

Responses to Stakeholder Questions and Comments on the Draft Alberta Greenhouse Gas Quantification Methodologies (December 2020)
Technology Innovation and Emissions Reduction Regulation

| Item | Page # & Line # | AQM Section, Table or Figure | Nature of Comment | Question or Comment | AEP Response |
|------|-----------------|---|-------------------|--|---|
| 1 | 200 | 17.2.1 1-a | Technical | Not all tanks may have a level indicator. Tanks may be used for waste collection from the process and then combusted. As these tanks are small, they may not have any device to show level. In situations like this, can the volume be estimated based on scientific literature? The concern is the cost of additional equipment. | If the emissions associated with the combustion of these wastes are below the negligible emissions threshold, the facility may use an alternative and conservative method to report these emissions. The facility may also submit a request for deviation for the department to review. |
| 2 | 201 | 17-2.1 3 | Technical | Solid fuels, such as biomass, may be back-calculated to determine the weight of fuel. In the past, this was an accepted method of reporting. With the proposed change, it appears that their would be the requirement of weightometers. Is the back-calculation method to determine the weight of fuel no longer accepted? | The facility may continue to use this methodology and document accordingly per Section 14.4 (2)(a) of the AQM which describes the quantification of biomass fuels when combusted in a mixture with fossil fuels. |
| 3 | 13-8 | Chapter 13-14.3. Alberta Process CWB The CWB Factor for all types of hydrogen production is set to 0, independent of the technology and/or feedstock used for hydrogen production. Useful hydrogen produced is treated as its own product. | Overarching | Proposed language: "The CWB Factor for Steam Methane Reforming, Steam Naphtha Reforming or Partial Oxidation hydrogen production is set to 0"...." Hydrogen production from Steam methane reforming, Steam naphtha reforming or partial oxidation is treated as its own product." "Explanation: Chapter 13.14.3: "The CWB Factor for all types of hydrogen production is set to 0, independent of the technology and/or feedstock used for hydrogen production. Useful hydrogen produced is treated as its own product." The intent of this section is to exclude the CWB units for processes that have for first objective to produce Hydrogen, like SMR and POx processes. Reformers also produce hydrogen, as a by-product. The hydrogen produced by reforming meets the definition of "useful hydrogen" in the Standard for Developing Benchmark 1(1)(aa) "useful hydrogen" means hydrogen generated at a facility excluding hydrogen that is combusted, or vented to the atmosphere. We recommend that the wording of "all types of hydrogen production" "useful hydrogen produced" be changed to limit it to the H2 production from SMR/POX/etc. units and excludes H2 production from reforming units. | Useful hydrogen includes all type of hydrogen produced except for hydrogen that is vented or combusted. It is provided the same benchmark as hydrogen that is exported. Additional clarification is provided in Section 13.14.3. |
| 4 | 13-7 | Chapter 13-10 Hydrogen | Overarching | In alignment with our comment under 13.8 (CWB), Chapter 13-10 Hydrogen should include the following statement "Hydrogen production should include all hydrogen produced by the following processes: Steam Methane Reforming, Steam Naphtha Reforming or Partial Oxidation hydrogen production." | The definition of hydrogen in section 13.10 is meant to provide a general definition of hydrogen product. Specific requirements for quantifying hydrogen as it relates to AB-CWB is specified in section 13.14. |
| 5 | 5-6, 5-7 | Chapter 5 Table 5-1 | Technical | The definitions of mobile equipment listed in Table 5-1 are not available therefore the use of emission factors in Table 5-1 cannot be validated. The addition of mobile equipment definitions is recommended. | The emission factors references the emission factors provided in the 2018 National Inventory Report (NIR) Part 2. We will review further to determine whether additional clarifications or definitions can be added for these mobile equipment. |

