Revised CEMS Code 2021

Stakeholder Information Webinar

Environment and Parks, Air Policy

April 27, 2021

Alberta

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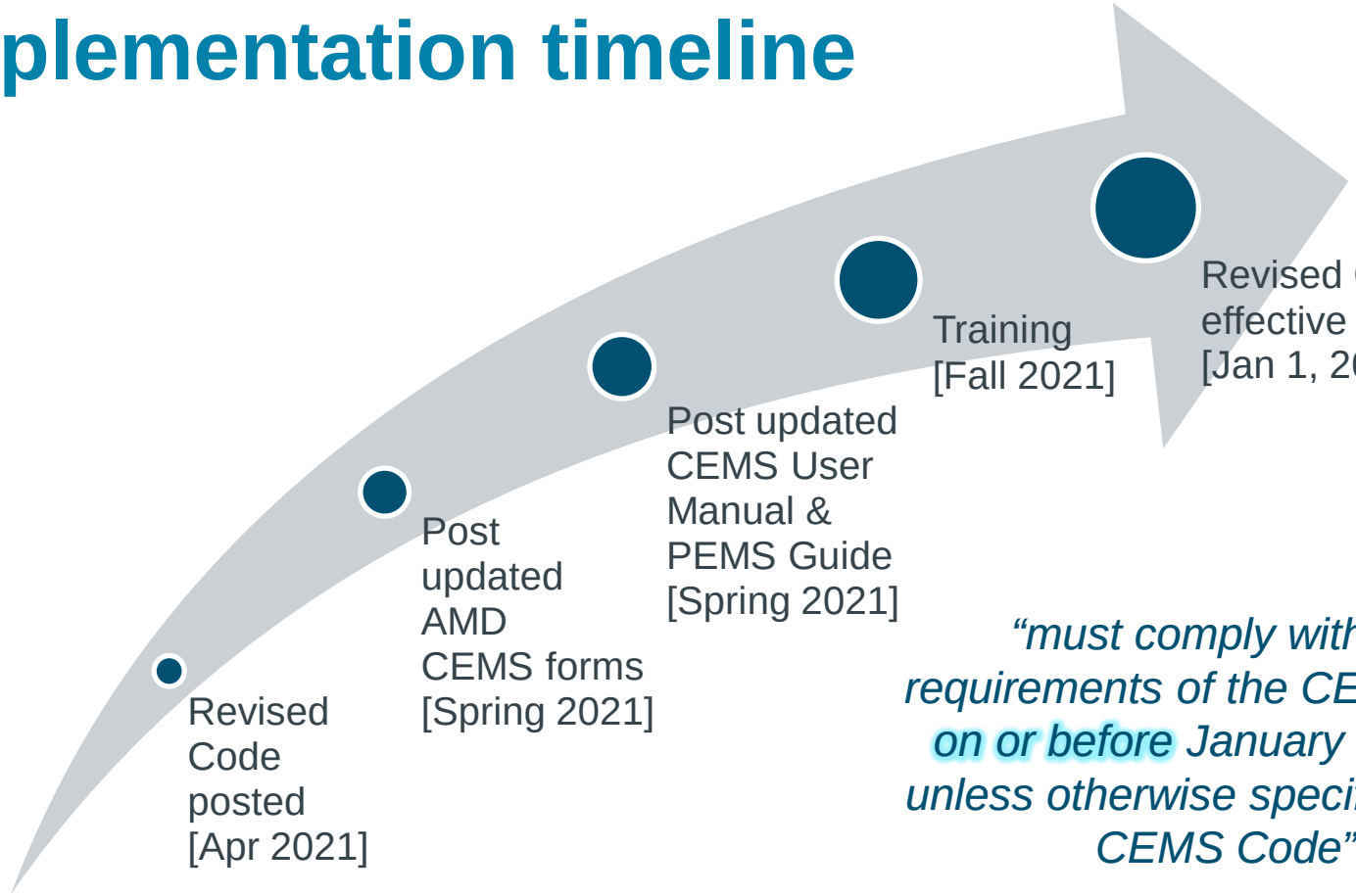
Implementation timeline



"must comply with the requirements of the CEMS Code on or before January 1, 2022, unless otherwise specified in the CEMS Code"

