QUALITY ASSURANCE (QA)/ QUALITY CONTROL (QC) AND VERIFICATION

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WORLD RESOURCES INSTITUTE

PARTNERSHIP FOR MARKET READINESS

3RD REGIONAL MRV TECHNICAL TRAINING

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Overview

• QA vs QC

• QC and monitoring plan

• QA – verification and other options
Definitions

Data Quality Management

Quality Control
a system of checks to assess and maintain the quality of the GHG emission report

Quality Assurance
a planned system of review procedures conducted outside the actual monitoring process, compilation by personnel not directly involved in the monitoring process.
Purpose of QA/QC

- Investigate accuracy, completeness, transparency, consistency
- Risk management
  - Preparation and controls now avoids potential big problems later
- Management and credibility
  - Without checks, risk “garbage in as garbage out”
  - Assurance builds trust and confidence
- Continuous improvement
  - State of the art always evolving
The Monitoring Plan

• Provides documentation of the reporting entity’s emissions monitoring methodology
• Explains data flow
• A living document
• Programs can provide templates
  • EU ETS requires installations to submit a report
  • EPA asks entities to prepare a plan, but not required to submit
Examples of QC Activities along the Data Trail

- **Input controls**
  - Metering equipment maintenance, calibration
  - Only personnel with training, job duty, data access

- **Data protection, version control, back ups, archiving, security**

- **Data checks**
  - Sequence testing, missing data tests, record counts, reasonableness checks, reference checks, transcription checks, units

- **Process controls**
  - Recalculation, profile analysis (related sources), trend/variance analysis (over time)
Quality Assurance System

- **Preparation**
  - Independence Confirmation
  - Competency Assessment

- **Plan**
  - Preliminary Assessment: Quality Control System
  - Risk Assessment: GHG Monitoring Procedure

- **Performance**
  - Data Quality Control System Assessment
  - GHG Data Assessment

- **Improvement**
  - Discuss Findings
  - Corrective Action Request
  - Re-assessment and Conclusion
## Type of Quality Assurance

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<tr>
<th>Type of Quality Assurance</th>
<th>Description</th>
<th>Independence Mechanism</th>
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<tbody>
<tr>
<td>Internal Assurance/Internal auditing</td>
<td>Persons(s) from within the reporting company but independent of the GHG inventory determination process conducts internal assurance</td>
<td>Different lines of reporting</td>
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<tr>
<td>External Assurance/Verification</td>
<td>Person(s) from an organization independent of the product GHG inventory determination process conducts third party assurance</td>
<td>Different business from the reporting company</td>
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Verification Relationships

- MRV Program Administrator
  - 2nd Party

- GHG Assertion
  - Assurance
  - Accountability

- Verifier
  - 3rd Party
  - Independence

- MRV Program Participant
  - 1st Party
## Verification Options

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| **Self Certification**          | • Relatively low cost option  
                                 | • May not instill sufficient confidence in data if it is the only QA mechanism utilized |
| **Regulatory Authority Review**| • Carries high level of confidence  
                                 | • Labor and cost intensive  
                                 | • Demands high level of technical capacity |
| **Third Party Verification**    | • Carries high level of confidence when done by accredited third party verifiers as per laid out guidelines  
                                 | • Higher cost to the reporter → May affect program uptake |
‘Reasonable assurance’ means a high but not absolute level of assurance
(Wording from international standard ISAE 3000 (www.ifac.org)

<table>
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<th>Reasonable level of assurance</th>
<th>Limited level of assurance</th>
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<tr>
<td>Intensive verification</td>
<td>Less intensive verification</td>
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<tr>
<td>Verification statement positively worded:</td>
<td>Verification statement with double-negative wording:</td>
</tr>
<tr>
<td>We have found that the emissions report is a fair representation of the emissions of the installation, and contains no material misstatements…</td>
<td>Nothing has come to our attention that causes us to believe that the data is not stated in all material respects in accordance with the relevant criteria…</td>
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LoA depends on the use of the verification statement and the intended user

- Regulatory compliance (mandatory facility reporting)
- Market transactions (emissions trading)
- Public relations (claims about GHG management efforts)

The degree of confidence the intended user (program administrator) requires in a verification statement
Risk-based Verification

- **Inherent risk** due to the complexity of the processes that are basis of GHG calculations and GHG assertions
  - Lower for a facility with a single combustion source vs. petroleum refinery

- **Control risk** due to failure of facility controls to prevent, detect, or correct an error or omission (QA/QC, metering)
  - Lower for an established company, with audited financial system

- **Detection risk** due to failure of verification activities to identify or detect evidence of material misstatement
  - Higher if entity is spread over a large area, multiple owners, mentality of fear or resentment towards the verifier, lack of cooperation
How a verifier deals with risks

Two-step approach

Check the control system
- Reliable and effective
  - Relatively small sample for detailed check

Check the control system
- Exist but not reliable/effective
  - Bigger sample for detailed check

Check the control system
- Not existent/small amount of data
  - Full check of data

Other Parameters
- Materiality
- Inherent Risk
- Level of Assurance

Exist but not reliable/effective
Materiality

- Criteria for determining if errors, omissions, misrepresentations, and non-conformities within or underlying a GHG assertion influence the decisions of the intended users

- Quantitative
  - uncertainty or error of 5% in the total emissions from the organization’s inventory would affect decision

- Qualitative
  - uncertainties related to issues that are not easily expressed numerically, such as the potential of industry or market instability
Materiality Thresholds

‘Materiality Thresholds’: the quantitative threshold or cut-off point above which misstatements, individually or when aggregated with other misstatements, are considered material

- **Absolute/relative/mixture**
  - e.g., 1000 metric tonnes of CO2e per year/
  - e.g., plus or minus 5% of annual total
  - e.g., 1000 metric tonnes of CO2e per year or 5% of total, whichever is less

- **Varies by industry sector, GHG source**

- **Materiality thresholds guide verifiers in their determination of whether a discrepancy is material or not**
Materiality Aggregation/Disaggregation

- 10% of an individual GHG source
  - A boiler is an example of an individual source of combustion emissions
  - A natural gas pipeline is an example of a source of fugitive emissions
- 5% of GHG emissions from a facility or site
- Discrepancies that are immaterial individually may be material when aggregated
QA/QC in Practice

- IPCC QA/QC and Uncertainty Guidelines
- Program requirements integrated into monitoring, data management, record keeping
- Industry standards, national standards, equipment specifications (e.g., metering equipment calibration)
Recap

- QA and QC are both measures to improve data quality
- QA and QC are often internalized to monitoring and reporting functions
- Several options for verification systems
  - Frequency (annually, every 2-3 years)
  - Verification activities (desk review, onsite audit...)
  - Program design (based on facility size, type of source....)
- Benefits from verification, but no ‘bullet proof’ guarantee
  - Trade off between cost and level of assurance
  - Different risks exist
  - Materiality defines the acceptable level
Thank You

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