CEMS Code Questions and Responses

April 27, 2021 Webinar – Revised 2021 CEMS Code

Q#	Question / Comment	Alberta Environment and Parks (AEP) Response
1	What deviations are deemed to be acceptable? Often we see deviating from the Alberta Stack Sampling Code or CEMS code (e.g., minimum spacing between flow measurements, etc.).	No deviation is "acceptable". Requests to deviate are handled on a case-by-case basis by the Director and approval coordinator. Any proposed deviation (from either the CEMS Code or Stack Sampling Code) would need to be warranted and substantiated. Requests for authorization to deviate are submitted to the Director, so the facility would contact their approval coordinator. It is up to the Director to decide whether or not to authorize a deviation. It is expected that sampling and siting requirements be met. It is up to the facility to know the requirements before CEMS purchase and installation. If a deviation is requested after installation, it could still be rejected by the Director.
2	Did the linearity allowance increase from current 2% for CGA tests?	No the linearity specification has not changed. The minimum specification remains at 2.0% of full scale for SO_2, NOx and CO, however we have added the decimal place to make it more clear when you meet and do not meet the spec.
3	Linearity for TRS should also be modified similar to NOx (6.1-B) since some analyzers on the market measure sulphur components individually.	We have not added an allowance for TRS linearity. We did look into and consider this, but have not received any indication from facilities in Alberta that this was a concern or that there is any difficulty in meeting linearity for TRS. If we were to make adjustments to linearity for TRS it would be in a future update.
4	Is NO_2 < 5% (by volume) confirmed by the Certificate of Analysis?	No. When NO_2 and NO are measured on individual channels, you would assess the relative proportion of each by volume in the effluent stream (emissions) prior to the CGA. So the allowance in 6.1-B is with respect to the NO_2 emission concentration, not the CGA result or cylinder gas concentration. So you do not use the Certificate of Analysis, as that provides the test gas concentration. The allowance provided in 6.1-B is that linearity of 2.0% does not need to be met for NO_2 if and when NO_2 accounts for < 5% of total NOx in emissions. You should take an average of each component in emissions from the past 30 days prior to the CGA to determine the ratio. If NO_2 accounts for < 5% of total NOx over the past 30-day average, then the CGA would only be required for NO.

5	Why does the average absolute difference link exclusively to Reference Method for the low emission criterion? If the RM is 50.1 ppm but the difference is 4 ppm it may not qualify, plus it may not qualify for RATA reduction.	For use of the alternative relative accuracy specification (either for the standard specification of ≤ ± 5.0 ppm absolute average difference, or the enhanced specification for reduced RATA frequency of ≤ ± 3.5 ppm absolute average difference) the average of Reference Method runs is used to determine whether or not the low emission criterion of ≤ 50 ppm is met. The Reference Method is the "gold standard" that is being compared to during the RATA so it is used. There of course is the potential to be very close to the low emission criteria cut-off and not meet it; we understand this will happen. However, we need to decide on and stick to a number and 50 ppm is it (based on average RM runs as per 6.1-C).
6	Need to add error associated with standards to the 2%. E.g., 2% of 100 ppm FS = +/-2 ppm allowance for difference between response and standard. But a standard has a 1% error, so for example, on an 80 ppm standard, that = 0.8 ppm give or take. Statistically the error allowed for 80 ppm standard should be +/- 2.8 ppm (statistically accounts for the standard error and the 2% full scale allowance).	EPA Protocol gases must meet strict analytical targets and are assumed to be the true value for the purposes of determining CEMS linearity. The 2.0% linearity spec in the CEMS Code is based on full scale (i.e., 2.0% of FS) and should not be confused with the stated % accuracy on EPA Protocol gases which is based on the cylinder concentration or tag value. We are not aware of persistent issues with CGAs not passing as a result of the Protocol Gases used. It is rare that certified gas would be the source of CGA failure.
7	With respect to root cause investigation: With the wide variety of Root Cause Analysis methodologies, what will the standards be for determining if an investigation is an appropriate root cause investigation?	Yes there are many types of root cause analysis methods out there. We are not prescribing any particular one. It is up to the facility to set out in their QAP what methods and tools will be used to investigate analyzer failure. While this may be something that is reviewed in an annual evaluation, the CEMS Code does not dictate or provide any standard for what these investigations must include. It is in the best interest of the facility to conduct a thorough investigation to determine the root cause so as to avoid future failure and loss of data. Whatever point in time is selected for the root cause will need to be supported and documented.
8	Is the temporary replacement system options separate from planned CEMS replacement since facility is allowed to have 2 months of not meeting CEMS requirements?	It is important to clarify that the two-month allowance is for meeting analyzer percent availability during a pre-planned analyzer replacement (it is <u>not</u> waiving all CEMS requirements). Temporary replacement monitoring is required going forward to avoid large periods of CEMS data loss. This could apply to pre-planned replacement (if the criteria in 3.4-K cannot be met; i.e., only 2 months of not meeting % availability and you must replace analyzer within 30 days), but more often will apply to analyzer failure and the need to replace or send an analyzer out for repair. The facility is now required to have a contingency plan in place for when un-planned outages occur.

