

## ARB Compliance Offset Program

### Livestock Projects Compliance Offset Protocol (November 14, 2014)

#### Frequently Asked Questions

In California's Greenhouse Gas (GHG) Cap-and-Trade Program, covered entities may use ARB offset credits to fulfill up to 8 percent of their compliance obligation. Offset credits are tradable compliance instruments that represent verified GHG emission reductions or removal enhancements made in sectors and sources not covered by the Cap-and-Trade Program.

ARB has developed this Frequently Asked Questions (FAQs) document specific to livestock projects using ARB's Compliance Offset Protocol Livestock Projects dated November 14, 2014 (Livestock Protocol), and the Cap-and-Trade Regulation (Regulation) as amended, effective November 1, 2015, except where explicitly noted. Unless otherwise specified, the citations in this document are to the Livestock Protocol.

The Regulation, which appears at sections 95801 to 96022 of Title 17, California Code of Regulations, and the protocols incorporated therein, are a set of rules that establish the compliance offset program and the methods for quantifying GHG emission reductions and enhanced sequestration.

**Disclaimer:** ARB staff has prepared this document to describe the regulatory requirements in a user-friendly format. **Unlike the Regulation and offset protocols, this guidance document does not have the force of law.** It is not intended to and cannot establish new mandatory requirements beyond those that are already in the Regulation, and it does not supplant, replace, or amend any of the legal requirements of the Regulation or protocols. Conversely, this document's omission or truncation of regulatory requirements does not relieve operators of their legal obligation to fully comply with all requirements of the Regulation and the offset protocols and is not intended as a substitute for reading the Regulation and protocols.

ARB makes every effort to keep its documents up to date. However, ARB does not guarantee the accuracy of this document and shall not be responsible for any errors or omission in content. ARB reserves the right to make changes without notice.

Conformance with protocols and the Regulation requirements is the responsibility of the Offset Project Operator, Authorized Project Designee, and Verification Body, as applicable. ARB cannot guarantee that offset projects using this document will pass verification.

## 1. Eligibility

### **a) Can there be a small dairy and a large beef cattle farm both feeding a digester?**

Yes. Subchapter 2.1 of ARB's Livestock Protocol does not preclude the offset project operator (OPO) or authorized project designee (APD) from co-digesting other organic matter in the biogas control system (BCS). Organic matter from the large beef farm may be fed into the BCS. However, for the purpose of ARB's Livestock Protocol, only dairy cattle and swine manure is eligible for offset credits for GHG emission reductions.

### **b) What is an "initial start-up period?" When does the ten year crediting period start?**

As defined in subchapter 1.2(a)(21), "initial start-up period" means the period between post-system installation and pre-project commencement. After the installation of the project's biogas control system (BCS), the Offset Project Operator (OPO) or Authorized Project Designee (APD) may run, tune, and test the system to ensure its operational quality. The commencement date, which follows the initial start-up period, is defined as the date that the BCS becomes operational.

The crediting period for the Livestock Protocol is ten reporting periods from the first day of the Reporting Period as identified in the first verified Offset Project Data Report received by ARB or an Offset Project Registry approved pursuant to section 95986 of the Regulation. (Livestock Protocol Section 3.6(a).) The initial reporting period does not have to begin at project commencement. If additional time is needed to get the project fully operationally the initial reporting period can be delayed. Projects with commencement dates prior to December 31, 2006 are not eligible under the Livestock Protocol.

### **c) Subchapter 3.4.2(c) of the Livestock Protocol notes that greenfield projects are eligible "only if uncontrolled anaerobic storage and/or treatment of manure is common practice in the industry and geographic region where the offset project is located." What constitutes common practice and over what geographic region must common practice be evaluated?**

Greenfield livestock projects will be considered by ARB on a case by case basis. An OPO/APD should provide detailed information on the project, including the specific project location (including geographic coordinates), what type of BCS

devices will be installed, and any information available from EPA or other sources about baseline manure management in the local area, state, and adjoining states. Based on the information provided by the OPO/APD, ARB will determine whether or not the requirements of the regulation are met for that project.

**d) Is it possible for a livestock project to start reporting emission reductions some period of time after the project commencement date? For example, if a project's BCS starts actively producing and destroying methane before the monitoring equipment is fully installed, can the OPO/APD choose to delay reporting until everything is up and running?**

Yes, the livestock project commencement date is defined as the date the BCS becomes operational. If this occurs before the reporting of emission reductions is possible, the first reporting period will start on a later date of the OPO's choosing after all monitoring equipment is in place. Please note that the reporting period start date is also the beginning of the initial crediting period, as this is when the first verified GHG emission reductions would have taken place. See also Question 1(b) above.

