
Greenhouse gases —

**Part 3:
Specification with guidance for
the verification and validation of
greenhouse gas statements**

Gaz à effet de serre —

Partie 3: Spécifications et lignes directrices pour la vérification et la validation des déclarations des gaz à effet de serre



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 7, *Greenhouse gas management and related activities*.

This second edition cancels and replaces the first edition (ISO 14064-3:2006), which has been technically revised. The main changes compared with the previous edition are as follows.

- The structure of the document has been changed so that verification and validation are discussed in sequence (see [Clauses 6](#) and [7](#)) rather than in parallel, because the processes of verification and validation are significantly different.
- The definitions of verification and validation and other key terms have been changed (see [Clause 3](#)).
- A new section on validation has been added (see [Clause 7](#)). It applies to future estimates of emissions, removals, emission reductions and removal enhancements. The purpose of validation is to provide assurance on the assumptions, limitations and methods used to develop a GHG statement.
- A new [Annex A](#) has been added that defines requirements for verifiers to follow when undertaking engagements at a limited level of assurance.
- A new [Annex B](#) has been added on considerations for verification.
- A new [Annex C](#) has been added on a new process called agreed-upon procedures (AUP), which allows for a selection of verification activities to be performed and reported upon. No opinion is expressed on the result of an AUP engagement as the intended user(s) are responsible for interpreting the information reported on by the verifier.
- A new [Annex D](#) has been added that provides guidance on how verifiers and validators can provide statements on engagements that are mixed.
- Requirements and guidance on the use of levels of assurance have been added.

A list of all parts in the ISO 14064 series can be found on the ISO website.

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Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 Background

Climate change arising from anthropogenic activity has been identified as one of the greatest challenges facing the world and will continue to affect business and citizens over future decades.

Climate change has implications for both human and natural systems and could lead to significant impacts on resource availability, economic activity and human wellbeing. In response, international, regional, national and local initiatives are being developed and implemented by public and private sectors to mitigate greenhouse gas (GHG) concentrations in the Earth's atmosphere as well as to facilitate adaptation to climate change.

There is a need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge. ISO produces documents that support the transformation of scientific knowledge into tools that will help address climate change.

GHG initiatives on mitigation rely on the quantification, monitoring, reporting and verification of GHG emissions and/or removals.

The ISO 14060 family of standards provides clarity and consistency for quantifying, monitoring, reporting and validating or verifying GHG emissions and removals to support sustainable development through a low-carbon economy and to benefit organizations, project proponents and interested parties worldwide. Specifically, the use of the ISO 14060 family of standards:

- enhances the environmental integrity of GHG quantification;
- enhances the credibility, consistency and transparency of GHG quantification, monitoring, reporting, verification and validation;
- facilitates the development and implementation of GHG management strategies and plans;
- facilitates the development and implementation of mitigation actions through emission reductions or removal enhancements;
- facilitates the ability to track performance and progress in the reduction of GHG emissions and/or increase in GHG removals.

Applications of the ISO 14060 family of standards include:

- corporate decisions, such as identifying emission reduction opportunities and increasing profitability by reducing energy consumption;
- carbon risk management, such as the identification and management of risks and opportunities;
- voluntary initiatives, such as participation in voluntary GHG registries or sustainability reporting initiatives;
- GHG markets, such as the buying and selling of GHG allowances or credits;
- regulatory/government GHG programmes, such as credit for early action, agreements or national and local reporting initiatives.

ISO 14064-1 details principles and requirements for designing, developing, managing and reporting organization-level GHG inventories.

It includes requirements for determining GHG emission and removal boundaries, quantifying an organization's GHG emissions and removals, and identifying specific company actions or activities aimed at improving GHG management.

It also includes requirements and guidance on inventory quality management, reporting, internal auditing and the organization's responsibilities in verification activities.

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ISO 14064-2 details principles and requirements for determining baselines, and monitoring, quantifying and reporting of project emissions. It focuses on GHG projects or project-based activities specifically designed to reduce GHG emissions and/or enhance GHG removals. It provides the basis for GHG projects to be verified and validated.

This document details requirements for verifying GHG statements related to GHG inventories, GHG projects, and carbon footprints of products. It describes the process for verification or validation, including verification or validation planning, assessment procedures, and the evaluation of organizational, project and product GHG statements.

ISO 14065 defines requirements for bodies that validate and verify GHG statements. Its requirements cover impartiality, competence, communication, validation and verification processes, appeals, complaints, and the management system of validation and verification bodies. It can be used as a basis for accreditation and other forms of recognition in relation to the impartiality, competence, and consistency of validation and verification bodies.

ISO 14066 specifies competence requirements for validation teams and verification teams. It includes principles and specifies competence requirements based on the tasks that validation teams or verification teams must be able to perform.