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|------|----------------------|---|-------------------|---|--|
| 6 | 17-1 | Chapter 17-4 | Technical | The draft quantification methodologies (QM) added minimum sampling frequency intervals between sampling events for weekly, monthly and quarterly sampling. The addition of minimum sampling frequency interval requirements will likely force importance of one sample over another (e.g. a fuel stream with a minimum weekly sampling requirement is being sampled 4 times per week. The last sample is forced to be excluded despite the validity of sample; or a lack of incentive to sample when the sampling interval requirement will not be satisfied). The implementation of minimum testing requirements will likely exclude some valid samples and cause an increase in missing data. Based on the potential negative impact outweighing the positive impact on dataset representativeness from this change, it is recommended that the minimum sampling intervals to be removed. | Facilities are not requested to discard any data that is collected. For facilities that are collecting samples at the minimum prescribed frequencies, the sampling intervals outlined in Section 17-4 are required. For facilities that are collecting higher than the prescribed sampling frequencies, facilities are required to use all of the data collected. Additional clarification is provided in section 17.3 of Chapter 17. |
| 7 | 1-15 | Chapter 1 Table 1-1 | Technical | Previous quantification methodologies (QM) included higher heating values (HHVs) of non-variable fuels in Table 1-1 for the use of energy based emission factors (tonnes/GJ). The HHV data is removed in the draft QM. The inclusion of non-variable fuels HHV is recommended to minimize HHV testing by individual sites to use energy emission factors | Facilities not required to use energy based emission factors for the combustion of non-variable fuels. Facilities may apply either volume or energy based emission factors. |
| 8 | 199-213 | Chapter 17 throughout | Overarching | Oil and gas facilities have detailed measurement and sampling systems set up to meet AER requirements (e.g., Directive 17, Directive 42, mining S-23 reporting). Can these AER directives be referenced as the relevant requirement for gaseous fuels for our sector in the AEP methodology document. This would avoid overlapping regulatory requirements. | Regulated facilities are required to meet the sampling requirements outlined in the Alberta Greenhouse Gas Quantification Methodologies based on the level classification for the facility. Where appropriate, alignments in sampling frequencies with other directives and standards have been made or being considered. In many cases, the sampling frequencies of one directive does not necessarily satisfy the requirements needed for quantification under this regulation. Facilities may submit deviation requests for specific scenarios for the department to review and consider. |
| 9 | vi | Introduction | Editorial | Text says "Quantification methodologies prescribed in the Alberta Greenhouse Gas Quantification Methodologies (AQM) as classified by levels (i.e. levels 0, 1, 2, 3, 3A, or 4)." Figure 1-1 only mentioned Levels 1, 2, 3 & 3A. Suggest a footnote referring to level 4 applicable to venting under Fig 1-1 or mention in the Introduction. | This is a general statement in the introduction section regarding level assignments in the AQM. Figure 1-1 is specific for chapter 1 only. Level assignments are described in the various chapters, as appropriate. |
| 10 | 17-7 | Table 17-1 | Technical | What does representative sampling mean? | Representative sampling is evaluated based on the facility's knowledge of the site specific process and fuels/feeds that are consumed. Facilities are encouraged to assess the variability of the fuel / feed to make a determination on the appropriate level of sampling in order to properly represent the fuel or feed that is being consumed. Facilities should document the justification of the selection of representative sampling for verification purposes. |
| 11 | x | Definitions | Editorial | Suggest including a definition for UOG and non-UOG. | Definitions have been added in Chapter 4 Venting. |
| 12 | -15, 1-17, 1-18, 1-1 | Table 1-1, Table 1-4, Table 1-5, Table 1-6, Table 1-7 | Editorial | Significant figures are not consistent in the tables, maybe related to ECCC sig figs and different units EF reported in. | Updated. |

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Technology Innovation and Emissions Reduction Regulation