**e) What is the definition of an anaerobic system?**

An anaerobic system is one that operates in the absence of oxygen. (See Livestock Protocol section 1.2(a)(2) and (3).) ARB's livestock protocol requires the Offset Project Operator or Authorized Project Designee to demonstrate that the depth of the anaerobic lagoons or ponds prior to the offset project's implementation were sufficient to prevent algal oxygen production and create an oxygen-free bottom layer; which means at least 1 meter in depth (subchapter 3.4.2(b)).

**f) Is it possible for a livestock operation that previously had a digester installed to revert back to the anaerobic lagoon baseline conditions outlined in the protocol, install a new digester, and then start reporting as a compliance project? Is there a timeframe that a previous digester must be inoperable to allow a new project to claim the anaerobic baseline?**

Unless the digester was part of an early action offset project and the project successfully listed to transition to a compliance offset project, the previous digester will be considered part of the project baseline. There is no timeline in the protocol for the anaerobic lagoon, so if a digester was ever present the baseline will be the digester.

**g) Two compliance livestock projects (Farm A and Farm B) operate as separate projects and are structured as separate businesses; however, they have one combined permit. A violation related to an effluent spill has occurred on Farm A but not on Farm B. If it is determined that the project on Farm A is not eligible to receive offsets as a result of this violation, is there any reason the project on Farm B would be impacted?**

The impetus is on the farm that did not receive the violation (Farm B) to demonstrate that the violation had nothing to do with the project (i.e. the violation occurred outside the offset project boundary). If the violation is clearly outside Farm B's project boundary, the violation should not affect Farm B.

**h) What is the boundary of regulatory compliance for a centralized digester? What activities on the source farms must be checked for regulatory compliance during the reporting period?**

All project-related activities must be in regulatory compliance at all farms that provide manure used in the modeled baseline calculation (project farms). As stated in the Offset Credit Regulatory Conformance and Invalidation Guidance document, ([http://www.arb.ca.gov/cc/capandtrade/offsets/arboc\\_guide\\_regul\\_conform\\_invalidation.pdf](http://www.arb.ca.gov/cc/capandtrade/offsets/arboc_guide_regul_conform_invalidation.pdf)) project related activities begin at waste collection and would include collection and transport of manure from project farms supplying manure to the project's centralized digester as well as activities at the centralized digester.

**i) Can ARB provide clarification as to whether livestock projects that are producing fuels under the Low Carbon Fuel Standard (LCFS) are able to simultaneously seek LCFS credits and ARB offset credits?**

Per section 95852.1(b) of the Regulation, projects cannot seek LCFS credits and ARB offset credits simultaneously for the same biogas.

**j) The first crediting period of an early action livestock project ended in 2014 and the project transitioned to the compliance offset program. For contractual reasons this particular project wishes to use the CAR Livestock Protocol V4.0 for the first year after transitioning to the compliance offset program and sell the credits on the voluntary market. The project's initial reporting period under the compliance protocol would not begin until the second year after transitioning. If this project meets the definition of an Early Action project and meets all applicable deadlines in the regulation, does ARB take issue with the fact that there**

**will be a period of time in which it is using a protocol that is neither early action nor compliance?**

The CAR Livestock Protocol V4.0 is not a recognized early action quantification methodology; therefore, any project that uses the Livestock Protocol will have to consider activities under the Livestock Protocol as part of the baseline. If the project needs to deliver voluntary offsets, they may monitor, report, and verify GHG emission reductions under a Compliance Offset Protocol but elect not to transition the resulting registry offset credits (ROCs) issued by the offset project registry (OPR) to ARB offset credits. They are free to deliver the ROCs on the voluntary market.

## 2. Baseline

**a) For a community digester processing manure from several farms, may the project only include a subset of farms within the project boundary?**

Only farms that are used in the calculation of the modeled project baseline would be considered within the project boundary. However, since once all manure for farm both within and outside the project boundary is combined in a centralized digester there is no way to attribute the metered digester gas to a specific farm, the metered biogas will not be adjusted to exclude digester gas from manure outside the project boundary. Regulatory conformance would only be assessed for farms within the project boundary.

