching (continuous monitoring only). | See Table 11 |
| Bias | Post-deployment calibration | See Table 11 |
| Accuracy | Pre-deployment calibration | |
| Representativeness | Daily checks of real-time data.<br>Auto-notification of problems.<br>Visual inspection to reject spikes | |
| Comparability | Use identical YSI equipment at all sites. | |
| Completeness | Data verification checks | Percentage of accepted data values. |
| Sensitivity | Manufacturer's specifications for each probe type. | See Appendix 1 |

**Table 6:** Discrete sample performance checks and acceptance criteria.

| | Performance Checks | Acceptance Criteria |
|---|---|---|
| Precision | Intra-lab: replicate 1/10 samples.<br>Inter-lab: quarterly Chesapeake Bay split samples. | Replicate control limits (For each parameter) |
| Bias and Accuracy | Analyze SRMs with each run.<br>Spike 1/20 samples.<br>Semi-annual blind audit sample.<br>Semi-annual USGS ref. samples.<br>Field blanks for nutrient samples. | % Recover of SRM<br>% Recovery of Spikes<br>± 3 std. dev. of mean<br>± 3 pseudo-σ of mean |
| Comparability | Use standard procedures for collecting and analyzing samples. | |
| Completeness | Number of reported values vs. number of samples submitted for analysis. | |
| Sensitivity | MDL calculated for each parameter according to 40 CFR, Part 136B. | See Table 9 |

# Standard Protocol for the Operation and Maintenance of Continuous Water-Quality Monitors

## Calibration Criteria

1. Conduct site inspection
   a. Record monitor readings, time, and monitor conditions
   b. With an independent field meter, observe and record readings and time near the sensor(s)
2. Remove sonde from the monitoring location
3. Clean sensors
4. Return sonde to the monitoring location
   a. Record monitor readings and time
   b. Using an independent field meter, observe and record readings near the sensor(s)
5. Remove sonde, rinse thoroughly, and check calibration
   a. Record calibration-check values
   b. Recalibrate if necessary
6. Return sonde to monitoring location
   a. Record monitor readings and time
   b. Using an independent field meter, observe and record readings near the sensor(s)

| Measurement | Calibration criteria (variation outside the value shown requires recalibration) |
|---|---|
| Temperature | ±0.2 °C |
| Specific conductance | ±5 µS/cm or ±3 % of the measured value, whichever is greater |
| Dissolved oxygen | ±0.3 mg/L |
| pH | ±0.2 pH unit |
| Turbidity | ±0.5 turbidity unit or ±5% of the measured value, whichever is greater |

