2.0 BASELINE DETERMINATION

2.1 Project Assessment Boundaries and Emissions Sources

The project boundaries will be confined to all conversions implemented by a single project proponent in a continuous time frame or in contiguous phases.

Because the project implementation, key project data collection and storage, calculation of the project emissions, and total emission reductions will be centrally managed and stored by the project proponent, then it is logical that the GHG emission reduction project assessment boundaries will be the universe of conversions undertaken by the project proponent. However, due to unique operating conditions (i.e. pressure or methane concentration) which could affect emission rates, certain baseline and project emissions will need to be calculated at a basin level in the production sector and at a facility or pipeline level in the transmission and distribution sectors, as described below.

Baseline emissions for the project will be determined through site-specific sampling. The project proponent can establish a manufacturer-specific emission factor for its own population of pneumatic controllers per Sections 3.1.1 & 4.4 and Appendix C below.

Project emission factors will be extrapolated from a series of representative sample measurements of the converted project population. Further information on the measurement and calculation of emissions can be found in the project and baseline emissions calculations as per Sections 3.2 and 4.4 and Appendix C below.

There are no emissions from construction or combustion as a part of the pneumatic retrofit project. Emissions in the project baseline and post-retrofit scenario consist solely of the GHG fraction of natural gas emissions from the pneumatic controllers. These gases, and their status (included or excluded) within the project are outlined in Table 2.1.

Table 2.1: Baseline and Project Emissions

Gas	Description	Status: (included, excluded)
CH_4	Methane is a major constituent of natural gas. The methane composition of natural gas tends to be between 70% and 90%, but varies depending on the location of the production, transmission or distribution facility. The methane fraction of the gas is an important component in the emission reductions calculation. Facilities will be required to present information from a gas chromatograph or comparable test.	Methane is included as a project and baseline emission.

Gas	Description	Status: (included, excluded)
CO_2	CO_2 constitutes about 5% of most natural gas emissions.	Excluded. While the retrofit of controllers will result in the reduction of CO_2 released bleeding to the atmosphere, no credit will be claimed for this reduction in order to ensure that the project emission reduction claims are conservative.
NMHCs	Non-methane hydrocarbon components of natural gas can include ethane, propane, butane, pentane, or any other non-methane gasses (e.g. nitrogen, helium, and hydrogen sulfide) found in the natural gas.	Excluded

In certain applications, controllers may reach the end of their useful life during the crediting period for the project, such as in cases where a controller is worn down more quickly if the application uses corrosive gas. To determine if any controller included in the project would normally have been replaced with a low-bleed alternative during the crediting period for a reason other than the project activity, the project proponent should provide the following information:

- The project proponent should describe current practice for routine refurbishment of controllers and should provide to the verifier the standard operating procedure, if any, for routine refurbishment of pneumatic controllers, including replacement specifications published by the controller's manufacturer if available.
- Any controllers which would have been so replaced during the crediting period should be identified, the expected date of such replacement should be stated, and no emission reductions credited for that controller after such date.

2.2 Baseline Description

The baseline scenario is the continued use of high-bleed pneumatic controllers. ~~Project entities must use the procedures outlined below to justify that the pneumatic conversion project is not common practice for the project entity and the industry.~~ Project entities must demonstrate that the pneumatic conversion project is not common practice per the Practice-based Performance Standard defined below.

2.3 Additionality Assessment

Emission reductions from the project must be additional, or deemed not to occur in the business-as-usual scenario. Assessment of the additionality of a project will be made based on passing the two tests cited below. These two tests require the project proponent to demonstrate that the project activity is surplus to regulations and reduces emissions below the level established, through the practice-based performance standard as defined below, to represent common practice or "business-as-usual" for the retrofit of high-bleed pneumatic controllers with low or no-bleed alternatives.

Project proponents utilizing this methodology should consult the latest version of the ACR Standard, which may be updated from time to time. At the time of the drafting of this methodology, the two additionality tests include:

1. Regulatory Surplus Test, and
2. Practice-based Performance Standard

Emission reductions from the project must be additional, or deemed not to occur in the business-as-usual scenario. Assessment of the additionality of a project will be made based on passing the three tests cited below. Project proponents utilizing this methodology should consult the latest version of the American Carbon Registry's Technical Standard, which may be updated from time to time. At the time of the drafting of this methodology, the three additionality tests include:

1. Regulatory Surplus Test
2. Common Practice Test, and
3. Implementation Barriers Test

Further guidance on these tests is given below:

TEST 1: Regulatory Surplus

In order to pass the regulatory surplus test, a project must not be mandated by existing laws, regulations, statutes, legal rulings, or other regulatory frameworks in effect now, or as of the project start date, that directly or indirectly affect the credited GHG emissions associated with a project.