**b) An existing dairy farm consisting of 400 cows was purchased for the purpose of building a digester as part of a major expansion of the farm. The dairy will expand to 3,000 cows. The baseline for the original 400 cows is pit storage, however as more animals have been added during the construction process, manure began being sent to an effluent pond that was built in conjunction with the digester. The OPO would like to know the appropriate baseline that should be used.**

The OPO must model the baseline scenario using the maximum capacity of the pit storage system with the remainder being modeled as a storage type that is common practice in the area. The verifier would also need to confirm with ARB that the storage type selected for the baseline is common practice for the area.

**c) For compliance projects with a baseline practice of less than one full cleaning each year, can the cleaning be applied as a percent deduction**

**rather than a zeroing out of the previous month's volatile solids available ( $VS_{avail-1,AS,L,i-1}$ )?**

No, the protocol does not have a method for calculating a percentage of one full cleaning per year, so to be conservative  $VS_{avail-1,AS,L,i-1}$  must be zeroed out in the appropriate month every reporting period if the lagoon was cleaned out as a baseline practice. Note:  $VS_{avail-1,AS,L,i-1}$  is misidentified in Equation 5.3 as  $VS_{avail,AS,L,i-1}$ . The final parenthetical should read  $(VS_{avail-1,AS,L,i-1} - VS_{degrade,AS,L,i-1})$ .

**d) A livestock project that has never cleaned their lagoons as part of their baseline practices conducted one full cleaning as part of their process for constructing and bringing the project online. Must this one-time cleaning be modeled on an annual basis?**

The livestock project does not need to model this one-time cleaning, as long as it wasn't part of annual baseline operations. As with all other baseline aspects, the livestock project must be able to demonstrate to the verifier that this was a one-off occurrence for bringing the project online.

### 3. Quantification

**a) ARB's Livestock Protocol does not describe acceptable methods to determine what percentage or fraction of manure is apportioned to anaerobic digestion, and what is apportioned to non-anaerobic storage/treatments systems. How should the Offset Project operator or Authorized Project Designee calculate this value?**

The baseline value should be reflective of the actual practices of the dairy prior to installation of the biogas control system. Engineering estimates are acceptable. Verifiers may examine documentation of practices and speak with staff to determine the validity of the estimate.

**b) The Climate Action Reserve (CAR) has developed the optional Beta Livestock Calculation Tool to assist with the quantification of GHG emission reductions from projects using CAR's voluntary Livestock Project Protocol - does ARB recognize such tools or approve them for use under ARB's Livestock Protocol?**

No. ARB does not endorse the use of any external tools. Projects must meet the requirements of the Cap-and-Trade Regulation and ARB's Livestock Protocol to be eligible for the issuance of ARB offset credits. If stakeholders wish to use any tools as a means of cross-checking or assisting their quantification, ARB

recommends that they ensure that the tools are compatible with ARB's protocols to avoid miscalculation or discrepancy. If any external tools are used by an OPO or APD, the verification team must ensure that all values returned reflect the requirements of ARB's Livestock Protocol.

**c) The global warming potential (GWP) of methane in the EPA's 40 CFR Part 98 is currently 25, but section 95100(c) of the Mandatory Reporting Regulation references specific versions of Part 98, the latest being April 25, 2011. The GWP of methane was updated from 21 to 25 in the November 29, 2013, version of 40 CFR Part 98. Does ARB intend for livestock projects to use the methane GWP that's published in the current version, or must OPOs refer only to the versions of 40 CFR Part 98 that are listed in section 95100(c)?**

OPO/APDs can only reference versions of 40 CFR Part 98 listed in section 95100(c) of the Mandatory Reporting Regulation, which would not include the November 29, 2013, version, so the GWP of methane is 21.

**d) The Livestock Protocol calculates the monthly volatile solids (VS) that are available for degradation by adding the new solids for the current month to the undegraded solids remaining from the previous month. When a project transitions from an Early Action Protocol to the Livestock Protocol, does it carry over the VS remaining from the final month of early action calculations to determine the VS available in its first month as a compliance project?**

Yes, the VS remaining from the final month reported under early action must be carried over to the first month reported under the compliance offset protocol (the Livestock Protocol).

**e) The manure management options defined in subchapter 1.2 of the Livestock Protocol are limited to 15 categories and do not capture every type of manure management that may be used. For farms that have a management system that doesn't fall into one of these categories, what MCF should be applied in equation 5.4?**

In instances where a project's baseline manure management system does not clearly fall into one of the defined categories, ARB will make a case-by-case determination of the appropriate category based on which category most closely matches the manure management system.