ISO 14067 defines the principles, requirements and guidelines for the quantification of carbon footprint of products. The aim of ISO 14067 is to quantify GHG emissions associated with the life cycle stages of a product, beginning with resource extraction and raw material sourcing and extending through the production, use and end-of-life stages of the product.

ISO/TR 14069 assists users in the application of ISO 14064-1, providing guidelines and examples for improving transparency in the quantification of emissions and their reporting. It does not provide additional guidance to ISO 14064-1.

[Figure 1](#) illustrates the relationship among the ISO 14060 family of GHG standards.

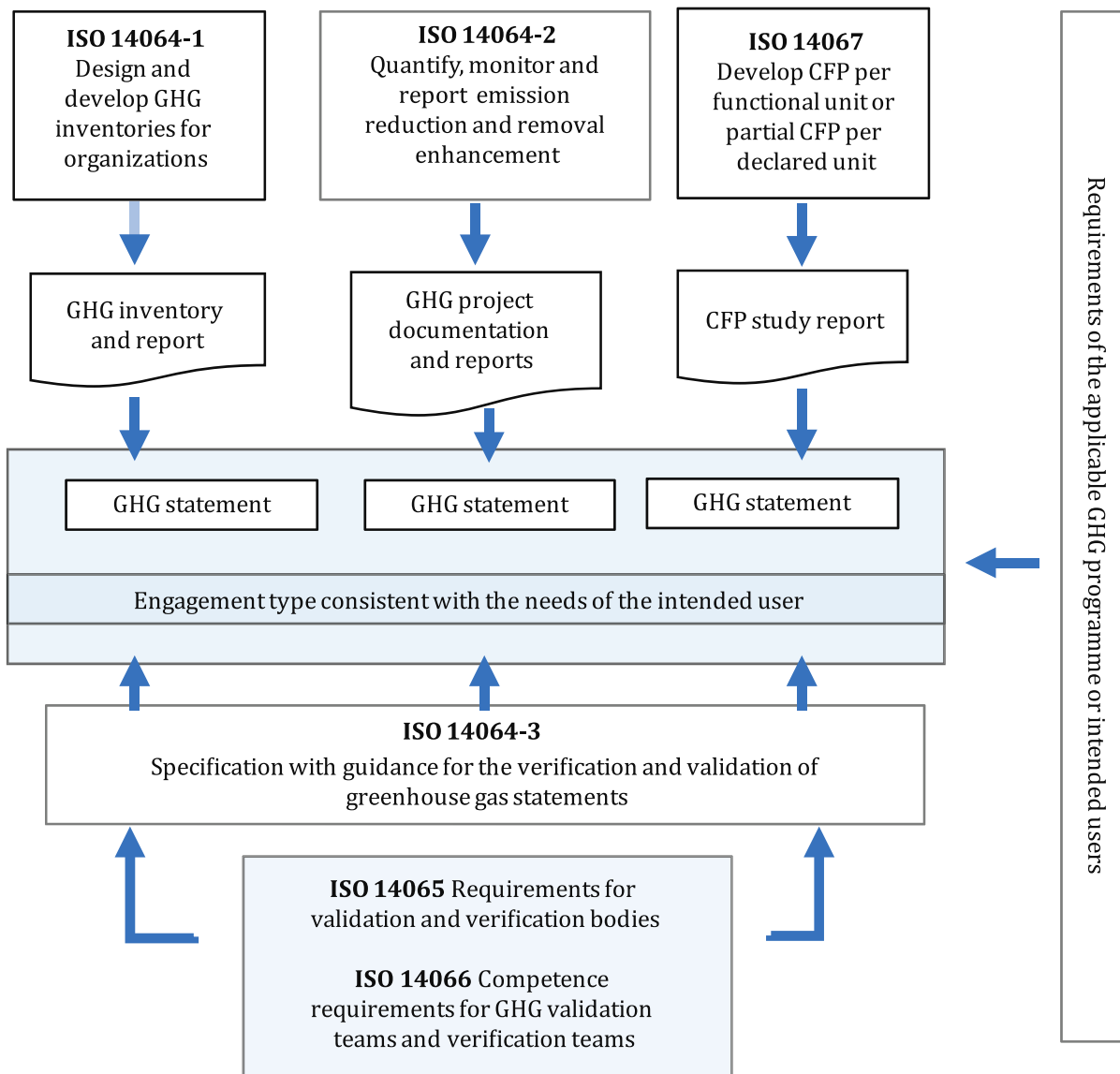


Figure 1 — Relationship among the ISO 14060 family of GHG standards

0.2 Approach of this document

This document details requirements for verifying GHG statements related to GHG inventories, GHG projects and carbon footprints of products. It describes verification activities that can enable a verifier to issue an opinion on GHG statements regarding emissions that are attributed to any organization, project or normalized unit (e.g. product). The data and information that are subject to verification are historical in nature.

