

Air Monitoring Directive – Summary of Feedback and Responses for Chapter 4 Monitoring

This feedback was received following the 60-day public review (February – April 2015) of the Air Monitoring Directive Chapter 4, Monitoring.

Chapter 4: Monitoring			
#	Comment	Response	Action Taken
1	Section 4.1 Mobile Monitoring, Personnel When it lists possible personnel qualifications, for “operator safety training in accordance with related Occupational Health and Safety regulations”, will they require Hazmat training if they are to be involved in emergency monitoring?	The chapter will not specify the specific safety training required. Hazmat training is one specific type of training that may be required before mobile monitoring is conducted.	Added hazmat training as an example in 4.1.
2	Section 4.2.5 “The temperature within the mobile air monitoring unit should be measured with a temperature sensor and logged in the data acquisition system.” – this should be “shall” so that it is enforceable and there is a way to prove that proper temp has been maintained throughout the monitoring event.	Agreed.	Added a new clause under 4.2.5 requiring that internal unit temperature be measured and logged.
3	Section 4.3 Instrument Calibration Who completes this audit? How long will it take? Is this completed by AEMERA or the operator? Could lead to issues with mobile monitoring by municipalities (i.e., Calgary Fire Department) and their response times if they need to spend hours doing audits on equipment prior to heading out. The details of this audit need to be fleshed out more since there are multiple ways emergency air monitoring occurs.	This is only provided as guidance and it is not a mandatory requirement. In the past, department auditors have performed audits on mobile units.	Changed wording of guidance in 4.3 to say “an audit may be conducted”.
4	Section 4.4 Monitoring Plan “it is recommended that a monitoring plan be completed for pre-planned surveys with the mobile air monitoring unit including the following components ...” Could apply to emergency monitoring as well. May not be applicable or reasonable in all situations, but we require monitoring plans for other incidents.	This is guidance, and the intent is to keep it open-ended since usually all planning during emergencies is conducted at a high level to fully respond to the situation, and actual monitoring activities change as the situation warrants.	No change made.
5	Section 4.5 Data Capture and Storage For emergency monitoring, can there be a clause related to data being available for responding agencies at all times in a digestible manner? I.e., some mechanism of emailing data in a legible format.	This is an important requirement – providing data in a timely manner when monitoring during an emergency event. However that would be a reporting requirement and would be better handled in the AMD reporting chapter.	Added clause to AMD Chapter 9 (Reporting) which will be released in second draft for public review.
6	Section 4.0 General Does emergency air monitoring warrant its own special section or	An emergency monitoring section is not included in this revision of the AMD. A separate document to augment this section of the AMD could be	No change made.

	attention.....typically short snap shot monitoring as opposed to hour long data sets?	developed in the future.	
7	Section 4.0 Guidance – “air quality emergencies” Often we don’t use this term when we are using the MAML at a fire or contaminate release. An air quality emergency might be where the Air Quality Health Index is off the chart. Would it be better to use “air contaminate release”, or “air contaminate release incident” or “emergency air monitoring”?	Agreed.	Changed “air quality emergencies” to “emergency air monitoring”.
8	Section 4.0 Guidance – “events such as forest fires” Or prescribed burns of forest or grassland.	Agreed.	Changed to “wild fires or prescribed burns”.
9	Section 4.0 Guidance – last bullet - assessing the local [ADD downwind] impact of point or area emission sources.	Agreed.	Made change as suggested.
10	Section 4.1 – suggested qualifications for personnel Suggested? Some of this could be suggested i.e., large vehicle training, but training on the operation of the equipment should be mandatory. Maybe proficiency test like the pesticide applicators? There is Incident command system training (ICS 100) online.	The AMD as a whole applies to those who conduct mobile monitoring as well (those who supply data to the Regulator). It is not possible to identify every training type that may be necessary for the various necessary tasks. Chapter 5 (Quality System) of the AMD requires that the necessary training and proficiency be obtained before conducting any air monitoring/maintenance activities.	No change made.
11	ME 4-N – wind mass location/height What about other interference, trees building etc.? If it’s an EBAM, minimum setbacks should apply. Maybe that applies to vehicles as well.	The overall AMD applies (including the siting criteria in Chapter 3 – see section 4.4.1). However, having required minimum set-back distances it not always practical, especially during an emergency situation in a populated area. The operator must use their best judgement to situate in an area where they will be able to safely collect data representative of the area.	No change made.
12	ME 4-U(a) Must conduct zero-span daily if unit is powered in standby state. And if not....then what?	Not all mobile units are powered and ready all the time. If they are kept in a ready state, then a daily zero/span is required. If they are not kept in a ready state, the operator must complete a successful multi-point calibration in accordance with the calibration section of the AMD. Bullets (a) through (d) in ME 4-U give the other scenarios for conducting a zero-span. Section ME 4-V requires corrective action if a span fails.	No change made.
13	Section 5.3 Sampling Equipment Installation Are evacuated canisters considered mobile devices? What about fire department handhelds and Area Raes?	Section 5.3 applies only to precipitation sampling equipment for wet deposition analysis.	No change made.