**f) How does ARB view the carryover of a negative calculation of emission reductions from one vintage to another? Livestock projects may generate negative emission reductions during cold winter months. If the reporting period does not line up with the calendar year, it is possible for a reporting period to contain a vintage with a negative number of emission reductions and a vintage with a positive number of emission reductions.**

ARB evaluates emissions reductions by reporting period and not by calendar year. Since a reporting period does not have to coincide with a calendar year, a project's reporting period may contain a period with increased emissions and a period with emission reductions. For example, a project with a reporting period from July 2013 through June 2014 would sum the emissions increases from July through December 2013 with the emission reductions from January to June 2014 to obtain the emission reductions for the entire reporting period.

**g) A project has a 1 to 7 day gap in data and wishes to use data substitution per Appendix B of the Livestock Protocol. However, there is another data gap of several hours that occurred a few days after the longer gap. As a result, the project developer cannot use the 95% upper or lower confidence interval of the 72 hours after the longer gap without overlapping with the shorter data gap. How should the project developer implement the data substitution requirements?**

In the event of overlapping gaps that hinder data substitution, the OPO/APD must discard the valid data between the gaps and combine the gaps to form one continuous gap. The data substitution method in Appendix B must then be applied to the new data gap. If the duration of the continuous data gap is greater than one week, data substitution cannot be used and no credits may be generated for that time period.

**h) Suppose a project that uses a continuous methane analyzer is missing extended periods (>seven days) of methane concentration data. Biogas flow was recorded and the destruction device was operational during these gaps. Since the Livestock Protocol does not specifically address continuous vs. discontinuous methane readings, how should the OPO/APD account for these long periods of missing methane concentration data, since data substitution per the guidelines in Appendix B is not possible?**



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For gaps in methane concentration only, the OPO/APD does not need to forgo the reporting of emission reductions during the gaps as long as each gap is less than one quarter (three months) in length. Instead, the OPO/APD may assign a reasonable and conservative substitute value to fill these gaps. The substitute value must be reviewed and accepted by the verifier and in most cases should be a straight or weighted average that is based on the project's recorded methane concentration readings, unless another value is deemed more appropriate (and conservative).

**i) Is it necessary for an OPO to fix an error which results in fewer emission reductions? More specifically, if a livestock project is adjusting flow data based on meter drift and it's easier for them to apply the drift to an entire month's worth of data, even if the problem only covers a partial month, may the OPO simply apply the drift to the entire month if doing so would result in a lower estimate of emission reductions? Or must the OPO fix the error and apply the drift correctly, even if it results in a higher estimate of emission reductions?**

Yes, all correctable errors must be fixed even if the correction results in a higher estimate of emission reductions (17 CCR § 95977.1(b)(3)(M)).

**j) Should a livestock project conduct its quantification separately for different calendar years, or should the entire reporting period be treated as one period for quantification? CAR has usually split things by vintage year, but there is no specific guidance for this in the Livestock Protocol or the regulation.**

The reporting period should not be split up by calendar year (vintage) for quantification purposes. The reporting period should be treated as a single time period.

**k) For projects that totalize flow and record the totalized flow value on a daily basis, is data substitution per Appendix B required if one to seven days of recording are missed, or can the actual flow that was logged during that time period be used in the project calculations? In this scenario, the flow meter was working properly but the running total was not recorded by a data logger or onsite staff.**

In the above case, the project should use the actual logged totalized flow data, and can at best receive a Qualified Positive Offset Verification Statement at the close of verification services. The project should not use Appendix B's data substitution methodology in such a case.

**l) Livestock projects utilizing totalized readings to supplement more frequent recording may not be able to meet the exact timeframes for upper or lower confidence intervals when applying data substitution, as described in Appendix B of the Livestock Protocol. Should these projects utilize the Livestock Protocol's methodology for data substitution, and – if so – how should the confidence intervals be applied?**

All projects should utilize data substitution where appropriate, following the requirements in Appendix B. For projects utilizing totalized readings, these requirements should be followed as closely as possible given the available data. Slight deviations (i.e., deviations of up to 12 hours) from the confidence interval time frames laid out in the Livestock Protocol would be acceptable in these instances. For example, if a reading on day 0 was taken at 8 am and the reading on day 3 was taken at noon there would be 76 hours between readings. This would be acceptable for meeting the 72 hour requirement for one to seven days of missing data.