Implementation timeline (1.2-A)

- Requirements for “new CEMS installations”
  - monitoring plans
  - installation
  - design specifications

Authorizations to deviate (1.2-B)

- Previous authorizations were based on 1998 Code
  - some may still be applicable (e.g., installation)
  - some would not be (e.g., no CGA, reduced RATA frequency)
- Check with approvals coordinator
- Authorization to deviate should be based on 2021 Code

Monitoring Plan (2.0)

- Submission timeline change from 60 days to 90 days
- New installations going forward
  - resubmission of existing plans not required
- Removed requirement for plan authorization
  - authorization now only for deviations

Operating range (3.0)

- Changed for SO_2, NOx, CO, flow and temperature
  - to encompass all anticipated concentrations / values
  - no longer prescribing 1.5X approval limit

Ability to conduct CGAs (3.1-B)

- New analyzers installed (permanent replacement) must conduct CGAs with test gas
- Alternate biannual audit with portable analyzer in interim

Data resolution and retention (1.6-A, 3.4.2)

- 1-minute base averages for calculating 1-hour average
  - unless the analyzer scan rate exceeds 1 minute (e.g., GCs)
- Data retention not required at scan-rate level
  - minimum is 1-minute base averages
  - scan rate not prescribed for gases

Data validity (3.4.2)

- Valid hour = 75% of base averages in the hour
- Valid partial hour = 75% of base averages in partial hour
  - source operated < 1 hour
- Valid interval requires 75% of hours within interval
  - e.g., 12-hour average, 24-hour average or total

Percent availability (3.4.3)

- Calculated monthly for each analyzer
  - 90% requirement (except for Hg)
- Exception for planned analyzer replacement
  - as part of preventative maintenance
  - analyzer must be replaced within 30 days
  - limit of two consecutive months not meeting % availability

Certification (5.1)

- Changed timeline from 90 unit operating days (in draft 2) to 120 unit operating days
- 180 calendar days remains the cap
- Conditional Test Period no longer mandated
  - still recommended
- Removed response-time test and specifications

RATA & CGA at certification (5.1.1)

- One of RATA or CGA conducted at certification can be used for annual frequency requirement
  - not spaced 30 days apart as per 7.3-D
- RATA can be conducted during OTP or in 7 days after
- If any test fails, OTP must be restarted
  - would include any RATA that was conducted
- If RATA fails, must restart OTP and repeat RATA

Recertification (5.2)

- Changed timeline from 30 calendar days (in draft 2) to 90 calendar days
- Authorization not required
- Notification instead of updated monitoring plan
  - via AMD notification template (currently submitted by email)
  - updated template will be posted Spring 2021

Component replacement (5.2, 5.3)

- Major changes that could impair system performance or impact data accuracy require recertification
  - no change from 1998 Code
- Required performance testing now specified (Table 4)
- Like-kind analyzer replacement only requires a CGA
- Checks following minor replacement / repair not prescribed
  - follow manufacturer specs and QAP

Like-kind analyzer replacement (5.2)

- Like-kind means same make and model
  - definition from USEPA, 40 CFR Part 75
- If manufacturer deploys new model it is not like-kind
- Same principle of operation does not mean like-kind
- CGA is allowable in place of certification with caveat that same analyzer is installed
  - lower risk of impairment to system / data

Flow factor establishment (5.1-J, Table 4)

- Requirements for establishing factor (k-factor) at certification
  - removed Director authorization requirement for flow factor changes (from draft 2)

Changes to Flow factors (Table 4)

- Considered a major change
- Added requirement to conduct RATA if flow factor changes by > ± 5% annually
  - factor should not change markedly from year to year
  - RATA is for diagnostic purposes
- Changing a flow factor prior to a RATA is not permitted

Changes to performance specs (6.1)

- Decimal place added for clarity
- Bias spec ↑ from 4% to 5.0% of FS for gas analyzers
- Added specs for H_2S (same as TRS)
- Added specs for Hg based on national specs
- Drift specs ↑ for SO_2, NOx, CO
  - from 2% to 2.5% for zero drift
  - from 4% to 5.0% for span drift

Addition of performance targets

- Targets added for ammonia, ethylene and ethylene oxide
  - Tables 9A and 9B
  - required to report against