14	<p>The terminology used in a few of these documents so far endorses only one manufacturer of equipment. It states in the specification sheet for SO₂ that the acceptable method is “UV pulsed fluorescence”.</p> <p>This terminology is specific to one manufacturer only, and ought to be changed to “UV fluorescence” so as to not exclude all the other manufacturers that have obtained EPA equivalency for their continuous analyzers.</p>	<p>UV pulsed fluorescence is specified as the principle of operation for SO₂, H₂S and TRS continuous analyzers. This does not result in endorsing only one manufacturer. UV pulsed fluorescence is specified for SO₂ analyzers to align with the requirements in the 1989 AMD, NAPS and the US EPA. The same principle of operation is specified for H₂S and TRS analyzers to align with NAPS and the US EPA. Some UV fluorescent analyzers are designated as EPA reference methods only under specific operating conditions.</p> <p>Background on how the analyzer specifications were derived is available in a report available on the AMD website (Development of Performance Specifications for Continuous Ambient Air Monitoring Analyzers).</p> <p>An analyzer must meet the minimum specifications. Analyzers may exceed the performance specification but cannot go below. To use an analyzer outside of the minimum specifications, written authorization would need to be obtained from the Director.</p>	No change made.
15	In Table 1 (performance specs for continuous analyzers), H ₂ S/TRS should be 0.1 ppm (100 ppb) full-scale not 0.5 or 1.0 ppm.	<p>The 0.5 – 1.0 ppm is the minimum requirement for H₂S/TRS emergency response monitoring. General continuous ambient analyzers would all meet and exceed this minimum requirement for monitoring under normal conditions.</p> <p>To ensure that the majority of H₂S/TRS analyzers currently achieving the more stringent requirement of 0.1 ppm continue to meet that requirement for monitoring under normal conditions, 0.1 ppm will be added to Table 1.</p>	Added the full-scale requirement for a continuous H ₂ S/TRS analyzer of 0.1 ppm as the compliance requirement in Table 1 and kept 0.5 - 1.0 ppm as the requirement for emergency purposes.
16	Now that it is established that PUF and VOC monitoring fall under the AMD – I have looked through Chapter 4 and Chapter 7 and cannot find anything on calibration frequency of these samplers. I understand the calibration method will need to be approved in writing by the director, however there is no frequency indicated – can you please provide some guidance?	<p>Chapter 7 (Calibration) provides minimum calibration requirements for continuous ambient monitoring. Cal 7-A states that high volume samplers must be calibrated every 3 months.</p> <p>Where no guidelines or requirements are detailed in the AMD, the person responsible must follow the manufacturer’s operational, maintenance and calibration requirements. If it is a custom one-of-a-kind piece of instrumentation, written approval is required to use it, and then the person responsible must follow specific operation, maintenance and calibration requirements for that instrument. This would be outlined in a QAP.</p> <p>In Chapter 4, clauses ME 3-C and ME 3-E require that SOPs be developed for integrated samplers outlining maintenance procedures (including calibration procedures).</p>	No change made.
17	ME 6-A and ME 6-B require that the analytical method be approved in writing by the Director. I wonder why this is necessary. There are only a limited number of analytical methods for analyzing F in vegetation (e.g., colourimetric, instrumental neutron activation analysis and total fusion/ion selective electrode), and each of these should provide adequate detection	In order to have a scientifically defensible monitoring program, it is important that the same analytical method be used throughout the season and from year to year so that the results are directly comparable. While the methods mentioned may have adequate detection limits, there is measurement errors associated with each method and direct comparison is not advisable. A	No change made.