This document also details requirements for validating the assumptions, limitations and methods that support a statement about the outcome of future activities. Validation differs from verification because its subject is data and information that are prospective and generally based on past performance. This document recognizes the different process requirements that apply to the validation of assumptions and methods.

This document can be used by first-, second- and third-party GHG verifiers and validators. It is regime neutral, meaning that it can be used for verifying and validating GHG statements regardless of the criteria used to develop those statements.

This document provides requirements and guidance for those persons performing verification and validation of GHG data and information. It is intended to be useful to a broad range of potential users, including:

- first-, second- and third-party GHG verifiers and validators;
- organizations and individuals involved in developing and commissioning GHG projects;
- organizations conducting internal audits of their GHG data and information;
- organizations involved in GHG verifier or validator training;
- voluntary and mandatory GHG programme administrators;
- investor, finance and insurance communities;
- regulators and those involved in the accreditation and conformity assessment of emissions trading and emission or removal offset programmes.

Figure 2 explains the application of verification, validation and AUP.

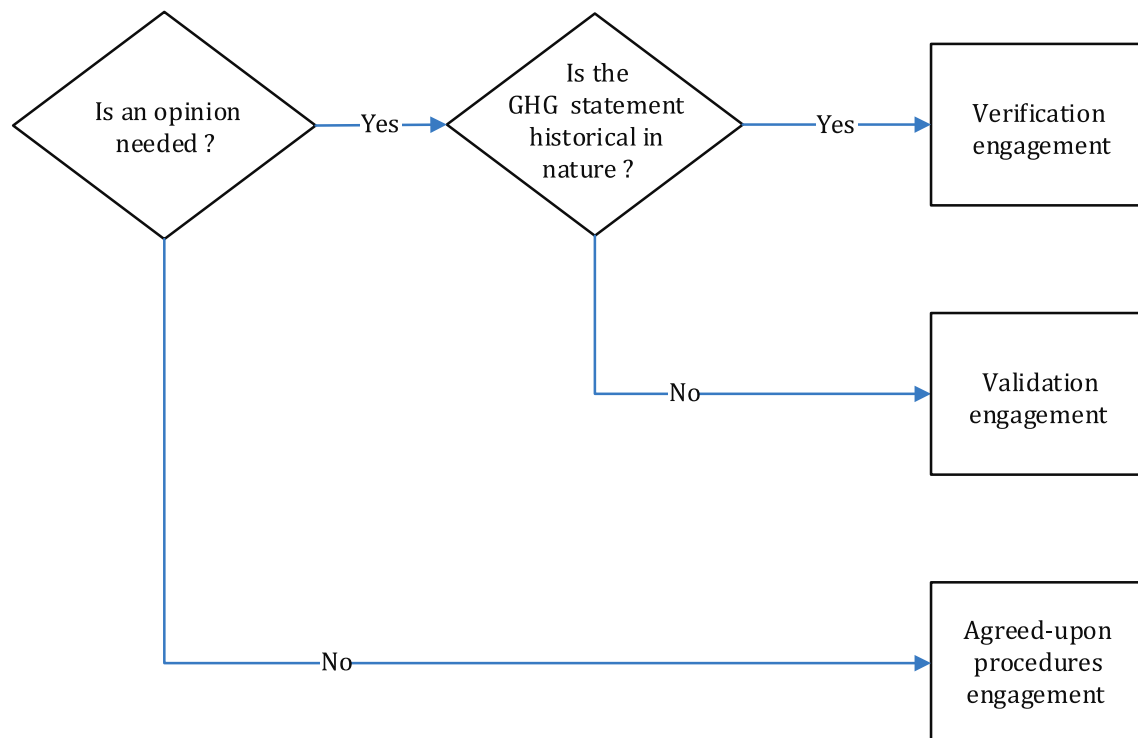


Figure 2 — Decision process for engagement type

In this document, validation is described as a specific type of engagement that assesses the assumptions, limitations and methods that generate hypothetical or projected data and information, i.e. estimates of the outcomes of future events.

0.3 Significance of the terms “explain” and “justify” in this document

Some clauses require users of this document to explain and justify the use of certain approaches or decisions taken.

Explanation generally includes:

- a) how approaches were used or decisions taken;
- b) why approaches were chosen or decisions made.

Justification has two more criteria:

- c) explain why alternative approaches were not chosen;
- d) provide supporting data or analysis.

Greenhouse gases —

Part 3: Specification with guidance for the verification and validation of greenhouse gas statements

1 Scope

This document specifies principles and requirements and provides guidance for verifying and validating greenhouse gas (GHG) statements.

It is applicable to organization, project and product GHG statements.