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|------|-----------------|---|-------------------|---|--|
| 13 | 15-1 | 15 | Overarching | In relation to the statement in the last sentence, please clarify if the COG facility emissions in which facility has been subject to Federal Carbon Pricing should be excluded for the entire year or just for the part of the year in a scenario where the COG was subject to Federal Carbon Pricing only for a part of the year. | Fuels with federal fuel charge paid can only be omitted during the time period when the fuel charge was in place. |
| 14 | 15-4 | 15 | Overarching | In relation to the sentence in the last sentence, can we use the Petrinex reported fuel volumes for the fuel balance in a multiple gas stream approach (Method 15-2)? The statement in the document reads "However, for reported fuels in Petrinex, the person responsible may only use Method 15-1 or Method 15-2 for each COG, not both." | Yes, Petrinex reported fuels may be used for Method 15-2. The requirement is that a facility may only apply Method 15-1 or 15-2 for a single COG. |
| 15 | 15-5 | 15.2.1/(1) Introduction | Overarching | Second sentence in this paragraph reads" For these volumes of fuel gas, a default carbon dioxide emission factor that is based on a rich gas composition would be applied to calculate the carbon dioxide emissions (refer to Method 15-4)" – is this statement applicable for the scenario where the facility is in fact using only one gas stream for stationary combustion and would also like to use method 15-6 or 15-7"? | To calculate CO2 emissions for a single COG, the facility may choose to use Method 15-1 to calculate the total fuel consumed and apply a single default emission factor (Method 15-4) or the facility may choose to use Method 15-2 to calculate the fuel consumption for various fuel streams and apply Methods 15-6 or 15-7. The requirement is that only one or the other approach is allowed for a single COG. |
| 16 | P vii | Scope and Applicability | Overarching | The objective of prescribed quantification methodologies is to ensure accuracy and consistency across all reporters facilities and sectors regulated under TIER and SGRR. How do we keep the alignment between AQM and Manual 15 for methane emission. How does AEP want industry to proceed should we encounter any methodology contradictions or alternatives that may exist in other AB regulatory guidance documents? | The purpose and requirements of TIER are different than other regulations and directives that facilities may also be subject to. While efforts are made to align sampling and other quantification requirements with other directives or standards, these may not be appropriate to apply under TIER. Facilities may submit deviation requests for specific scenarios for the department to review and consider. |
| 17 | P233 | C.10 Oxidation factor | Overarching | Generally, 98% combustion efficiency is used for flare. Onwards, 100%, not 98% will be used for flare. please confirm | Flare combustion efficiency has not been prescribed yet under the AQM. A draft of the flaring chapter will be posted for stakeholder comments. In absence of a flaring efficiency prescribed, a facility may use an efficiency that best represents flare technologies used at the facility. The selection of flare efficiency would be subject to verification. |
| 18 | P12 | 1.2.6. Method 1-5 - Continuous emissions monitoring systems (1) Generality (d) | Overarching | As per section 1.2.6 (d) the method is to calculate emissions from fossil and biomass fuels separately. However, do we need to do that if diesel with biomass added is not monitored by CEMS; should this be calculated using default EFs, or following this method in section 1.2.6 (d)? | Yes, emission factors for diesel may be used per Method 1-1. The facility may use the default "Diesel in Alberta" emission factors to account for the biodiesel component or if the facility has the composition of the biomass component of the diesel, the CO2 from stationary fuel combustion and biomass combustion may be calculated separately. |
| 19 | P219 | Equation C.1-1 | Overarching | If daily CC data are available, do we need to do weighted average based on daily average, or weighted average for monthly average? | Facilities are required to calculate the weighted averages based on the highest sampling frequency that the facility is conducting. This sampling frequency may be higher than the prescribed sampling frequency in the AQM. Additional clarification is provided in Chapter 17 and Appendix C. |
| 20 | P18 | Table 1-3: Technology based default CH4 and N2O emission factors for natural gas | Editorial | Can't find footnote 4. | Updated. |

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Technology Innovation and Emissions Reduction Regulation