# Criteria for WQ Data Corrections

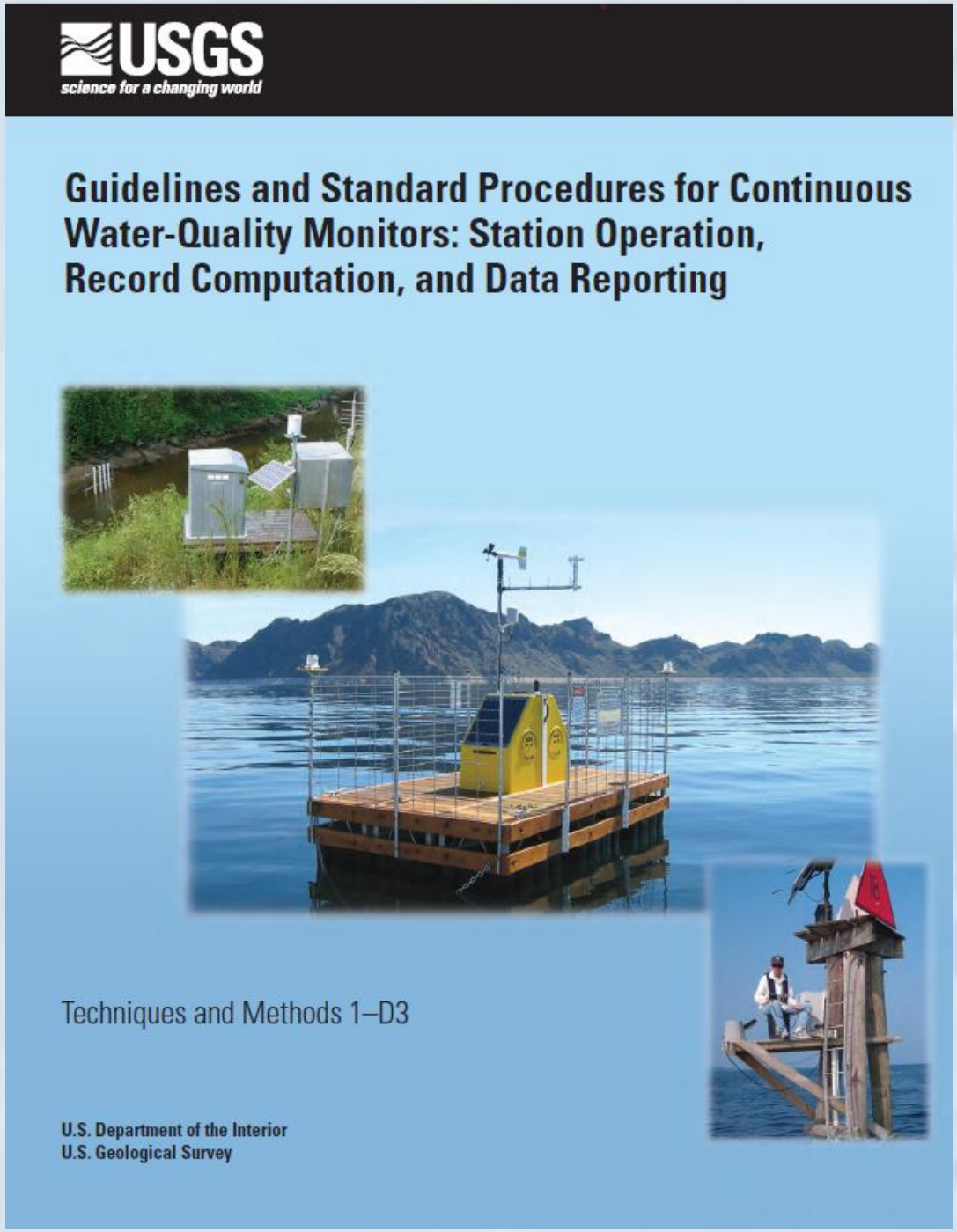
## Maximum Allowable limits for Continuous WQ Monitoring Sensors

| Measured field parameter | Data-correction criteria (apply correction when the sum of the absolute values for fouling and calibration drift error exceeds the value listed) |
|---|---|
| Temperature (may affect other field parameters) | ±0.2 °C |
| Specific conductance | ±5 µS/cm or ±3% of the measured value, whichever is greater |
| Dissolved oxygen | ±0.3 mg/L |
| pH | ±0.2 pH unit |
| Turbidity | ±0.5 turbidity units or ±5% of the measured value, whichever is greater |

| Measured field parameter | Maximum allowable limits for water-quality sensor values |
|---|---|
| Temperature | ±2.0 °C |
| Specific conductance | ±30% |
| Dissolved oxygen | ±2.0 mg/L or 20%, whichever is greater |
| pH | ±2 pH units |
| Turbidity | ±3.0 turbidity units or ±30%, whichever is greater |

# Accuracy Ratings of Continuous WQ Records

| Measured field parameter | Ratings of accuracy (based on combined fouling and calibration drift corrections applied to the record) | | | |
|---|---|---|---|---|
| | **Excellent** | **Good** | **Fair** | **Poor** |
| Water temperature | ≤±0.2 °C | >±0.2–0.5 °C | >±0.5–0.8 °C | >±0.8 °C |
| Specific conductance | ≤±3% | >±3–10% | >±10–15% | >±15 % |
| Dissolved oxygen | ≤±0.3 mg/L or ≤±5%, whichever is greater | >±0.3–0.5 mg/L or >±5–10%, whichever is greater | >±0.5–0.8 mg/L or >±10–15%, whichever is greater | >±0.8 mg/L or >±15%, whichever is greater |
| pH | ≤±0.2 units | >±0.2–0.5 units | >±0.5–0.8 units | >±0.8 units |
| Turbidity | ≤±0.5 turbidity units or ≤±5%, whichever is greater | >±0.5–1.0 turbidity units or >±5–10%, whichever is greater | >±1.0–1.5 turbidity units or >±10–15%, whichever is greater | >±1.5 turbidity units or >±15%, whichever is greater |




Thank You

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