Flow specifications (6.1.3, Table 7)

- Flow relative accuracy spec ↓ from 15% to 10.0%
  - aligns with gas analyzers since emission rate depends on both
- Adjusted alternative spec for flow velocity:
  - ↑ from 0.5 m/s to 0.6 m/s absolute average difference
  - now has no restriction on when alternative can be used
- 5.0% bias now applies to flow (same as gas analyzers)

Internal verification methods (6.2-H, I, J; 7.2-J)

- Internal verification methods can be used for daily zero/span checks
  - e.g., gas cells, reference spectra, calibrated filters
  - authorization not required
- Recommend that analyzers currently using test gas for daily verifications continue to do so

Linearity for NOx (6.1-B)

- Provision added for meeting linearity if NO and NO_2 are measured on separate channels
  - NO_2 doesn't need to meet linearity if <5% of NOx (by volume)
  - linearity specs are for NOx (total), as specified by approval
  - Code does not add requirement to monitor NO or NO_2
- No need to measure NO_2 unless approval requires
- No need to assess linearity on NO and NO_2 separately

Alternative Relative Accuracy spec

- Footnote A (Table 7) from 1998 Code not carried forward
  - RATAs have been reported as ‘passed’ with RA > 30%
  - but see facilities with similar emissions / limits that pass < 10%
- Looking for overall improvement in analyzer performance

Alternative Relative Accuracy spec (6.1-C, D)

- Alternative RA spec added:
  - applies only to SO_2, NOx and CO
  - ≤ ± 5.0 ppm absolute average difference (increased from draft 2)
  - can only be used when low emission criterion is met
- Removed abs accuracy alternative spec (from draft 2)
  - testing confirmed the absolute ave difference is met first

Low emission criterion (6.1-C, D)

- Average emissions ≤ 50 ppm during a RATA
  - based on RM runs
- Focus on allowance for facilities with low emissions
  - low in magnitude, as opposed to low relative to limit
- Focus on improved data quality for reported emissions

Alternate biannual audit (6.2-V → Y)

- For analyzer not able to conduct a CGA
  - interim until facility replaces analyzer
- Like a simplified RATA with portable analyzer
  - independent audit twice a year
  - lower cost than RATA and only 6 runs
  - need EPA Protocol Gas (same as CGA) to calibrate analyzer
  - spec to meet is ± 15.0% (or alternate spec)

CGA low level range (6.2-B, 6.2-S)

- Changed from 0-20% to 1-20%
  - stopping use of zero / inert gases
  - 1998 Code always required EPA Protocol Gas for CGAs
- Key is to challenge analyzer response to low concentration
  - many sources are operating in the low range

Changes prior to RATA / CGA (6.2-Q, 6.2-CC)

- Restrictions on what can be done prior to test
  - not a change from 1998 Code
  - you can perform normal maintenance / daily checks as per QAP
- Cannot make adjustments prior to test or “pre-check”
  - added timeline of “at least 24-hours prior to and during”
- Is an as-found challenge

RATA run length (6.2-HH)

- Runs must be minimum of 30 minutes for all RATAs
  - “for every RATA conducted”, “applies to all parameters”
  - 1998 Code gave RATA procedure only for gas analyzers
  - want consistency from run to run / parameter to parameter
- Ensures a representative sample is taken
- RM needs to be representative of emissions and correlate with CEMS data (6.2-A)

RATA – aborting (6.2-PP)

- RATAs that are aborted when deemed to fail (based on initial runs)
  - must follow the actions for a failed RATA, including retest
  - failure to meet performance specs
  - would lose RATA reduction (7.3-H)
- NOT referring to aborting a RATA due to safety reasons
  - covered in guidance below 6.2-KK

QAP and annual evaluation (7.1 and 7.7)

- Added additional QAP requirements and guidance on what should be covered in each QAP section
  - facilities have until September 1, 2022 to update existing QAPs
- Added requirements for follow up and taking action on annual evaluation findings

Regular QA / QC (7.2, Table 12)

- Daily inspection requirement removed
  - now follow QAP for regular inspections of all CEMS components
- Not mandating removal of flow analyzer from stack
- Regular review of data required
  - trends, anomalies, root cause identification

RATA and CGA frequency (7.3)