	<p>limits and an accurate quantitative determination of F when conducted by an accredited laboratory.</p> <p>Also, in some years it is beneficial to have more than one analytical option for F in vegetation in case the laboratory has equipment problems or is backlogged with samples and can no longer provide a reasonable turnaround time for the vegetation samples. If there are potential adverse effects of F on the environment, a good turnaround time is essential so that landowners can be notified not to graze livestock. I would suggest that perhaps the requirements should be rewritten to something like:</p> <p>ME 6-A The person responsible shall notify the Director in writing of the proposed vegetation fluoride analysis method prior to conducting any vegetation fluoride monitoring. The analysis shall be performed by an accredited laboratory using a method that provides a minimum detection limit of 20 ppm F.</p> <p>ME 6-B The person responsible shall use only the vegetation fluoride analysis method outlined above.</p>	<p>reasonable turnaround time by the laboratory is important for landowner notifications, but it would be more reasonable to find a laboratory that could analyze samples in the required time frame rather than change the analytical method. Alternatively, you could request the landowner not graze livestock until such time the results have been received.</p> <p>In this particular case, the analytical method currently being used by the facility has been approved and in use for a few years, so no further approval for this method is required because of the AMD update.</p>	
18	Chapter 4 seems good. No comments.		No change made.
19	Definition 48 “NAPS” National Air Pollution Surveillance program (not system)	Agreed.	Changed definition as suggested.
20	Definition 82 – suggested rewording “span drift” (24 hour) means the percent change in analyzer output response to a <i>consistent</i> upscale pollutant concentration <i>within a 24 hour period</i> of unadjusted continuous operation	Agreed.	Changed definition as suggested.
21	Definition 93 – suggested rewording “zero drift” (24 hour) means the percent change in analyzer output response to a <i>consistent</i> zero air concentration <i>within a 24 hour period</i> of unadjusted continuous operation	Agreed.	Changed definition as suggested.
22	ME 1-U When the person responsible (a) conducts any monitoring outside of that which is specified in the AMD , and (b) will be submitting the results of this monitoring to the Regulator, the person responsible must have written authorization from the Director prior to commencing the following: (i) the use of different monitoring methods; (ii) the use of different monitoring equipment; ... - Different from what?	Should say rather the use of methods/equipment not specified in the AMD.	Changed ME 1-U(i) to say “the use of monitoring methods not specified in the AMD and changed ME 1-U(ii) to say “the use of monitoring equipment not specified in the AMD.
23	ME 1-U (iii) – define “special air studies”. Are these studies as described in an operating approval?	Special air studies are any additional air monitoring studies carried out by an industrial operation or Alberta airshed that go beyond their normal routine air monitoring. The results of a special air study may or may not be reported to the Regulator (as outlined in Chapter 9 Reporting).	Added definition for special air studies.
24	ME 1-U(iv) “monitoring for parameters not specified in the AMD” Are these parameters meant to be specific to ambient? There are no	This is meant for ambient parameters.	Changed ME 1-U(iv) to specify monitoring for ambient

	parameters listed for SESs and this is the general section which one would expect to apply to the entire chapter.		parameters.
25	ME 2-G/2-I Needs clarification as to the intent. What does selected mean? i.e., selected or purchased? The way this is currently worded new equipment must be operated according to this chapter within 2 months after release. While all other equipment doesn't have to be operated according to Chapter 4 for 2 years after release. This will lead to 2 sets of operation standards at the same time in a network. What if new equipment isn't received till a year after release? Make the wording clearer on what is actually required. "New equipment purchased after date XX or by date XX must meet the requirements of this chapter".	<p>The intent of clauses 2-G/2-H and 2-I/2-J is to provide two years for the replacement of existing analyzers and to require that if any new equipment is purchased it meets the new requirements so that new equipment purchased will not have to be replaced shortly after to meet the 2-year time frame.</p> <p>The word select means that, when purchasing a new analyzer, it must be capable of meeting the minimum performance specifications. Then after purchasing, it must be operated according to the minimum specifications in Chapter 4.</p>	Changed wording in ME 2-G and ME 2-I to clarify that the requirement is limited to the purchase of new analyzers or sensors.
26	ME 2-H/2-J This item has a date of December 31, 2016 but the chapter is not to take affect for 2 years after it is released. Will this date be updated or is this specific item required prior to the rest of this chapter?	Will change to 2 years from date of release of chapter.	Changed ME 2-H and 2-J to have a compliance date of 2-years following release of the chapter.
27	Table 1: Where a specification depends on another setting of the analyzer (i.e., range or averaging time), that other setting should be specified.	Table 1 represents the minimum performance specifications and operating principals for continuous ambient air analyzers in the most clear and concise manner for each individual parameter. It becomes complicated to identify the interdependence of each specification for every analyzer under every scenario. Compliance conformance or exceedance of the individual specifications ensures compliance with all settings that depend on one another.	No change made.
28	Table 1: Rise times and fall times are not given in Thermo operating manual specifications. Do you want the Director to have to give that many written authorizations?	<p>As stated in the AMD's draft Chapter 4, "Written authorization from the Director allows for the use of alternative analyzers demonstrating equivalency. For example, continuous ambient air analyzer(s) that do not publish all the minimum performance specifications in Table 1 are subject to authorization from the Director prior to use. Any equipment incapable of meeting the specified requirements in Table 1 will need to be upgraded or replaced."</p> <p>If this approach is not taken, it becomes unclear under which circumstances, to which analyzers, and which minimum requirements would apply. This could ultimately lead to analyzers being used that do not meet the minimum performance specifications.</p> <p>When Director authorization is required for an existing analyzer, it must be acquired prior to the AMD date for compliance with the minimum performance specifications.</p>	No change made.
29	Table 1: Got the method for PM2.5 & 10, why is Light Scattering/BAM written that way? Does that refer to the SHARP? If so what about GRIMM?	The performance specifications for continuous ambient air analyzers and meteorological sensors are not intended to endorse any specific analyzer	Added clarification note to Table 1 stating: "U.S. EPA equivalent