The ISO 14060 family of standards is GHG programme neutral. If a GHG programme is applicable, requirements of that GHG programme are additional to the requirements of the ISO 14060 family of standards.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1 Terms related to greenhouse gases

3.1.1

greenhouse gas

GHG

gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds

Note 1 to entry: GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆).

Note 2 to entry: *Criteria* (3.6.10) may specify other radiative forcing constituents.

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3.1.2 global warming potential GWP

index, based on radiative properties of *GHGs* (3.1.1), measuring the radiative forcing following a pulse emission of a unit mass of a given GHG in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide (CO₂)

Note 1 to entry: A list of GHGs with their recognized GWPs is provided in the latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report^[15].

3.1.3 greenhouse gas emission or removal factor GHG emission or removal factor

coefficient relating GHG activity data with *GHG emissions* (3.3.2) or *GHG removals* (3.3.4)

3.1.4 carbon footprint of product CFP

sum of *GHG emissions* (3.3.2) and *GHG removals* (3.3.4) in a product system, expressed as CO₂ equivalents and based on a life cycle assessment using the single impact category of climate change

Note 1 to entry: A CFP can be disaggregated into a set of figures identifying specific GHG emissions and GHG removals. A CFP can also be disaggregated into the stages of the life cycle.

Note 2 to entry: The results of the quantification of the CFP are documented in the CFP study report, called *GHG statement* (3.4.3) in this document, expressed in mass of CO₂e per functional unit.

[SOURCE: ISO 14067:2018, 3.1.1.1, modified — A reference to "GHG statement" has been added to Note 2 to entry.]

3.2 Terms related to entities involved in GHG verification and validation

3.2.1 greenhouse gas programme GHG programme

voluntary or mandatory international, national or subnational system or scheme that registers, accounts or manages *GHG emissions* (3.3.2), *GHG removals* (3.3.4), *GHG emission reductions* (3.4.8) or *GHG removal enhancements* (3.4.9) outside the *organization* (3.2.2) or *GHG project* (3.4.1)

Note 1 to entry: In this document, a GHG programme may also register, account or manage GHG emissions, GHG removals, GHG emission reductions or GHG removal enhancements from products.

3.2.2 organization

person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives

3.2.3 responsible party

person or persons responsible for the provision of the *GHG statement* (3.4.3) and the supporting *GHG* (3.1.1) information

Note 1 to entry: The responsible party can be either individuals or representatives of an *organization* (3.2.2), *GHG project* (3.4.1) or product, and can be the party who engages the *verifier* (3.2.6) or *validator* (3.2.7).

3.2.4**intended user**

individual or *organization* (3.2.2) identified by those reporting GHG-related information as being the one who relies on that information to make decisions

Note 1 to entry: The intended user can be the *client* (3.2.5), the *responsible party* (3.2.3), *GHG programme* (3.2.1) administrators, regulators, the financial community or other interested parties, such as local communities, government departments or non-governmental organizations.

3.2.5**client**

organization (3.2.2) or person requesting *verification* (3.6.2) or *validation* (3.6.3)

Note 1 to entry: The client could be the *responsible party* (3.2.3), *GHG programme* (3.2.1) administrator or other interested party.

3.2.6**verifier**

competent and impartial person with responsibility for performing and reporting on a *verification* (3.6.2)

3.2.7**validator**

competent and impartial person with responsibility for performing and reporting on a *validation* (3.6.3)

3.2.8**verification/validation team**

person or persons conducting *verification* (3.6.2) / *validation* (3.6.3) activities

Note 1 to entry: One person of the verification/validation team is appointed as the team leader.

3.2.9**independent reviewer**

competent person, who is not a member of the *verification/validation team* (3.2.8), who reviews the *verification* (3.6.2) or *validation* (3.6.3) activities and conclusions

3.2.10**retracing**

test (3.6.21) that uncovers errors in *GHG* (3.1.1) information by following *data trails* (3.5.2) back to primary data

3.2.11**tracing**

test (3.6.21) that uncovers errors in *GHG* (3.1.1) information by following primary data to GHG information

3.3 Terms related to the GHG inventory**3.3.1****greenhouse gas source****GHG source**

process that releases a *GHG* (3.1.1) into the atmosphere

3.3.2**greenhouse gas emission****GHG emission**

release of a *GHG* (3.1.1) into the atmosphere

3.3.3**greenhouse gas sink****GHG sink**

process that removes a *GHG* (3.1.1) from the atmosphere

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3.3.4

greenhouse gas removal

GHG removal

withdrawal of a *GHG* (3.1.1) from the atmosphere by *GHG sinks* (3.3.3)

3.3.5

greenhouse gas reservoir

GHG reservoir

component, other than the atmosphere, that has the capability to accumulate *GHGs* (3.1.1), and to store and release them

Note 1 to entry: The total mass of carbon contained in a GHG reservoir at a specified point in time could be referred to as the carbon stock of the reservoir.