- 2 RATAs and 2 CGAs annually is still minimum req't
  - alternate biannual audit can be conducted in place of CGA
  - a RATA can replace a CGA
  - must be 30 days apart to count towards annual requirement
- RATA for recert can count towards annual requirement
- Flow and temp RATAs have same frequency
  - unless it is a temperature only CEMS (1 RATA per year)

Reduced RATA frequency (7.3.1)

- Can now reduce to 1 RATA/yr without authorization needed
  - must meet and keep all conditions
  - CGAs increase to 3/yr
- Any failure to keep conditions results in loss of reduction
- Changes to frequency apply to next calendar year
- Frequency reported on AMD2 Form

Reduced RATA frequency (7.3.1)

- Four consecutive RATAs must meet enhanced RA spec
  - ≤ ± 7.5% RA
  - or 3.5 ppm absolute average difference (low emission criterion)
- Could start reduced frequency in 2022, based on past RATA results
- Applicable to all typical gas analyzers (Table 5)

Reduced RATA frequency (7.3.1)

Q:

If you replace an analyzer can you keep reduced RATA frequency?

- Yes
- If you continue to meet all conditions with the new analyzer you keep the reduced frequency

Reduced RATA frequency (7.3.1)

Q:

If you currently have an authorized reduced RATA frequency can you keep it?

- Yes
- But starting January 1, 2022 you are required to keep all conditions for reduced RATA frequency
- If you fail to meet a condition you will lose the reduction

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Out-of-control criteria (drift) (7.6)

- OOC now triggered 1st time zero / span drift 2X spec
- Removed 4X spec criteria
- Added OOC criteria for flow, H_2S and Hg
- Table added for comparison against targets for NH_3, ethylene and ethylene oxide zero / span drift

Out-of-control criteria (drift) (7.6)

Q:

Why can’t there be a buffer period before deeming the CEMS OOC?

- The buffer period is in between the spec and 2X the spec
- Two columns in Table 13

Out-of-control criteria (reporting) (7.6)

- AMD3 Zero / Span summary form will be removed
- OOC events will be reported on updated AMD2 form
  - # events
  - total hours OOC
- Form updates will be released later this Spring
- Removed requirement (from draft 2) to immediately report RATA / CGA failure

OOC following failed CGA / RATA (7.6-F)

- OOC period begins with:
  - time when root cause is determined to have occurred (ideal)
  - OR end time of last successful RATA / CGA (default)
- 1998 criteria had no incentive to investigate and determine root cause
  - means questionable data is submitted as quality-assured
- Need better tracking of data and diagnostics and more effort on root cause investigation

OOC following failed CGA / RATA (7.6)

Q:

How will previously submitted data be invalidated?

- Requires resubmission of data
- No data estimation required
- Can leave data in but will be flagged as missing data
- New missing data method being added to User Manual