**m) How are vented emissions from a digester cleanout accounted for?**

Vented methane emissions from a cleanout are accounted for using the protocol equation for project methane emissions from venting events (equation 5.6). The project operator will use the maximum biogas storage capacity of the BCS system and assign a zero BDE for the number of days of uncontrolled venting. This will correctly account for all methane emissions as a result of the cleanout.

**n) Is it appropriate to classify separated digester effluent solids that are sent to freestalls as "deep bedding?" Given the treatment of these solids, is designating a management system with a lower MCF, such as daily spread or composting, more appropriate?**

The MCF used should correspond to the system description in the MCF table in Appendix A that is most similar to the actual system type used. In the case of solids sent to the freestalls, the deep bedding system most accurately reflects the system type being used.

**o) How should the BCS effluent pond emissions be calculated in Equation 5.8 if solids are separated from the digester effluent and diverted from the effluent pond? For example, 20% of the digester effluent is separated and used as deep bedding (<1 month).**

The MCF for liquid/slurry uncovered should not be applied to the total amount of effluent. The MCF should be a weighted average of the systems used for the effluent. In the example above this would be:  $MCF_{ep} = (80\% \text{ of VS sent to effluent pond})(20\% - \text{MCF for liquid/slurry uncovered}) + (20\% \text{ of VS sent to deep bedding})(3\% - \text{MCF for deep bedding}) = 16.6\% \text{ MCF}$ .

**p) The values for several MCFs values in table A.5 have changed from the 2011 protocol; can projects still use the values from the 2011 protocol?**

The correct MCF values from the references found in the “Sources and comments” column of table A.5 should be used. The table provided in the 2014 Livestock Protocol is just a compiled version of the reference data for ease of use. In all cases the 2011 values were correct. The known errors are the MCF for Daily spread (15-25°C) should be 0.005, the MCF for Dry lot (15-25°C) should be 0.015, and the MCF for Pit storage below animal confinements (>1 month, ≤10°C) should be 0.17.

**q) In Equation 5.3,  $P_L$  is defined as the “annual average population of livestock category ‘L’ (based on monthly population data).” This variable is used to determine the amount of volatile solids available for degradation in the anaerobic storage/treatment system on a monthly basis, i.e.,  $VS_{avail,AS,L}$ , which is also affected by the average temperature for the month. Is the OPO/APD required to use the annual average population for each monthly calculation of  $VS_{avail,AS,L}$ , or can the relevant monthly average population be used?**

The OPO/APD should use the appropriate monthly population to determine the monthly VS value.

**r) A project employs a solids separator and uses solids from the effluent for bedding. Rather than using a weighted approach to account for the solids being separated which would result in a lower methane conversion factor (MCF) percentage, the project assumes 100% of the effluent is treated in an anaerobic storage lagoon. While this approach is more conservative, this scenario is not indicative of what is actually taking place at the dairy. Because this as a more conservative approach, is this an acceptable method?**

No, the protocols require the OPO to model what is actually happening, even if it is a less conservative method.

#### 4. Monitoring Requirements

**a) Monitoring systems may not be possible to install on some destruction devices. Must these unmonitored destruction devices be excluded from the GHG emission reduction calculations, or is there some tolerance in relation to the Offset Project Operator or Authorized Project Designee demonstrating operation of the destruction device?**

Yes, if the monitoring system or safety shut off devices are absent or cannot show operation, the portion of gas delivered to these systems will be ineligible for crediting. Monitoring systems or safety shut off devices are required on destruction devices to document methane destruction. Chapter 6 of ARB's Livestock Protocol specifies the monitoring requirements for the methane capture and control system.

**b) Does each individual metering device need to meet the requirements for the  $\pm 5\%$  calibration threshold, or can this requirement be demonstrated through engineering calculations that a metering system on aggregate meets the requirements. Is it possible for an Offset Project Operator or Authorized Project Designee to use meters that do not meet the accuracy requirements as specified in the protocol?**

Subchapter 6.2 of ARB's Livestock Protocol requires that every device used to calculate GHG emission reductions must meet the  $\pm 5\%$  accuracy requirement. If a field check on a piece of equipment reveals the equipment was operating outside of the required  $\pm 5\%$  threshold, calibration by the manufacturer or a certified service provider is required for that piece of equipment. Subchapter 6.2(c) contains provisions for scaling data in the event a field check indicates equipment is outside the  $\pm 5\%$  threshold. An Offset Project Operator or Authorized Project Designee may not use meters that do not meet that accuracy requirements set forth in the Livestock Protocol.