Note 2 to entry: A GHG reservoir can transfer GHGs to another GHG reservoir.

Note 3 to entry: The collection of a GHG from a *GHG source* (3.3.1) before it enters the atmosphere and storage of the collected GHG in a GHG reservoir could be referred to as GHG capture and *GHG storage* (3.3.6).

3.3.6

greenhouse gas storage

GHG storage

process for retaining captured *GHGs* (3.1.1) so that they do not reach the atmosphere

3.4 Terms related to the GHG statement

3.4.1

greenhouse gas project

GHG project

activity or activities that alter the conditions of a *GHG baseline* (3.4.6) and which cause *GHG emission reductions* (3.4.8) or *GHG removal enhancements* (3.4.9)

3.4.2

greenhouse gas report

GHG report

standalone document intended to communicate an *organization's* (3.2.2) or *GHG project's* (3.4.1) GHG-related information to its *intended users* (3.2.4)

Note 1 to entry: A GHG report can include a *GHG statement* (3.4.3).

3.4.3

greenhouse gas statement

GHG statement

DEPRECATED: GHG assertion

factual and objective declaration that provides the subject matter for the *verification* (3.6.2) or *validation* (3.6.3)

Note 1 to entry: The GHG statement could be presented at a point in time or could cover a period of time.

Note 2 to entry: The GHG statement provided by the *responsible party* (3.2.3) should be clearly identifiable, capable of consistent evaluation or measurement against suitable *criteria* (3.6.10) by a *verifier* (3.2.6) or *validator* (3.2.7).

Note 3 to entry: The GHG statement could be provided in a *GHG report* (3.4.2), *GHG project* (3.4.1) plan or CFP study report. "CFP study report" is defined in ISO 14067:2018, 3.1.1.5.

3.4.4**greenhouse gas inventory****GHG inventory**

list of *GHG sources* (3.3.1), *GHG sinks* (3.3.3) and *GHG reservoirs* (3.3.5) and their quantified *GHG emissions* (3.3.2) and *GHG removals* (3.3.4)

Note 1 to entry: An inventory is established to cover a defined period of time.

3.4.5**base year**

specific, historical period identified for the purpose of comparing *GHG emissions* (3.3.2) or *GHG removals* (3.3.4) or other GHG-related information over time

Note 1 to entry: Base-year emissions, removals or storage may be quantified based on a specific period (e.g. a year) or averaged from several periods (e.g. several years).

3.4.6**greenhouse gas baseline****GHG baseline**

quantitative reference(s) of *GHG emissions* (3.3.2) and/or *GHG removals* (3.3.4) that would have occurred in the absence of a *GHG project* (3.4.1) and provides the *baseline scenario* (3.4.7) for comparison with project GHG emissions and/or GHG removals

3.4.7**baseline scenario**

hypothetical reference case that best represents the conditions most likely to occur in the absence of a proposed *GHG project* (3.4.1)

Note 1 to entry: The baseline scenario concurs with the GHG project timeline.

3.4.8**greenhouse gas emission reduction****GHG emission reduction**

quantified decrease in *GHG emissions* (3.3.2) between a *baseline scenario* (3.4.7) and the *GHG project* (3.4.1)

3.4.9**greenhouse gas removal enhancement****GHG removal enhancement**

quantified increase in *GHG removals* (3.3.4) between a *baseline scenario* (3.4.7) and the *GHG project* (3.4.1)

3.5 Terms related to GHG data and information management**3.5.1****greenhouse gas information system****GHG information system**

policies, processes and procedures to establish, manage, maintain and record *GHG* (3.1.1) information

Note 1 to entry: A GHG information system can include measurements, spreadsheets, samples, calibration instructions, etc.

3.5.2**data trail**

complete record by which *GHG* (3.1.1) information can be traced to the *GHG source* (3.3.1)

3.5.3**monitoring**

continuous or periodic collection of *GHG emissions* (3.3.2), *GHG removals* (3.3.4) or other GHG-related data

3.6 Terms related to verification and validation

3.6.1

engagement

arrangement between two parties, with the terms usually specified in a contract, to perform services

3.6.2

verification

process for evaluating a statement of historical data and information to determine if the statement is materially correct and conforms to *criteria* (3.6.10)

3.6.3

validation

process for evaluating the reasonableness of the assumptions, limitations and methods that support a statement about the outcome of future activities

3.6.4

agreed-upon procedures

AUP

engagement (3.6.1) that reports on the results of *verification* (3.6.2) activities and does not provide an *opinion* (3.6.18)

3.6.5

level of assurance

degree of confidence in the *GHG statement* (3.4.3)

Note 1 to entry: Assurance is provided on historical information.