The project proponent must demonstrate that there is no existing regulation that mandates the project or effectively requires the GHG emission reductions associated with the retrofit of high-bleed pneumatic controllers with low or no-bleed alternatives.

TEST 2: Common Practice Analysis

The common practice test is designed to demonstrate that the conversion of high-bleed pneumatic controllers is not already being undertaken as a matter of common practice. It is to answer the question of whether, in the industry/sector, there is widespread deployment of this project, technology, or practice.

The project document should demonstrate within reason why the conversion of high-bleed pneumatic controllers with low-bleed alternatives is not common practice in the market. For example, this assessment could include a review and updated assessment of the assumptions on regulations and pneumatic devices populations described below.

National and regional market information and data should be collected from various government agencies (federal, state, local), equipment vendors, and trade associations, as available, to support this market penetration assessment. This assessment should demonstrate that market conditions have not created, nor resulted in, a common practice conversion rate for high-bleed pneumatic devices that is significantly greater than that which the project proponent is undertaking in the project.

TEST 2: Practice-based Performance Standard

An assessment of the market penetration of high- to low-bleed retrofits, based on national and regional market information from various government agencies (federal, state, local), equipment vendors and trade associations, demonstrates that market conditions have resulted in a common practice conversion rate for high-bleed pneumatic devices of less than 10%. Because the conversion of high-bleed pneumatic controllers with low-bleed alternatives is not common practice in the oil and gas industry, retrofit projects using this methodology are deemed "beyond business as usual" and therefore additional.

Projects which meet the eligibility criteria for this methodology can use the performance standard to demonstrate additionality without providing additional implementation barrier analysis. Projects that are certified under this version of the methodology do not need to reassess additionality with each verification during their 10-year crediting period. However, the following common practice assessment and the applicability of the practice-based performance standard will be reassessed periodically after significant changes to the market, or, at a minimum, every 10 years. Future common practice assessments should differentiate between retrofits that occurred as emission reduction projects and business-as-usual.

ACR reserves the right to review the common practice assessment as necessary to ensure additionality of future projects. All GHG Project Plans for new projects, and all applications for crediting period renewal on existing projects, shall apply the regulatory surplus and practice-based performance standard tests in the latest approved revision of this methodology in effect at the time of GHG Project Plan submission or application for crediting period renewal.

Common Practice Assessment for Conversion of High-Bleed Pneumatic Controllers: Because pneumatic controllers are numerous and dispersed throughout the oil and gas production, gathering, and transmission segments, and no organization has undertaken a comprehensive inventory, it is impossible to have a precise estimate of the number of pneumatic controllers or their aggregate emissions. However, the U.S. EPA, for its annual Inventory on Greenhouse Gas Emissions and Sinks, routinely performs top-down estimations of pneumatic populations and emissions using available industry activity data and emission factors. Based on this EPA data and further analysis of population size and penetration rates it is estimated that less than 10% of the pneumatic high-bleed controller population has been replaced with low-bleed pneumatic devices.

According to the EPA's study, emissions from pneumatic controllers in the oil and gas sector account for 48 billion cubic feet of natural gas emissions per annum.[1] In the same study, the EPA also estimated that there were approximately 498,000 pneumatic controllers in the oil and gas sectors. This number includes high and low-bleed pneumatic controls. Additionally, using the EPA's estimate of total emissions and estimates of average emissions from each high-bleed controller (~140,000 cf/year) and low-bleed controllers (~8,000 cf/year) the total number of pneumatic controllers is estimated at closer to 525,650.

Further, the U.S. EPA undertook a study in 2002 that estimated that the ratio of high-bleed to low-bleed pneumatic controls in the oil and gas sector was 66% to 34%.[2] The study also implied that the number of existing high-bleed pneumatics was diminishing at a very low rate; this is essentially because few replacements are occurring. These ratios, along with total population figures, imply that the total number of remaining high-bleed population in the United States is currently between 328,680 and 346,930 controllers.

Like the total number of pneumatic controllers, the number of retrofits/replacements that have occurred is equally difficult to determine precisely. However, data from the EPA and industry vendors and equipment suppliers suggest that the market penetration rate for

[1] US Environmental Production Agency (EPA), "Lessons Learned from Natural Gas STAR Partners: Options for Reducing Methane Emissions from Pneumatic Devices in the Natural Gas Industry", EPA430-B-03-004, Washington, DC, July 2003.

[2] More information on this study may be accessed by contacting the EPA's Natural Gas STAR program.

high-bleed conversion in the production sector remains low.