**c) If a cogeneration plant is operated by a third party other than the OPO or APD, and it takes biogas from a digester through a meter that is used for billing - is that meter considered a revenue meter, and considered as meeting the accuracy requirements of ARB's Livestock Protocol (similar to the Mandatory Reporting Regulation)?**

Yes, the meter used for billing is acceptable under the meter accuracy requirements of ARB's Livestock Protocol. Data from the cogeneration plant demonstrating destruction is still required to meet the requirements of the Livestock Protocol.

**d) If a livestock project does not want to claim credits for a destruction device, does that device need to be metered?**

No, if the device is not being used to support the crediting of methane destruction, it does not need to be metered. However, the actual volume of biogas destroyed in the BCS is required for both the baseline and project emissions. So a device not used to support the crediting of methane destruction must be physically isolated (e.g., closed valve, piping removed) to the satisfaction of the verifier, or biogas flow to the device must be measured by another meter that meets the requirements of the Livestock Protocol (e.g., meter immediately downstream of the digester).

**e) A livestock project has 2 engines that have been out of service during the entire initial reporting period (12 months). Currently the project is sending all its biogas to other destruction devices. Valves have completely closed off biogas flow to the engines and there is no kWh data during this time. While the engines are being repaired, the Offset Project Operator (OPO) would like to ship the flow meters monitoring flow to the engines back to the manufacturer for calibration. The OPO would like to know whether data substitution is necessary during the time when the flow meters are being calibrated, if it can be demonstrated that the engines are not receiving biogas.**

Provided that the destruction device is completely isolated from the project through its removal or the closing of a valve, it is acceptable to exclude the destruction device from the monitoring requirements of the Livestock Protocol, as long as the verifier can confirm the destruction device is completely isolated.

**f) What happens in a situation where the destruction device monitoring equipment or other monitoring equipment is inoperable?**

Pursuant to subchapter 6.1(e) of ARB's Livestock Protocol, when a meter/monitoring device that is used to monitor whether a destruction device is functioning properly breaks down, no credits will be issued to the project for any metered biogas going to that device during the down time. Devices with a verified safety shut-off device do not require hourly monitoring.

In situations where the flow rate or methane concentration monitoring equipment is inoperable, the OPO or APD must apply the data substitution methodology provided in Appendix B. The missing or replaced data should be identified in the projects records, and values substituted according to Appendix B.

**g) In the Livestock Protocol, the project definition states, "The biogas control system must destroy methane gas that would otherwise have been emitted to the atmosphere in the absence of the offset project from uncontrolled anaerobic treatment and/or storage of manure." There are permeable, geotextile/foam lagoon cover products on the market that are specifically designed to control odor. A few studies describe the ability of these types of covers to oxidize methane or act as a medium on which methanotrophic bacteria can grow. However, it is possible that the actual amount of methane oxidized by these covers is negligible. Would a livestock operation with odor control lagoon covers installed in the baseline meet the "uncontrolled anaerobic (manure) treatment and/or storage" requirement in the project definition?**

Yes, ARB has determined that there is insufficient evidence to classify odor control covers as methane capture/destruction devices. Baseline lagoons with odor control covers are considered to be "uncontrolled anaerobic manure treatment and/or storage facilities" under the project definition, assuming the lagoons otherwise meet the other performance standard requirements in Livestock Protocol subchapter 3.4.2(b).

**h) If a project destruction device was taken out of service before the end of the reporting period and not reactivated, does the field calibration check of the associated flow meter need to take place within two months of the end of the reporting period, or can the check take place around the time that the device was deactivated?**

If the flow meter is field checked around the time the destruction device is taken out of service that check can serve to meet the QA/QC requirement of the Livestock Protocol. A subsequent check within two months of the end of the reporting period is not necessary unless the device is reactivated.

**i) How is "hourly" defined in regards to the operational activity monitoring requirement in the Livestock Protocol? Does "hourly" mean that gaps in operational data cannot be longer than one hour, or can a project meet the requirement if destruction device operation is recorded at least once per hour?**

The typical time between readings should ideally be one hour or less. However, the hourly operational activity monitoring requirement can be met if the device is shown to be operating at least once per hour-long block of time, within reason.