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| 21 | 5-6 | Table 5-1 | Editorial | Should "Tier" be replaced with "Level" for consistency throughout the document? | Per the 2018 NIR, the tiers referenced in the noted section refers to transportation modes. Specifically, the NIR provides this table note: "In the context of Transportation Modes, Tiers refer to increasingly stringent emission standards, enabled through advancements in emission control technologies. It should not be confused with IPCC GHG estimation methodologies. * Advanced control diesel emission factors are used for Tier 2 diesel vehicle populations." |
| 22 | 5-3 | 5.1 Introduction | Technical | Does "Motor vehicle usage on site for general transportation purposes" still include transportation of people on site as in the most recent CCIR QMD? | Refer to (23). |
| 23 | 5-3 | 5.1 Introduction | Technical | Can the AQM provide more guidance with respect to "general transportation" or perhaps specifically exclude personal vehicle use (ie. distance from site entrance to parking locations) and third-party vehicles that may be on site for a brief period (ex. couriers, vac trucks). This would ease the reporting burden by omitting the additional step to justify the negligibility (vehicle counts, etc). | Emissions from personal vehicles are not excluded from the facility's direct emissions unless the fuel that is consumed in these vehicles have already been subject to the federal levy. In most cases, these emissions can be classified as negligible emissions and the facility may apply an alternative and conservative method to quantify the emissions. |
| 24 | 0 | nitric acid - stack testing | Technical | Is a routine change-out of abatement catalyst considered a process change? | No, this would be considered part of the required maintenance and operation of the abatement equipment. |
| 25 | 1-6 | 1.2.5 Method 1-4 Carbon mass balance method | Technical | Propose to allow the inclusion of vented carbon in mass balance calculations as a "known source" to determine IP emissions. This quantity can be very significant, such as what can occur during shutdown, startup or catalyst reduction. If excluded, this double-counts emissions. | Noted for consideration. The department will evaluate this option further and will potentially update the methodology in future iterations of the AQM. In the meanwhile, the facility may continue to submit a request for deviation for their facility specific scenario. |
| 26 | 8-8 | 8.2.5 IP emissions mass balance...as it refers back to Method 1-4 | Technical | Propose to allow the inclusion of vented carbon in mass balance calculations as a "known source" to determine IP emissions. This quantity can be very significant, such as what can occur during shutdown, startup or catalyst reduction. If excluded, this double-counts emissions. | Refer to (25) |
| 27 | 246-247 | C.6 (Eq. C.6-1) | Technical | In Equation C.6-1, the HHV is used to convert the max output-based power to fuel volume, while in Table C-1, typical thermal efficiencies are based on the LHV. Equation C.6-1 is not consistent with the fuel consumption formula in Appendix D of "A Recommended Approach to Completing the National Pollutant Release Inventory (NPRI) for the Upstream Oil and Gas Industry" (CAPP, Oct 2014), which is based on the LHV. Since the thermal efficiencies are based on LHV, it makes more sense to use LHV instead of HHV to convert the max power to fuel consumption | Updated per recommendation. |
| 28 | 218 | Figure 16-1 | Technical | Boundary of integrated Cogen: Figure 16-1 includes the Water flow and treatment (e.g. Boiler Feed Water Treatment). However it does not include the Gas flow and treatment, which include the heaters to increase NG/Combustion air temperature above dew point. Please clarify the boundary of the integrated Cogen, as the boundary impacts the emission and heat quantifications. | If the gas flow and treatment is included in the HRSG, then these emissions would be considered to be part of the cogeneration boundary. |

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Technology Innovation and Emissions Reduction Regulation

| Item | Page # & Line # | AQM Section, Table or Figure | Nature of Comment | Question or Comment | AEP Response |
|------|-----------------|------------------------------|-------------------|---|---|
| 29 | 218 | 16.2.2 | Technical | EEcogeneration is defined as the combustion emission attributable to cogeneration at the facility. In operations, when Cogen starts up or shuts down, NG may be flared or vented. Please clarify if the emissions associated with flaring/venting are in EEcogeneration | Emissions associated with flaring or venting would not be included as it does not contribute to the generation of useful energy. |
| 30 | 176 | 13.14.4 | Editorial | It would be better if "Non-crude input barrels includes the total input raw material processed by the refinery other than crude or other materials entering the atmospheric distillation unit. As per Solomon Associates they potentially include: could change" to "Non-crude input barrels includes the total input raw material processed by the refinery other than crude or other materials entering the atmospheric distillation unit. As per Solomon Associates they potentially, but not limited to, include". It is just case there would have some material which is not listed on the text due to unusual operation. | The department believes that the current wording is aligned with the intent of the requirement. If there are any materials from facility specific operations that are not accounted for, the facility may contact the department to discuss or submit a deviation request. |
| 31 | 176 | 13.14.4 | Overarching | In "The Bitumen Upgrader Can-CWB methodology for Regulatory Support: Public Report" published by Canadian Fuels Association, it mentioned Raw material includes: <ul style="list-style-type: none"> • bitumen and diluent to be distilled and otherwise processed by the bitumen Upgrader; However, in Section 13.14.4, it only mentioned Crude oil and no diluent. (see the below copy) <ul style="list-style-type: none"> • Crude oil to be distilled and otherwise processed by the refinery. Comment: Should add diluent in the text, and mentioned diluent is net diluent to the facility. | Section 13.14.4 is updated to provide this clarification. |
| 32 | 176 | 13.14.4&13.14.5 | Overarching | It would be better if they can change "Blending raw materials which are not processed at the refinery are also not included. As per Solomon Associates these may include the following types of material" to "Blending raw materials which are not processed at the refinery are also not included. As per Solomon Associates these may include , but not limited to, the following types of material" . It is just case there would have some material which is not listed on the text due to unusual operation . | Refer to (30) |
| 33 | 15/232 | Figure 1-1/Table 17-1 | Overarching | The correlations between sampling requirements for Level 1/2/3 and Methods for each Level are not very clear. <p>For example, based on Figure 1-1, the Level Classification is defined based on Method. For Variable Fuel types, Method 1-3 or Method 1-4 are applied for Level 1/2/3. In this case, which sampling requirements are applied in Table 17-1? As Level 1 and 2 has different sampling requirement from Level 3.</p> Please also clarify the definition of "Representative sampling" for Level 1/2. | Noted for consideration. The department will work on providing further clarification on level classifications in the AQM. In the example provided, if the same method is provided for multiple levels, it means that it is an acceptable method that can be used for the levels noted. Separately, the sampling frequencies for the fuel properties are identified in Table 17-1 for various levels. If your facility is permitted to use level 1 methodologies, then level 1 sampling frequencies would apply. <p>Refer to (10) for question related to representative sampling.</p> |