3.6.6

reasonable assurance

level of assurance (3.6.5) where the nature and extent of the *verification* (3.6.2) activities have been designed to provide a high but not absolute level of assurance on historical data and information

3.6.7

limited assurance

level of assurance (3.6.5) where the nature and extent of the *verification* (3.6.2) activities have been designed to provide a reduced level of assurance on historical data and information

3.6.8

material

information capable of influencing the decisions of *intended users* (3.2.4)

3.6.9

materiality

concept that individual *misstatements* (3.6.15) or the aggregation of misstatements could influence the *intended users'* (3.2.4) decisions

3.6.10

criteria

policy, procedure or requirement used as a reference against which the *GHG statement* (3.4.3) is compared

3.6.11

controls

responsible party's (3.2.3) policies and procedures that help ensure that the *GHG statement* (3.4.3) is free from *material misstatements* (3.6.17) and conforms to the *criteria* (3.6.10)

3.6.12

cut-off

point in time for starting or ending *GHG* (3.1.1) reporting periods

Note 1 to entry: In this document, cut-off has a different meaning than in ISO 14067.

3.6.13

site

location where an *organization* (3.2.2) carries out work or a service

Note 1 to entry: A site may include one or several *facilities* (3.6.14).

3.6.14

facility

single installation, set of installations or production processes (stationary or mobile), which can be defined within a single geographical boundary, organizational unit or production process

3.6.15

misstatement

errors, omissions, misreporting or misrepresentations in the *GHG statement* (3.4.3)

3.6.16

uncertainty

parameter associated with the result of quantification that characterizes the dispersion of the values that could be reasonably attributed to the quantified amount

Note 1 to entry: Uncertainty information typically specifies quantitative estimates of the likely dispersion of values and a qualitative description of the likely causes of the dispersion.

3.6.17

material misstatement

individual *misstatement* (3.6.15) or the aggregate of actual misstatements in the *GHG statement* (3.4.3) that could affect the decisions of the *intended users* (3.2.4)

3.6.18

verification/validation opinion

DEPRECATED: verification/validation statement

formal written declaration to the *intended user* (3.2.4) that provides confidence on the *GHG statement* (3.4.3) in the *responsible party's* (3.2.3) *GHG report* (3.4.2) and confirms conformity with the *criteria* (3.6.10)

3.6.19

nonconformity

non-fulfilment of a requirement

3.6.20

analytical procedure

evaluation of *GHG* (3.1.1) information made by an analysis of plausible relationships among GHG and non-GHG data

3.6.21

test

technique used to assess a characteristic of items in a sampled population of *GHG* (3.1.1) data and information against *verification* (3.6.2) or *validation* (3.6.3) *criteria* (3.6.10)

4 Principles

4.1 General

The application of principles is fundamental to ensure that GHG-related information is a true and fair account. The principles are the basis for, and will guide the application of, the requirements in this document.

4.2 Impartiality

Design and execute the verification/validation engagement so that it is objective and does not introduce bias.

4.3 Evidence-based approach

Ensure the verification/validation engagement employs a rational method for reaching reliable and reproducible verification/validation conclusions and is based on sufficient and appropriate evidence.

4.4 Fair presentation

Ensure the verification/validation activities, findings, conclusions and opinions are truthfully and fairly presented. Report significant obstacles encountered during the process, as well as unresolved, diverging opinions among verifiers or validators, to the responsible party and the client.

4.5 Documentation

Document the verification/validation and ensure it establishes the basis for the conclusion and conformity with the criteria.

4.6 Conservativeness

When assessing comparable alternatives, use a selection that is cautiously moderate.

NOTE For further details, see [B.9](#).

5 Requirements applicable to verification/validation

5.1 Pre-engagement activities

5.1.1 General

The verifier/validator shall confirm the following aspects of the engagement:

- a) type;
- b) objectives: verification/validation;
- c) scope: boundary, period;
- d) criteria: materiality, level of assurance, etc.

NOTE Engagement types specified in this document include verification and validation. [Annex C](#) describes an engagement type called “agreed-upon procedures”.

5.1.2 Type of engagement

The verifier/validator and the client shall agree on the engagement type(s) and shall consider the needs of the intended user. The verifier/validator shall assess the appropriateness of the proposed engagement type.

NOTE A verifier/validator can conduct a mixed engagement, as described in [Annex D](#), when:

- a) the scope of each type of engagements is clearly defined;
- b) the GHG statements are developed in accordance with criteria.

5.1.3 Level of assurance in the case of verification

For verification, the verifier and the client shall agree on the level of assurance to be applied and shall consider the needs of the intended user. The verifier shall assess the appropriateness of the level of assurance. The verifier shall not change the level of assurance during the verification, but may terminate the engagement and start a new engagement with a different level of assurance. The level of assurance shall be specified prior to the start of the verification because the level of assurance establishes the nature, extent and timing (the design) of the evidence-gathering activities.