30	Table 1: Add PM1. See comment above about the method, GRIMM uses light scattering.	<p>nor exclude instruments with operating principles and/or performance specifications based on currently accepted technologies. As a result, the statement light scattering/BAM does not specifically refer to a SHARP nor does it exclude the GRIMM. The particulate matter performance specification standards sheet indicates that “because of the wide variety of particulate monitoring methodologies available, U.S. Environmental Protection Agency equivalent methods will be accepted for continuous and semi-continuous monitoring of ambient levels of PM_{2.5} or PM₁₀.”</p> <p>As of December 18, 2014, the GRIMM analyzer is identified on the EPA List of Designated and Reference Methods for PM_{2.5}. Please note: for use of a GRIMM in Alberta it must comply with all the AMD specifications identified in Table 1: Minimum performance specifications and operating principles for continuous air analyzers. If not, a Director authorization may be granted if the analyzer is deemed to provide an equivalent level of performance.</p>	methods will be accepted for continuous monitoring of ambient levels of PM _{2.5} and PM ₁₀ .”
31	Table 2: Hygrometer and Pyranometer operating principles are too generic, like specifying a thermometer as the method to measure temperature.	Meteorological sensors are used to sample the state of the atmosphere at any given time. The terms hygrometer and pyranometer are generic terms, like thermometer, and describe the equipment to sample the associated atmospheric parameter. Instead of describing how these sensors work, the table includes the generic terms describing the basic equipment used. A generic description of a hygrometer and a pyranometer are contained on the individual performance specification standards sheets for relative humidity and solar radiation, respectively.	No change made.
32	ME 3-L(a) – suggested rewording Operates under ...ISOprocedures in all measurement and <i>calibration associated with the analysis required by the person responsible</i> (may be hard to determine all the analyses and calibrations and how for other clients).	Agreed. In addition, ME 5-DD will be edited for consistency.	Made change to ME 3-L(a) as suggested, and similarly to ME 5-DD.
33	ME 3-O(c) “protects the diffusion barrier surface from high wind speeds.” Clause is too vague. Wind speeds how high? Does this imply wind tunnel test of the shelter and mounting? How protected is protected?	This should be a consideration in passive sampler design therefore recommendations for use may be provided by the manufacturer. The guidance below the clause provides some clarification. “Some considerations in protecting the diffusive barrier surface of a passive sampler may include siting, orientation of the diffusive barrier surface, and use of a protective shelter.”	Added the following guidance: “Recommendations may be provided by the manufacturer of the passive sampler.”
34	ME 3-EE(b) “When conducting filtration sampling, the person responsible shall use particulate matter filters consisting of the a) material, b) filter diameter, and c) pore size needed to sample the pollutant of interest.” Filter diameter is determined by the equipment used not the pollutant of interest.	Agreed.	Changed the wording to specify that the filter diameter must be chosen so as to prevent sample air from bypassing the particulate matter filter.
35	Paragraph just before ME 3-FF – suggested rewording The <i>laboratory or</i> the person responsible should.....or The person	Agreed.	Revised guidance to say that the “person responsible should

	responsible should <i>ensure</i> .		ensure that filter cassettes are cleaned before reuse...".
36	ME 3-GG, 3-LL and 3-SS – suggested rewording Add sampling start and stop time and date.	The requirement for sampling start and stop time and date is already in ME 3-J. Clauses 3-GG, 3-LL and 3-SS refer to clause 3-J.	No change made.
37	ME 4-G – suggested rewordingflag any data collected from a mobile air monitoring unit that have been affected by vehicle exhaust <i>from the mobile lab itself</i> or The object of a survey may in fact be to measure exhaust from traffic or idling vehicles i.e. school loading zones, urban transportation corridor characterization.	Agreed.	Changed wording to specify "affected by the mobile air monitoring unit's vehicle or generator exhaust"
38	ME 4-H – suggested rewording ...specifications for all of the instrumentation on board <i>even when the vehicle is not running</i> You don't want to have to run the engine for monitoring if parked. Way too much likelihood of compromising monitoring data. An alternate source of heat should be something other than electric. Like the MAML, heat runs on propane or natural gas so the only power needed is a small bit for the furnace fan. A/C is rarely needed at night except for the hottest days so when it was critical, a couple of analyzers could be run overnight with the computer and furnace fan – all on a regular 15 amp circuit.	Clause 4-I already requires that a constant and stable temperature must be maintained within the operating range of the instruments while actively monitoring or calibrating instruments. It is not reasonable to expect that the HVAC system must maintain the temperature in the mobile unit when not monitoring. Clause 4-H is meant to require that an adequate HVAC system is installed.	No change made.
39	ME 4-O(d) – suggested rewording <i>Vehicle</i> speed	Agreed.	Made change as suggested.
40	ME 4-S(a) – suggested rewording ...before powering off <i>for over 3 days</i> . If there are no plans for an extended power off state and the daily spans and regular monthly calibration are completed subsequent to the survey, this extra calibration is unnecessary.	Agreed.	Made change as suggested.
41	ME 4-T(a) – suggested rewording Replace "standby state" with " <i>ready</i> state"	Agreed.	Made change as suggested.
42	Section 4.4.1, bullet (4) – suggested rewording <i>Safety considerations</i> such that the mobile	Agreed.	Made change as suggested.
43	What are the monitoring and reporting requirements for wind speed and direction, and are they compatible with the requirements for generating surface wind profiles for dispersion modelling needs? I know that there are very specific requirements that the modelling programs use (USEPA outlines it nicely). So, I guess the question is - is information being collected in a manner which will make it useful later?	Chapter 4 of the AMD provides the minimum performance standards for monitoring wind speed and wind direction based on commercially available equipment. There is the ability to use equipment performing at a more stringent level than the specifications in the AMD. If someone was specifically collecting wind data for dispersion modelling, then they would have to ensure the monitoring equipment complied with the minimum performance standards in the AMD along with their own specific monitoring objectives.	No change made.