Since 1993, the EPA has run a voluntary program called Gas STAR to educate natural gas companies about opportunities to reduce emissions from their operations. There are over 100 Gas STAR members, of which more than 30 are natural gas production companies, including 21 of the 25 largest domestic producers. These members submit annual reports to Gas STAR describing the annual emission reduction projects completed during the year. According to the EPA data, members have reported replacing approximately 34,000 high-bleed devices *since 1990* (this figure includes both transmission and distribution companies as well as production companies).

Combining the above estimate of 328,680 – 346,930 high-bleed controllers (in the oil and gas sectors) with the EPA figure that 34,000 high-bleed conversions have occurred (in *both* production and transmission sectors since 1990) would suggest that the market penetration of low-bleed conversions in the industry is below 10%.

This penetration rate is further supported by discussions with vendors. Though vendors do not track whether their low-bleed devices are sold for conversion projects or new installations, anecdotal evidence suggests that such replacement projects are uncommon. Vendor surveys indicate that approximately 20,000 devices have been retrofitted since 2000, implying a market penetration rate well below 10% and 'natural conversion' rate of less than 1%.

In summary, despite superior technology having been available in the market for 20 years, a very large number of high-bleed pneumatic controllers still exist. The rate of conversion of these controllers, either through the retirement of the equipment on which they operate, or through retrofits, is extremely slow. Anecdotal evidence from industry professionals and field operators indicates that there are a number of reasons for this slow natural rate of conversion, including lack of understanding of the new technology among field operators, a pervasive "if it ain't broke, don't fix it" attitude, scarcity of capital and human resources for non-core projects, and corporate budgeting practices that do not account for lifecycle efficiency costs. Additionally, operators are reluctant to act on emission reduction activities before there is a clear path forward on U.S. GHG regulations and law and are adopting a "wait and see" attitude.

~~TEST 3: Implementation Barrier Analysis~~

~~The project proponent should establish that the project overcomes at least one prohibitive financial, technological, or institutional barrier. Further guidance on these barriers is provided below.~~

~~In order to demonstrate that there are prohibitive barriers to the project being implemented, the project proponent will provide documented evidence, and offer conservative interpretations of this evidence, as to how the project is overcoming the identified barrier. Anecdotal evidence can be included, but alone is not sufficient proof of barriers. Demonstration of the project facing at least one of the three barriers below is required for approval of the project.~~

~~Financial Barriers~~

~~The financial barriers test is intended to answer the following question: Does the project face capital constraints that carbon revenues can potentially address; or is carbon funding reasonably expected to incentivize the project's implementation; or are carbon revenues a key element to maintaining the project action's~~

ongoing economic viability after its implementation?

To pass the financial barriers test, the project should face capital constraints that carbon revenue will play a significant role in helping it overcome. Financial constraints can include, but are not limited to:

- High costs – material and personnel costs associated with retrofit process, production losses, etc.
- Immaterial or low returns – project IRR does not meet company thresholds, revenue from gas savings is linked to volatile commodity pricing
- Limited access to capital or capital constraints due to the non-core nature of the project
- High risks from unproven technologies or business models
- Poor credit rating of project partners or high project financial failure risk

If the financial barriers test is selected for the project, the project proponent should both explain the financial barriers and provide sufficient supporting documentation at the time of the project validation. The project proponent should also consider the economic life of the controllers and the costs associated with refurbishment or replacement of these units at the end of this economic life. Project proponents can use a default value for controller replacement of 7 years or use a project-specific estimate in their financial analyses. Additionally, if applicable, economic analysis to demonstrate financial barriers should also account for the dispersion of value from gas savings from the project activity (e.g. passing of savings on to customers or increased royalties to gas lease holders).

Technological Barriers

The technological barriers test is intended to answer the following question: Is a primary reason for implementation of the technology in question its GHG reduction capabilities or benefits, and is the reduction of GHG emissions one of the goals of the project at the start date?

Technological barriers can include high R&D costs, deployment risk of new technologies, and lack of trained personnel available on-site to install, maintain, or properly operate the equipment or any other relevant technical barriers. If the technical barriers test is selected for the project, the project entity should both explain the technical barriers and provide, at the time of the project validation, sufficient supporting documentation.

Institutional Barriers

The institutional barriers test is intended to answer the following question: Does the project face significant organizational, cultural, or social barriers to achieving GHG emission reductions that the accrual of benefits from the project action will help to overcome?

Institutional barriers can include a scarcity of human resources for technology implementation, lack of support from management or operations personnel for new technology practices, an aversion to investment in an area where risks and returns are unfamiliar (as opposed to actual capital constraints), lack of awareness or concern with the benefits of the project, or any other relevant institutional barriers. If the institutional barriers test is selected for the project, the project entity should both explain the institutional barriers and provide, at the time of the project validation, sufficient supporting documentation.