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For example, the total amount of biogas sent to the destruction device in the following scenario can be considered destroyed:

Timestamp	Flow (scfm)	Operating?
1:00	1000	Yes
1:15	1000	- (data missing)
1:30	1000	- (data missing)
1:45	1000	(data missing)
2:00	1000	- (data missing)
2:15	1000	- (data missing)
2:30	1000	Yes
2:45	1000	Yes
3:00	1000	Yes

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However, if the device has more-frequent-than-hourly monitoring, and records a period of nonoperation (not just missing data) less than one hour, the device will not be considered operational for that time period even if there is a record in the hour block showing operation. For example the biogas sent the destruction device between 2:00 and 2:44 would not be considered destroyed:

Timestamp	Flow (scfm)	Operating?
1:00	1000	Yes
1:15	1000	Yes
1:30	1000	Yes
1:45	1000	Yes
2:00	1000	No
2:15	1000	No
2:30	1000	No
2:45	1000	Yes
3:00	1000	Yes

**j) What if a boiler does not have hourly operational monitoring?**

A boiler is considered a destruction device. Therefore, there must be monitoring devices detecting whether the boiler is functioning properly. Any malfunction in these types of monitoring devices will result in no crediting. Biogas sent to boilers, internal combustion engines, flaring devices, and biogas cleanup systems without monitoring capabilities to meet the requirement of ARB's Livestock Protocol will be ineligible for ARB offset credits during the period operational monitoring equipment is inoperable. Devices with a verified safety shut-off device do not require hourly monitoring.

**k) The instruction manual for Sage Prime flow meters recommends quarterly in-situ calibration checks (page 46) for projects under the Reserve's U.S. Livestock Project Protocol V3.0, which is more frequent than the monitoring equipment calibration check requirement in the Livestock Protocol and some early action protocols, including V3.0. The COP is not specifically referenced in the Sage manual. Does this recommendation apply to compliance projects that use Sage meters**



**(falling under the “per manufacturer’s specifications” clause), or is it limited to early action livestock projects under V3.0?**

Sage’s recommendation of quarterly in-situ calibration checks does apply to projects under subchapter 6.2 of the Livestock Protocol (“per manufacturer’s specifications”). If a compliance project is using a Sage flow meter, it must conduct quarterly calibration checks.

**l) A project’s boiler thermocouple has been reporting exhaust temperatures lower than what would be expected under normal circumstances. The OPO has asserted that this is due to improper thermocouple placement, since the boiler was observed to be functioning properly during the reporting period. To account for this, they have provided evidence of biogas combustion through recorded differences in temperature between the thermocouple readings and ambient air temperature in the building. The standard employed by the OPO is a difference of 10°C. Is this a reasonable approach to show operational activity?**

The Livestock Protocol is silent on a specific approach to demonstrate operational activity. The verifier may apply professional judgment to determine whether the method used is reasonable.

**m) A project has performed quarterly calibrations of its flow meters but did not record any of the as-found readings, thus it is impossible to know if they were reading within the ±5% accuracy threshold. Is it acceptable for the OPO to come up with a hypothetical drift and scale the data by a percentage that would allow the verifier to be comfortable that “the submitted Offset Project Data Report is reasonably assured of being free of offset material misstatement”?**

In the absence of as-found readings, the OPO should come up with a conservative hypothetical drift based on “historic data” and apply the appropriate scaling as required by the Livestock Protocol. The verifier will need reasonable assurance that this approach will not result in a material misstatement, and this will result in a qualified positive offset verification statement.

**n) In most, if not all, cases, projects that combust biogas in engines use scrubbers to remove hydrogen sulfide, which changes the methane concentration of the gas. The Livestock Protocol does not specify where the methane concentration should be measured relative to the scrubber. It is also possible to divert biogas to a backup destruction device (open**

**flare, etc.) upstream of the scrubber. In these cases, how should the OPO address the discrepancy between methane concentration measured downstream of the scrubber and flow measured upstream, or vice versa?**

If the OPO has multiple methane concentrations then the one most appropriate for each destruction device should be used. If the OPO has only a single methane concentration the OPO may apply that concentration to all destruction devices. The verifier should be reasonably assured that applying a single methane concentration will not result in a material misstatement.