		The appropriate meteorology to be used for modelling for approval requirements is outlined in the Air Quality Modelling Guideline.	
44	<p>Definitions</p> <p>Linearity (40) means "the maximum deviation between the actual analyzer output reading and the predicted analyzer output from a least square fit to the actual readings."</p> <ul style="list-style-type: none"> • Please consider providing clarification that "a least square fit" is a linear regression method <p>There is no definition for "Distance Constant"</p> <ul style="list-style-type: none"> • Consider providing a definition for clarity (Table 2) 	<p>The term "least square fit" in the definition of linearity does not need to be specifically defined since it refers to a well-established, standard approach.</p> <p>A definition of "distance constant" means the length of fluid flow past the sensor required to cause it to respond to 63.2% of the increasing step-function change in speed. The term distance constant in relation to wind speed sensors was used in the 1989 AMD without any definition provided.</p>	<p>No change to include definition of linearity.</p> <p>Added definition of distance constant.</p>
45	<p>Section 2.0 Continuous Monitoring</p> <p>The second paragraph of this section states that "The final results of the technology assessment are contained in a report entitled Development of Performance Specifications for Continuous Ambient Air Monitoring Analyzers (Alberta Environment and Sustainable Resource Development 2014)."</p> <ul style="list-style-type: none"> • Will this report/section allow flexibility to change? • I.e., how will more advanced technology in the future be addressed in this Chapter and in terms of the performance specifications? 	<p>The report was published as a supporting document to clearly demonstrate in a transparent manner the analysis completed in developing the performance specifications. The report itself is not flexible as it is based on the current state of commercially available technology at the time.</p> <p>The performance specifications do provide a degree of flexible as they represent minimum performance standards and do not preclude the use of analyzers and/or sensors exceeding the requirements – either now or in the future. The AMD will be reviewed and updated in time including any necessary changes to the performance standards to encompass more advanced technology in the future.</p>	No change made.
46	<p>ME 2-B states that the person responsible must comply, at a minimum, with all the terms and conditions on the performance specification standards sheets for all: (a) continuous ambient air analyzer(s); and (b) meteorological sensors(s).</p> <ul style="list-style-type: none"> • As this section states that the specification sheets may be periodically reviewed and revised, and the person responsible must meet the minimum requirements, consider providing a Regulator review schedule/timeline for these specification sheets and a flexible timeline for equipment upgrades, if necessary. • A review schedule/timeline would be beneficial to allow for potential upgrades to occur all at one time. This would lessen analyzer downtime and costs. 	<p>Both the individual performance specification standards sheets and the AMD work together to ensure appropriate selection, installation and operation of both continuous ambient air analyzers and meteorological sensors.</p> <p>The intention is to review both documents at the same time to ensure there are no discrepancies. In the scenario where inconsistencies exist; then, clause ME 2-C of the AMD becomes relevant as it states: "Any discrepancy between the terms and conditions of the AMD and an individual performance specification standards sheets ... shall be resolved in favour of the AMD."</p> <p>A regulatory review schedule/timeline is not specified because large scale technology changes are not expected to occur on a regular basis requiring constant updating. For example, the current state of technology will most likely not occur on an annual basis. However, the requirements will be reviewed and updated as required with appropriate changes made at that time. As with all regulatory changes, suitable timelines and transition plans are developed to ensure appropriate stakeholder involvement and implementation.</p>	No change made.