This document describes requirements applicable for verification at a reasonable level of assurance. In cases of limited level of assurance, the requirements in [Annex A](#) shall be met.

Considerations for verification are given in [Annex B](#).

5.1.4 Objectives

The verifier/validator and client shall agree on the verification/validation objectives at the beginning of the verification/validation engagement.

Verification objectives shall include reaching a conclusion about the accuracy of the GHG statement and the conformity of the statement with criteria.

Validation objectives shall include an assessment of the likelihood that implementation of the GHG-related activities will result in the achievement of GHG outcomes as stated by the responsible party, if included in the validation scope.

5.1.5 Criteria

The verifier/validator and client shall agree on the criteria taking into account the principles and requirements of the standards or GHG programme to which the responsible party subscribes. The verifier/validator shall assess the suitability of the criteria proposed by the client, considering:

- a) the method for determining engagement scope and boundaries;
- b) the GHGs and sources, sinks and reservoirs (SSRs) to be accounted for;
- c) the quantification methods;
- d) requirements for disclosures.

Criteria shall be relevant, complete, reliable and understandable. It shall be available to the intended user. The criteria shall be referenced in the opinion.

5.1.6 Scope

The verifier/validator and client shall agree on the verification/validation scope at the beginning of the verification/validation process. The scope, as a minimum, shall include the following:

- a) boundaries;

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- b) facilities, physical infrastructure, activities, technologies and processes;
- c) GHG SSRs;
- d) types of GHGs;
- e) time period.

For GHG statements that contain emission reductions or removal enhancements, the scope shall also include:

- any material secondary effects;
- baselines (verification);
- baseline scenarios (validation).

NOTE GHG emission reductions or removal enhancements can be offset by affected GHG SSRs (see ISO 14064-2:2019, 3.1.11). GHG emission reductions or removal enhancements affected by GHG SSRs are often referred to as leakage or other secondary effects.

5.1.7 Materiality thresholds

The verifier/validator shall confirm the materiality threshold required by the intended users. If no materiality threshold has been specified by intended users, the verifier/validator shall set (a) materiality threshold(s) and communicate them to the client.

NOTE 1 The GHG programme can establish a threshold for materiality. Materiality has qualitative and quantitative components.

Quantitative materiality refers to error in value in the GHG statement. Examples include misstatements, incomplete inventories, misclassified GHG emissions or misapplication of calculations.

Qualitative materiality refers to intangible issues that affect the GHG statement. Examples include:

- a) control issues that erode the verifier's confidence in the reported data;
- b) poorly managed documented information;
- c) difficulty in locating requested information;
- d) noncompliance with regulations indirectly related to GHG emissions, removals or storage.

NOTE 2 The concept of materiality is used in designing the verification/validation and in assessing the evidence to come to a conclusion.

5.2 Verification/validation team selection

A team shall be selected that has the necessary skills and competences to undertake the verification/validation.

5.3 Verification/validation activities and techniques

Verifiers/validators shall use one or more of the following evidence-gathering activities and techniques in the verification/validation:

- a) observation;
- b) inquiry;
- c) analytical testing;
- d) confirmation;

- e) recalculation;
- f) examination;
- g) retracing;
- h) tracing;
- i) control testing;
- j) sampling;
- k) estimate testing;
- l) cross-checking;
- m) reconciliation.

5.4 Specific requirements

5.4.1 Verifier/validator communication

The verifier/validator, as soon as practicable, shall communicate requests for clarification, material misstatements and nonconformities to the responsible party. If there is a material adjustment to be made to the GHG statement, the verifier/validator shall communicate the need for the adjustment to the responsible party.

If, in the verifier's/validator's judgement, the responsible party does not respond appropriately within a reasonable period, the verifier/validator shall inform the client, if different from the responsible party.

If, in the verifier's/validator's judgement, the client does not respond appropriately within a reasonable period, the verifier/validator shall:

- a) issue a modified or adverse verification/validation opinion; or
- b) withdraw from the verification/validation.

The verifier/validator should communicate non-material misstatements to the responsible party.

5.4.2 Sufficiency of evidence

If the verifier/validator determines that there is insufficient information to support the GHG statement, the verifier/validator shall request additional information. If sufficient information cannot be obtained and the information is necessary for the verifier/validator to form a conclusion, the verifier/validator shall not proceed with the verification/validation and shall disclaim the issuance of an opinion.

5.4.3 Intentional misstatement

If a matter comes to the verifier's/validator's attention that causes the verifier/validator to believe in the existence of intentional misstatement or noncompliance by the responsible party with laws and regulations, the verifier/validator shall communicate the matter to the appropriate parties as soon as practicable.