**o) The Livestock Protocol contains the term "certified calibration service". Is there a specific standard to which these calibration services need to be certified?**

There is no specific standard that the Livestock Protocol requires the calibration services to be certified against. There are several standards available but ultimately it is up to the OPO to demonstrate to the verifier that they are certified against a relevant standard.

**p) The Livestock Protocol requires that the OPO/APD "independently monitor the operational activity of each destruction device and must collect and maintain documentation at least hourly to ensure actual methane destruction." A situation has come up where a project has multiple engines which are independently metered but utility records from the combined output of the engines are being used to demonstrate hourly operational activity. As a result, it is not possible to determine which engine was running while flow was being sent to it. Under what circumstances, if any, would an OPO/APD be able to claim emission reductions for the flow being sent to the engines?**

Since the Livestock Protocol requires the OPO to "independently monitor the operational activity of each destruction device" the combined utility records could not be used to demonstrate operational activity.

**q) A livestock project is missing flow data for its two engines for a period of 10 weeks. Since the period of missing data is more than one week, the data substitution guidance in the Livestock Protocol states that a zero biogas destruction efficiency (BDE) must be used. The OPO has proof that the engines were operational for nearly every hour of this 10-week period and they are equipped with safety shutoff valves so it is almost certain that biogas was being destroyed during this entire period. Is there a way that the project developer can use the brake-specific fuel**

**consumption (BSFC) in order to determine theoretical flow and NOT have to take a zero BDE? If the project comes up with a theoretical flow based on the BSFC, is this equivalent to recording flow on a daily totalized basis?**

The Livestock Protocol requires measurement equipment that directly measures the flow of biogas. The BSFC is not a direct measure so it could not be used. The project will have to take a zero BDE for the ten-week period. The missing data must be substituted as required in Appendix B. This may result in a positive offset verification statement because the Livestock Protocol allows for missing data substitution.

**r) A livestock project is missing flow and operational data for its two boilers for a period of 2 weeks. Since there is more than one data parameter missing the data substitution guidance in the Livestock Protocol states that a zero BDE must be taken. However, subchapter 6.1(d)(1) states that “Any destruction device equipped with a safety shut off device that prevents biogas flow to the destruction device when the destruction device is not operational does not require hourly monitoring, provided that the presence, operability, and use of the safety device are verified.” Does this language preclude projects from having to monitor the boiler, and thus all flow to the boiler be counted as destroyed.**

No, the gas sent to the boiler will be assigned a BDE of zero because the missing data is in excess of one week. Appendix B assigns a zero BDE to any missing data in excess of one week. If the missing data was for seven days or less then the missing data would be able to be substituted per the requirements in Appendix B because the boiler meets the operational activity requirement with the verified presence and operability of the safety shut off.

**s) How is the operability and use of a "safety shut off device" installed on a destruction device verified per subchapter 6.1(d)(1) of the Livestock Protocol? What are examples of steps the OPO can take to document the operability of safety valves in an engine or boiler?**

If the original equipment manufacturer specifications identify the safety device(s), then the OPO simply needs to demonstrate that they are operating and maintaining the device per the manufacturer's requirements. If a “safety shut off device” is not included in the original equipment manufacturer specifications, the OPO must be able to demonstrate the presence (i.e., purchase invoice and proof

of installation) and operability of such a device (i.e., log books, maintenance records).

**t) A project has installed temperature and pressure probes in conjunction with the flow meters in order to correct to standard temperature and pressure (STP). A pressure probe was inoperative for a period longer than one week during the initial reporting period. Given that temperature, flow, and destruction device operational activity data are available, must the OPO apply the >1 week data substitution methodology from Appendix B (with the zero BDE), or can the project report emission reductions by using the default BDE instead?**

The missing pressure data is considered missing flow data since the pressure must be used to calculate the flow corrected to STP. Therefore, the OPO must use the Livestock Protocol's data substitution procedures (Appendix B) for one missing parameter in excess of one week.

**u) If a project is missing more than a week of data is this considered a non-conformance with the monitoring requirements of the Livestock Protocol? When should issues related to missing data result in a qualified positive verification statement (OVS)?**

A qualified positive OVS will be issued when the project cannot conform to the data substitution procedures in the applicable protocol. If it does conform to data substitution procedure, this may result in a positive OVS. Missing operational status will result in a qualified positive if the device is not equipped with a safety shut off valve. Substitution procedures as noted in Appendix B must be used, which will avoid a nonconformance in regard to monitoring requirements. However, all operational data requirements must be met to avoid non-conformance.