47	<p>ME 2-G states that commencing no later than [2 months after release of Chapter 4], the person responsible must (a) select and (b) operate all new continuous ambient air analyzers in accordance with the minimum performance specifications in Table 1 unless use of an equivalent, alternative analyzer is authorized in writing by the Director.</p> <ul style="list-style-type: none"> • Does this mean two months after the Final version of Chapter 4 is released? This is a short timeline for engineering, designing and installation. • Consider extending this timeline. 	<p>This clause is for new equipment only. For existing equipment, the person responsible has 2 years to make upgrades, if necessary, to meet the requirements of Chapter 4 (clause 2-I). Clause 2-G requires that if any new equipment is purchased after the chapter is finalized, it must meet the new requirements so that new equipment purchased will not have to be replaced shortly after to meet the 2-year time frame.</p>	<p>Changed wording in ME 2-G and ME 2-I to clarify that the requirement is limited to the purchase of new analyzers or sensors.</p>
48	<p>Table 1 Minimum performance specifications This table has a row titled "Required Operating Range (Full Scale)" and these ranges can be found in the Performance Specifications Standards Sheets. However, a "range" is a set of numbers with a low and high value. The use of the word "or" adds confusion.</p> <ul style="list-style-type: none"> • Consider changing the title of the row as these are not ranges or consider clarifying by adding this to the definitions or by adding clarification at the bottom of the table. 	<p>"Required Operating Range (Full Scale)" is a commonly used term regarding continuous ambient air analyzers and meteorological sensors. As a result, the term has been incorporated as a minimum performance specification. The AMD does define "required operation range (full scale)" as "the ranges allowed for analog data collection from analyzers."</p>	<p>No change made.</p>
49	<p>Table 1 Minimum performance specifications This Table has a number of parameters to analyze. However, many of the parameters may not be required by an approval. Given the feedback that we received regarding Chapter 9, facilities will be only required to report those parameters that are required by their approval.</p> <ul style="list-style-type: none"> • Please clarify that if a parameter is not required to be monitored by an approval that facilities are not required to monitor for that parameter. 	<p>Identifying a full range of typical pollutants in the Table 1 does not mean they are all to be monitored at any given time and/or case. The approval dictates which parameters must be monitored. The person responsible must be aware of which pollutants they are responsible for monitoring.</p>	<p>No change made.</p>
50	<p>Table 2 Minimum performance specifications and operating principals for meteorological sensors The "Wind Speed" column of the "Accuracy" row states 0.25 m s⁻¹ or 2% <u>or</u> reading</p> <ul style="list-style-type: none"> • This should state <u>of</u> not or 	<p>Agreed.</p>	<p>Change made to Table 2 as suggested.</p>
51	<p>Table 2 Minimum performance specifications and operating principals for meteorological sensors The "Ambient Temperature" column only allows for a thermal resistor as the operating principle.</p> <ul style="list-style-type: none"> • Thermocouples meet the accuracy requirement but are not included in the operating principle. <p>Given this, having to receive written approval from the Director to use a standard industry sensor which meets the accuracy requirements is redundant.</p> <ul style="list-style-type: none"> • Consider adding "suitable temperature sensors that meet accuracy requirements" to this category. 	<p>Agreed.</p>	<p>Changed Table 2 to incorporate thermocouples.</p> <p>Change also made to associated performance specification standards sheet.</p>

52	<p>ME 3-D states that any conflict between the Monitoring Chapter and the manufacturer's specifications for integrated sampling in ME 3-C (ii) shall be resolved in favour of the Monitoring Chapter, unless otherwise authorized in writing by the Director</p> <ul style="list-style-type: none"> • There is some concern with this clause. If a conflict is resolved in favour of the AMD and an operator is not using the analyzers as per the manufacturer's manual, how can you be sure the equipment is being used as intended? • Please consider looking at the implications of this clause and consider rewording as the intent of this clause may be different than how it reads. 	<p>The AMD provides the minimum requirements for integrated sampling. The manufacturer may provide more stringent or a wide range of specifications. The person responsible is required to meet the minimum requirements of the AMD, but can always surpass the minimum. It is unlikely that the AMD would be in conflict with the manufacturer's specifications. If a conflict comes up that was unanticipated, clause 3-D states "unless otherwise authorized in writing by the Director" to authorize an alternative.</p>	No change made.
53	<p>ME 3-AA states that where meteorological data are required to determine the sampling rate of a passive sampler, the person responsible shall use the most representative meteorological data that are available.</p> <ul style="list-style-type: none"> • This clause should read "where meteorological data is required to determine the sampling rate of a passive sampler, the person responsible shall use the most representative meteorological data that is available. • As in Chapter 9, even the most representative meteorological data for remote locations will not be representative. • When meteorological data is published, please consider including a statement about remote locations and how the data was calculated. 	<p>Data is plural, so using "data are" is completely suitable. This is done consistently throughout the chapter.</p> <p>The use of meteorological data for the purpose of this clause is not for reporting meteorological data, it is for determining the passive sampling rate. As the performance of passive samplers is influenced by meteorological factors, rationale is needed for the best available meteorological data chosen and records are needed for the origin of that data.</p> <p>The guidance below ME 3-AA indicates the following: "There can be local variation in meteorology. If site-specific meteorological data are unavailable, which is common in remote areas, appropriate meteorological data could be obtained from a nearby monitoring station, airport, or Alberta Agriculture and Rural Development's Agro-Climatic Information Service. Considerations for choosing representative meteorological data are not limited to proximity to the passive sampling site, but also include topography and land use for example."</p>	No change made.
54	<p>Section 4 Mobile Monitoring This section applies to monitoring ambient air quality using a mobile air monitoring unit or vehicle. Please clarify if this section includes audits done on trailers by another party using their own equipment.</p>	<p>This section only applies to a vehicle that has been outfitted as a moving air quality monitoring laboratory (i.e., a motor home equipped with air quality monitoring equipment) in order to monitor air quality in areas/situation where there is no monitoring station.</p>	No change made.
55	<p>Section 7 Industrial Source Monitoring This entire section is already included in Chapter 9 and covered by approvals</p> <ul style="list-style-type: none"> • Consider removing this section as it is already included in Chapter 9 of the Air Monitoring Directive. 	<p>Chapter 9 lists the reporting requirements, whereas these are requirements for monitoring. Although the nature of industrial source monitoring in Alberta is such that the monitoring requirements are mainly established in specific approvals and applicable codes or methods, the AMD still needs to cover the general industrial source monitoring requirements.</p>	No change made.