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Technology Innovation and Emissions Reduction Regulation

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|------|-----------------|------------------------------|-------------------|--|--|
| 34 | 6 | Definition | Overarching | "Negligible emission sources" -Alternative methodologies may be used to assess the negligibility of these emissions. Does it mean negligible emissions do not need to follow methods and sampling requirement prescribe in this AQM? Please indicate. | Correct, the facility is not required to follow quantification methodologies in the AQM for negligible emissions. |
| 35 | 15/28 | 1.2.2/Table 1-1 | Technical | On Page 15, it says "Non-variable fuels include ethane, propane, butane, diesel, and gasoline". Biodiesel is not in the list. In Table 1-1, Biodiesel has default emission factors. Please clarify if biodiesel could be considered as the non-variable fuel. | Yes, biodiesel is considered a non-variable fuel. |
| 36 | 186/187 | 13.16.3 | Technical | For Section 13.16.3- Production and Throughput Quantification Methods, It requires that method 13-1 should be used for Module throughput or production is Not metered, and Method 13-2 should be used for Module throughput or production is metered. 1) For the metered throughput, reconciled meter output are also used for the reporting. For example for DB stream as throughput in DRU unit, we are using reconciled DB stream for the reporting, not using the direct meter value. It didn't list "the reconciled method' on the Method 13. 2) Also for Method 13-1, it is only acceptable to use material balance method for the throughput which are NOT measured. In our method, we also use other engineering estimate such as valve opening to estimate the flow. It should add "other engineering estimate" in the Method 13-1. | Noted for future consideration. The department recommends that the facility submits a deviation request if needed to address any potential deviations. |
| 37 | 177 | 13.16.2 | Overarching | Sales gas compression involves pressurizing/compressing pipeline specification sales natural gas to a pressure required for the natural gas transmission and distribution system. <Redacted>. Can AEP mention other gases for sales? | The description provides a general coverage of fuel gases. However, if the facility believes that it excludes any type of gas, the facility may contact the department to discuss or submit a deviation request. |
| 38 | 28 | Table 1-1 | Technical | Gasoline's emission factors are lower than the previous version 1.4. Please confirm. | These emission factors are consistent with the updated emission factors in the GHGRP. Note that gasoline emission factors for 2-stroke and 4-stroke on-site transportation were moved to Chapter 5 On-Site Transportation. |
| 39 | 31 | Table 1-5 | Technical | Both Petroleum Coke and Coke are listed in the table. Please clarify the difference of these two solid fuels. | Updated with clarification. |
| 40 | 1-15 | Table 1-1 | Editorial | Diesel and Biodiesel - 'All Industry' and 'Upgraders' all appear to have the same factors, not sure why they are separated. | Noted. These emission factors were adapted from Environment and Climate Change Canada (ECCC's) Greenhouse Gas Reporting Program (GHGRP). |

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 Technology Innovation and Emissions Reduction Regulation

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|------|-----------------|--|-------------------|--|---|
| 41 | 1-15 | Chapter 1, Table 1-1: Default emission factors by fuel type for non-variable fuels | Technical | <p>In the previous versions of the quantification guideline, there was a default HHV for gasoline and diesel in Table 1-1. It appears this is no longer part of the table. In relation to this, in Chapter C, section C.6 Fuel Consumption Estimation, Equation C.6-1, this formula references a HHV but there is no longer a recommended default value in the AQM. The alternative equation (C.6-2) does not require a HHV but does require BSFC value.</p> <p>Our specific use case for Equation C.6-1 is to estimate the fuel for backup stationary generators that use diesel fuel and these do not have a BSFC value and we do not have a HHV for the diesel used as they're purchased from any retail gas station.</p> <p>Can a default HHV be added back into the AQM or can there be a recommendation for one?</p> | Refer to (7). The HHV can be calculated based on the emission factors in volume and energy basis. |