9	Considering the following situation: A company did a RATA in March and passed, and another RATA in September and failed. Based on the default, CEMS data would be considered valid until the date of March RATA, and all the CEMS data between March and September would be considered invalid. Is this a correct interpretation? If yes, this would mean the CEMS would be missing data for all days between March and September.	The ideal situation would be, following the failed RATA, the company investigates and determines the root cause and point in time when it occurred. Then data is invalidated only to that point. If the point in time of the root cause of the RATA failure cannot be determined following investigation, then the company must invalidate data back to the end time of the last successfully passed RATA, CGA or alternate biannual audit (according to 7.6-A and 7.6-F). So while the example provided is possible, if the company had conducted a CGA in between March and September, they would invalidate data back to that test. Data is invalidated back to the most recently passed performance audit (it need not be back to the last audit of the same type that failed).
10	No more 24 hours added for any out-of-control?	In the 1998 Code (Table 15 footnotes) it said that if zero or span drift exceeded four times the performance spec, the CEMS is out-of-control back to the previous passed drift test. In the revised Code, we have removed the 4X performance spec criteria. See clause 7.6-F for determining the start time of the out-of-control period. For drift, the out-of-control period begins either with the time when the root cause is determined to have occurred, or if the root cause timing cannot be determined, the start time of the failed zero and span verification. So the default for zero and span drift, if a root cause is not determined, is the start of the failed test. You are not required to invalidate the previous 24-hour period.
11	If I have a temporary CEMS, is the CGA based on the duration that I use the data from the CEMS or the duration that the temporary system is running?	The CGA conducted when you put temporary replacement monitoring into place is to validate the data from the replacement analyzer. So rather than needing to conduct a full recertification, if you put a like-kind analyzer or third party short-term continuous monitoring into place you are only required to complete a CGA in order for the data to be considered quality assured.
12	If you replace a flow analyzer (like-kind), wouldn't a flow RATA be more beneficial rather than performing a CGA? (Table 4 - Testing Requirement)	Yes, that is correct. Table 4 says for permanent replacement of a gas or flow analyzer with a like-kind analyzer “CGA (alternate biannual audit or RATA if CGA is not possible)”. So for flow or temperature analyzers a RATA is the only option. This would also be the case for temporary analyzer replacement under Section 8.0 (see guidance under 8.0-A for flow and temperature analyzers).
13	Will copies of the slides be made available?	A link to the recorded webinar has been added to the CEMS webpage: https://www.alberta.ca/continuous-emissions-monitoring.aspx If you would like a copy of the slide deck, please email AEP.CEMSCode@gov.ab.ca.