56	<p>Appendix Under the Passive Sampler Validation Guidance section it states that passive samplers for validation should be installed in triplicate.</p> <ul style="list-style-type: none"> • Please clarify if this a requirement or a recommendation? • The requirement to install triplicate samplers will increase costs in terms of equipment and time in lab. 	<p>This Appendix is provided as guidance and is not written in clause form, so it is not a requirement. Triplicate samplers are only being recommended for validation of the passive sampler, not for ongoing field sampling. See 3.1.1 for requirements for passive sampler validation and 3.1.3 for requirements for quality control samples for field sampling (clause ME 3-S pertains to replicates).</p>	No change made.
57	<p>Appendix Under the Bias, precision, correlation and accuracy section it states that for determination of accuracy, there should be at least one "validation site" with passive samplers co-located with a reference method monitor.</p> <ul style="list-style-type: none"> • The overall intent of this paragraph is unclear. • Please provide more clarity or more explanation. 	<p>Agreed. This appendix is provided as guidance and is not written in clause form, so it is not a requirement.</p>	Modified guidance to provide more clarity.
58	<p>Chapter 4 of the AMD considers CEMS method as the only method available. However, we strongly believe that computer based methods like Predictive Emission Monitoring Systems (PEMS) are the future and they will soon replace CEMS worldwide. Indeed, such systems are already being accepted by other regulators for a broad range of applications. The Alberta government has been recognized as a leader in the field of air quality monitoring for many years. We are strongly suggesting that the AMD at least consider PEMS for applications where it is currently quite common. This change may keep the door open for PEMS proponents to propose additional applications (to allow for pilot studies).</p>	<p>It is the CEMS Code that provides emissions monitoring requirements. The AMD does not specify continuous emissions monitoring requirements, but rather refers to the Code. The CEMS Code will be reviewed and updated at a later date.</p> <p>The current CEMS Code allows for the use of PEMS, however it would be up to the discretion of the industrial operation. An industrial operation would need to submit a proposal to the Regulator for review and acceptance before proceeding with the implementation of PEMS technology.</p>	No change made.
59	<p>We recommend the coming into force (i.e. "2 MONTHS after release of Chapter 4") of the requirements stipulated in ME 2-G and ME 2-I to be aligned with the compliance timeline stated in ME 1-A: "The person responsible must comply with the requirements set out in the Monitoring Chapter on or before [2 YEARS from release of chapter], unless otherwise specified in the Monitoring Chapter." Alternatively, ME 2-G and ME 2-I can be aligned with ME 2-H and ME 2-J, i.e. "no later than December 31, 2016" given that Dec 31, 2016 is sooner than 2 years from release of Chapter 4.</p>	<p>Clauses ME 2-G and ME 2-I are for new equipment only. For existing equipment, the person responsible has 2 years to make upgrades, if necessary, to meet the requirements of Chapter 4 (clause 2-I). Clauses 2-G and 2-I require that if any new equipment is purchased after the chapter is finalized, it must meet the new requirements so that new equipment purchased will not have to be replaced shortly after to meet the 2-year time frame.</p>	Changed wording in ME 2-G and ME 2-I to clarify that the requirement is limited to the purchase of new analyzers or sensors. Changed clauses 2-H and 2-J to have a 2-year compliance rather than Dec. 31, 2016.
60	<p><u>Ethylene Analyzer Requirements</u> Table 1 includes proposed specification standards for ambient ethylene analysis that will be problematic as stated in the draft. The Required Operating Range (Full Scale) options of 1 ppm or 10 ppm are not a good fit with respect to the current ambient air objective limits for ethylene. In particular, the scale should be above the 1-hour limit of 1,044 ppb (>1 ppm). However, setting too large a range can also have implications at the low end of the scale, which is where most data is collected (>93% of Joffre site ethylene values are <10 ppb) and also aligns with the 3-day limit of 40 ppb and the annual limit of 26 ppb. According to the pre-set ranges of the instruments currently in use at the NOVA Chemicals Joffre facility (3</p>	<p>All the performance specifications in Table 1 represent minimum requirements for continuous ambient air analyzers – including the required operating range (full scale) for ethylene analyzers. The information in Table 1 is based on the current state of commercially available technology and ensures the appropriate selection, installation and operation of continuous ambient air monitoring technologies. The use of instrumentation meeting or exceeding the performance specifications is critical to collect representative and accurate ambient air data within Alberta.</p> <p>The AMD incorporates flexibility in the type of ambient air monitoring equipment operated by allowing the Director to grant written authorization to</p>	No change made.