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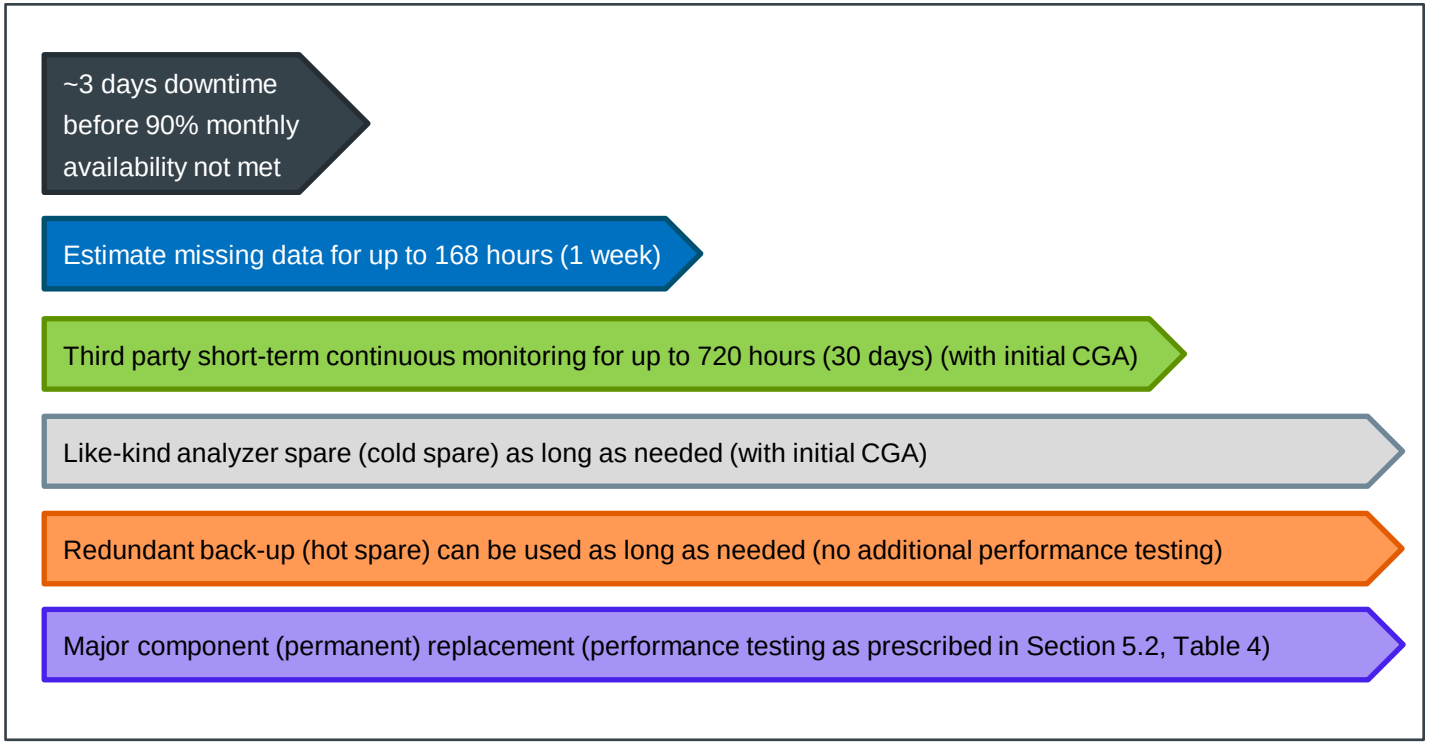
Missing data estimation (8.0)

- Increased missing data from 120 hours to 168 hours max per month
- Methods in CEMS User Manual (unchanged)
  - Method 4: Director authorization for beyond 168 hours
- Estimated data is flagged
  - Does not count towards percent availability

Temporary replacement monitoring (8.0)

- Contingency plan is now required for monitoring during outages
  - missing data estimation (not QA'd)
  - temporary replacement monitoring (QA'd; counts for % availability)
- Options provided
  - Removed reference method (from draft 2)

Temporary replacement monitoring (8.0)



Third-party short-term monitoring (8.0)

Q:

What is third party short-term continuous monitoring?

- Back-up analyzer / system (e.g., mobile unit)
- Operated by third party
- Continuous measurement
- Follows ASSC, or EPA promulgated, instrumental methods
- Temporary (≤ 720 hours)

Reporting (9.0)

- Now covered in AMD Chapter 9
  - quarterly CEMS reports replaced by monthly CEMS Summary Form (AMD2)
- 2021 Code adds:
  - must report all parameters
  - must report consistent wet or dry basis
  - must report data from pre-certification period
  - updated flagging

PEMS (10.0)

- Mandatory requirements in Code for:
  - PEMS development
  - submission of PEMS monitoring plan and model data
  - ongoing PEMS operation
- Guide V1.0 contains guidance
- PEMS must be authorized before using to meet CEMS requirement in approval

Next steps

- Posting later this Spring:
  - updated AMD reporting forms (AMD2/3, 4, 7, 9)
  - updated AMD notification template (AMD0)
  - updated CEMS User Manual
  - PEMS Guide
- Training webinar Fall 2021

Contacts and resources

- Email:

  AEP.CEMSCode@gov.ab.ca (CEMS Code)

  CEM.UserCoord@gov.ab.ca (online reporting)

  Air.Reporting@gov.ab.ca (AMD forms)

- CEMS webpage:

  https://www.alberta.ca/continuous-emissions-monitoring.aspx

Questions?

Email:

AEP.CEMSCode@gov.ab.ca

CEM.UserCoord@gov.ab.ca (online reporting)