14	Should an alternative test, in place of a CGA, test the full range of the CEMS?	The alternative biannual audit procedure is given in 6.2-V. The portable analyzer must be calibrated and drift tested with low- and high-level test gas, however the test itself is conducted on actual emissions from the source (similar to a RATA). So no, you would not be required to alter production rates for this test.
15	What are the criteria for PEMS development?	The requirements for PEMS development are provided in Section 10.0 of the revised CEMS Code. See clauses 10.0-C and 10.0-D.
17	What is the minimum range for SO_2? We currently have a CEM with a range of 0 – 10 ppm SO_2. This small range makes for a very small tolerance for performance specs. For example, 4% of 10 ppm is only 0.4 ppm. This small tolerance is tighter than the specs of our CEM itself. Is there a minimum performance spec? For instance 4% of FS or 2 ppm whichever is greater.	For linearity you need to be within 2.0% of FS for each CGA test point. There is no alternative specification provided for linearity. In the example provided, with an operating range of 0 – 10 ppm, the results would need to be within ± 0.2 ppm. So yes this creates a tighter target with the lower full scale, but the % of full scale target and the test are the same (you need to meet 2.0% of FS). There is no minimum range for SO_2 analyzers. Operating range and full scale are chosen based on the emissions level of the source, so that all anticipated concentrations are captured. In the example provided, yes it means the CEMS comparison to test gas concentration would need to be within ± 0.2 ppm to meet the linearity spec, which could be lower than the analyzer design spec for accuracy. In such a case, the facility would have to question whether or not such an analyzer is appropriate for the operation. If measuring SO_2 in that range, an analyzer designed for low concentrations may be a better choice. We are not aware of facilities operating in Alberta with SO_2 concentrations in this low range.
18	With regard to reporting and electronic submission, how much is the CEMS User Manual expected to change?	There will be minimal changes to the User Manual. We only anticipate updating any sections that are impacted by the revised CEMS Code. There will be addition of new codes such as Null data codes, VMV for PEMS, and added guidance. Reporting of partial hours has now been added to the CEMS Code and will need to be added by facilities if it has not already been implemented.
19	What changes should we prepare for in how data needs to get formatted and eventually submitted? Is any reporting workflow changing? Is data file formatting? Are existing SFTP tools or Industry Signoff pages changing?	Nothing is changing with respect to data format, submission, workflow, SFTP tools or signoff.
20	Will facilities CEMS approvals change? Will codes for electronic reporting change?	Approvals do not require specific changes in response to the revised CEMS Code, however approval conditions can change from time to time. That is the prerogative of the Director under the *Environmental Protection and Enhancement Act*. Codes for electronic reporting are not changing.

21	When will CEMS electronic data submissions need to comply with the new code and user manual? (Assume submission of the first valid month where new code is in place. E.g., January 2022 add 30 days to submit)	That is correct. Electronic submission under the revised CEMS Code requirements will apply to the January 2022 reporting period (so submission of January 2022 data).
22	How does Alberta Environment and Parks envision the 1-minute averages to work? For instance, is the expectation that it's done via a DAS module, or alternatively that the control system should calculate and log a 1-minute average to a historian? Is there a preference?	AEP doesn't mandate this. It is up to the facility, but they must have the details captured in their QAP (and monitoring plan for new CEMS going forward). We have left the DAS requirements relatively open because there are different ways the data can be captured and stored. The facility needs to consider raw data retention requirements as well as internal data accessibility.
16	A like-kind analyzer is now defined as an analyzer of the same make and model, and it was mentioned that this definition was taken from 40 CFR Part 75. However, Part 75 considers analyzers of different make and model, but that use the same analytical technique (i.e., chemiluminescence for NOx) as like-kind analyzers. For reference, this is clarified in Question 7.13 of the Part 75 Policy Manual.	That is true that the EPA policy manual clarifies that a like-kind replacement analyzer is one that uses the same method of sample collection, using the same probe and interface as the primary system. However Part 75 only allows the use of a like-kind analyzer replacement temporarily (max of 720 hours per year). Section 12 in the Policy Manual requires recertification following permanent replacement with a like-kind analyzer. Rather than putting a timeline on like-kind replacement, AEP has stuck with a firm definition of same make and model and is allowing a like-kind spare to remain in place, if the facility chooses (Section 8.0 in revised CEMS Code). We have also allowed permanent replacement with a like-kind analyzer with only a CGA required (Section 5.2, Table 4). The 1998 CEMS Code also requires recertification for "replacement of components with different makes/models". Analyzers can vary greatly from manufacturer to manufacturer, even with the same principle of operation. The same can be true when a model changes. Some analyzers need a whole new SOP for operation when the model changes and operation can be quite different for the same principle of operation. You can't assume they will operate the same and there is potential for an impact to system performance or data accuracy. The RATA is the baseline for making a major change and has been the standard since 1998. A RATA conducted for recertification can be used to meet the annual frequency requirement, so it need not be an "extra" RATA. The CGA has now been added as a special allowance for like-kind analyzer replacement or temporary use.