	compliance ambient ethylene monitors), better options include 0-1250 ppb or 1-5500 ppb ranges. Some flexibility for setting ranges may be wise to consider in this table, as different analyzer manufacturers may be limited to other/similar ranges.	use alternative analyzers demonstrating equivalency.	
61	<p>Analyzer Linearity</p> <p>Table 1 also specifies linearity requirements for various analyzers, including Gas Chromatography (GC) and Reduction Gas Detectors (RGD). In our experience with Ethylene (RDG + GC) and Methane/Non-Methane (GC) analysis using these detection principles, linearity can present challenges, typically on the high-point calibration correction factor due to limitations of the instrument technology even though the equipment is operating within the manufacturer's specifications and meets the AMD requirements for slope, intercept and correlation. Clarifying/confirming that the 1% linearity requirement applies to the entire calibration, rather than on a point-by-point basis would be helpful to align with technology currently in use. Note that Alberta Environment historically released a technical bulletin to operators regarding TECO 55C methane/non-methane analyzer linearity issues, which might provide further context on linearity to consider.</p>	<p>All the performance specifications in Table 1 represent minimum requirements for continuous ambient air analyzers – including analyzer linearity. The information in Table 1 is based on the current state of commercially available technology and ensures the appropriate selection, installation and operation of continuous ambient air monitoring technologies. The use of instrumentation meeting or exceeding the performance specifications is critical to collect representative and accurate ambient air data within Alberta.</p> <p>The AMD incorporates flexibility in the type of ambient air monitoring equipment operated by allowing the Director to grant written authorization to use alternative analyzers demonstrating equivalency.</p> <p>Linearity for calibrations is different than the performance specifications due to differences in tolerances.</p>	No change made.
62	<p>Wind Speed and Direction Requirements</p> <p>Table 2 includes proposed specification standards for Wind Direction and Wind Speed that would have implications to our monitoring network that would likely require both the written authorization of the Director per ME 2-1 and then an upgrade for alignment with the AMD as written. We currently operate four RM Young model 05103VK instruments. Some of the challenges include:</p> <ul style="list-style-type: none"> • The Required Operating Range for direction. While our sensors have 360° mechanical range, the electrical range is 0-355°. While this is part of the instrument design, it isn't clear if the electrical range would align with the wording of the AMD as written. • Our instruments have a higher starting threshold of 1.1 m/s compared to the proposed 0.5 m/s standard. • The actual resolution of the instrument against the 1° requirement does not appear to be identified in the specification that we reviewed. <p>We recommend that the standards for wind sensors be reconsidered based on administrative/cost impacts to ambient station operators, considering the small perceived benefit from having a more stringent operating requirement for wind sensors. For industrial monitoring networks, we believe that the wind sensors we currently use deliver the appropriate data to reflect conditions at the site and sources of any readings that are detected by the ambient air analyzers.</p>	<p>All the performance specifications in Table 2 represent minimum requirements for meteorological sensors – including wind speed and direction requirements. The information in Table 2 is based on the current state of commercially available technology and ensures the appropriate selection, installation and operation of meteorological sensing technologies. The use of instrumentation meeting or exceeding the performance specifications is critical to collect representative and accurate ambient air data within Alberta, as well as to ensure comparability between sites.</p> <p>The choice in minimum wind speed and direction specifications does align with regulatory requirements in leading jurisdictions and reflect commercially available technology. As a result, the technology choices are deemed economic and costs should not have any impact on the type of sensor used.</p> <p>The AMD incorporates flexibility in the type of meteorological sensors operated by allowing the Director to grant written authorization to use alternative sensors demonstrating equivalency.</p>	No change made.

63	<p>Section 7.1 Sampling Procedures</p> <p>The wording of clause ME 7-B includes the word 'all', which could imply that all of the methods (Alberta CEMs Code, Alberta Stack Code and USEPA) apply at the same time creating a potential for conflict between methods for the same parameter and/or a requirement to be in compliance with other methods than those specified in the Approval. Suggest that the word 'all' could be removed from the clause.</p>	<p>There should not be conflict between the Codes and US EPA methods or the methods manual. This clause will be edited to clarify that methods prescribed in the CEMS Code and Stack Sampling Code cannot be bypassed. The CEMS Code and Stack Sampling Code must be followed, and the US EPA and methods manual are to be used as deemed applicable by the industrial operation in accordance with the stack testing requirements in their approval.</p>	<p>Changed 7-A and 7-B to require that manual stack surveys be conducted in accordance with the CEMS Code and Stack Sampling Code, and RATAs and GCAs must be conducted in accordance with the CEMS Code. Other methods must be used as applicable. Added that "sample analysis" must be conducted in accordance with the CEMS Code and Stack Sampling Code.</p> <p>New clause requires that before any modifications can be made to the prescribed methods for manual stack surveys, RATAs or CGAs, written authorization must be obtained from the Director.</p>
64	<p>The term "principals" is incorrectly used in the titles of Tables 1 and 2. It should read principle.</p>	<p>Agreed</p>	<p>Changed the word to "principles".</p>
65	<p>Worked with Environment Canada to align section 5.0 (Precipitation Chemistry Monitoring) with the Canadian Air and Precipitation Monitoring Network and Canadian National Atmospheric Chemistry (NAtChem) Database And Analysis System</p>		<p>Added some clauses and modified others in section 5.0.</p>