5.4.4 Documented information

The verifier/validator shall maintain the following records:

- a) engagement terms;
- b) verification/validation plan;

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- c) evidence-gathering plan;
- d) who performed the evidence-gathering activities and when they were performed;
- e) collected evidence;
- f) requests for clarification, material misstatements and nonconformities arising from the verification/validation and the conclusions reached;
- g) communication with the responsible party on material misstatements;
- h) the conclusions reached and opinions by the verifier/validator;
- i) the name of the independent reviewer, the date of review and comments of the reviewer.

5.4.5 Process for completing a verification/validation

The process for completing a verification of GHG information based on the requirements in [Clause 6](#) is shown in [Figure 3](#).

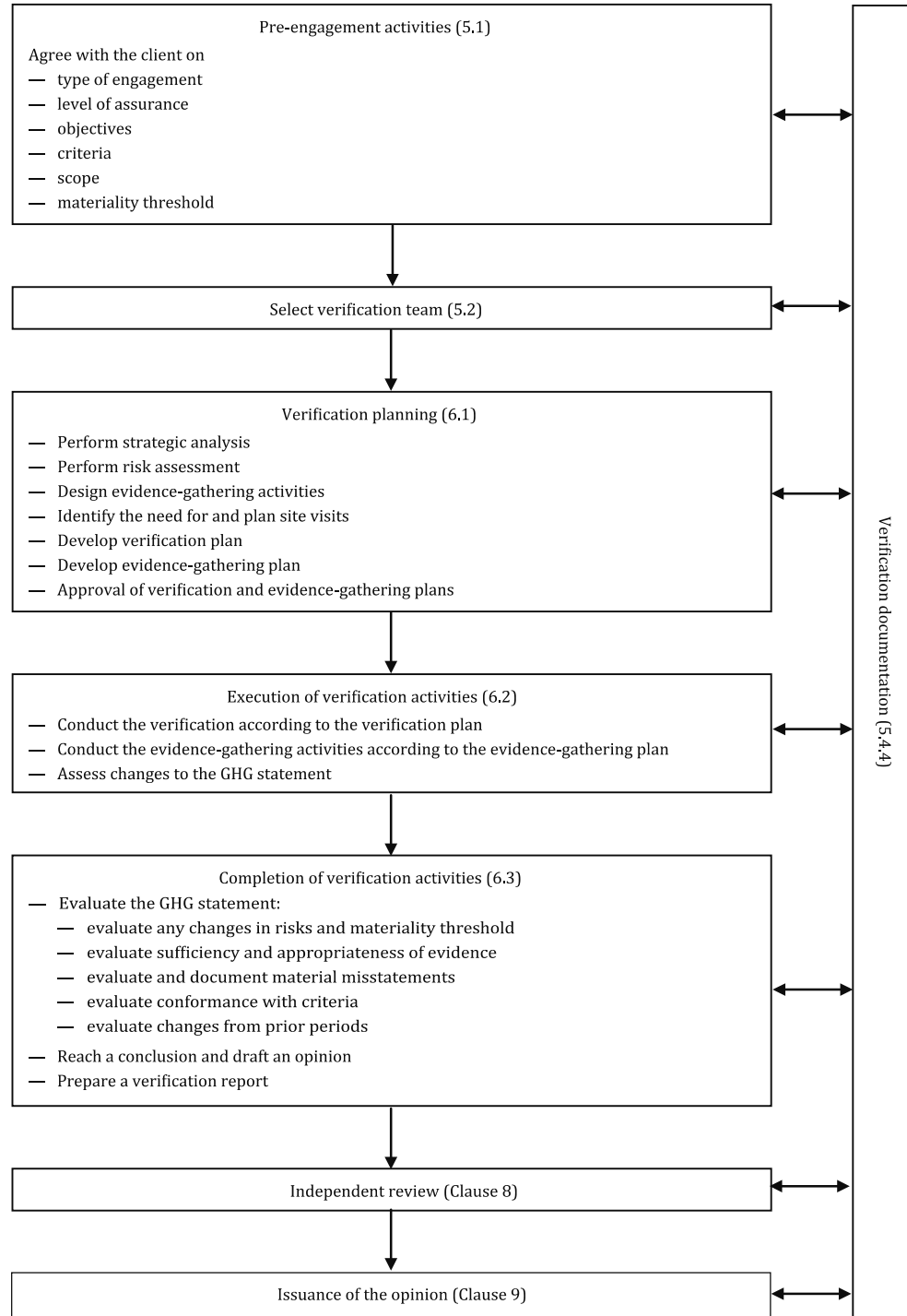


Figure 3 — Verification process

The process for completing a validation of GHG information based on the requirements in [Clause 7](#) is shown in [Figure 4](#).

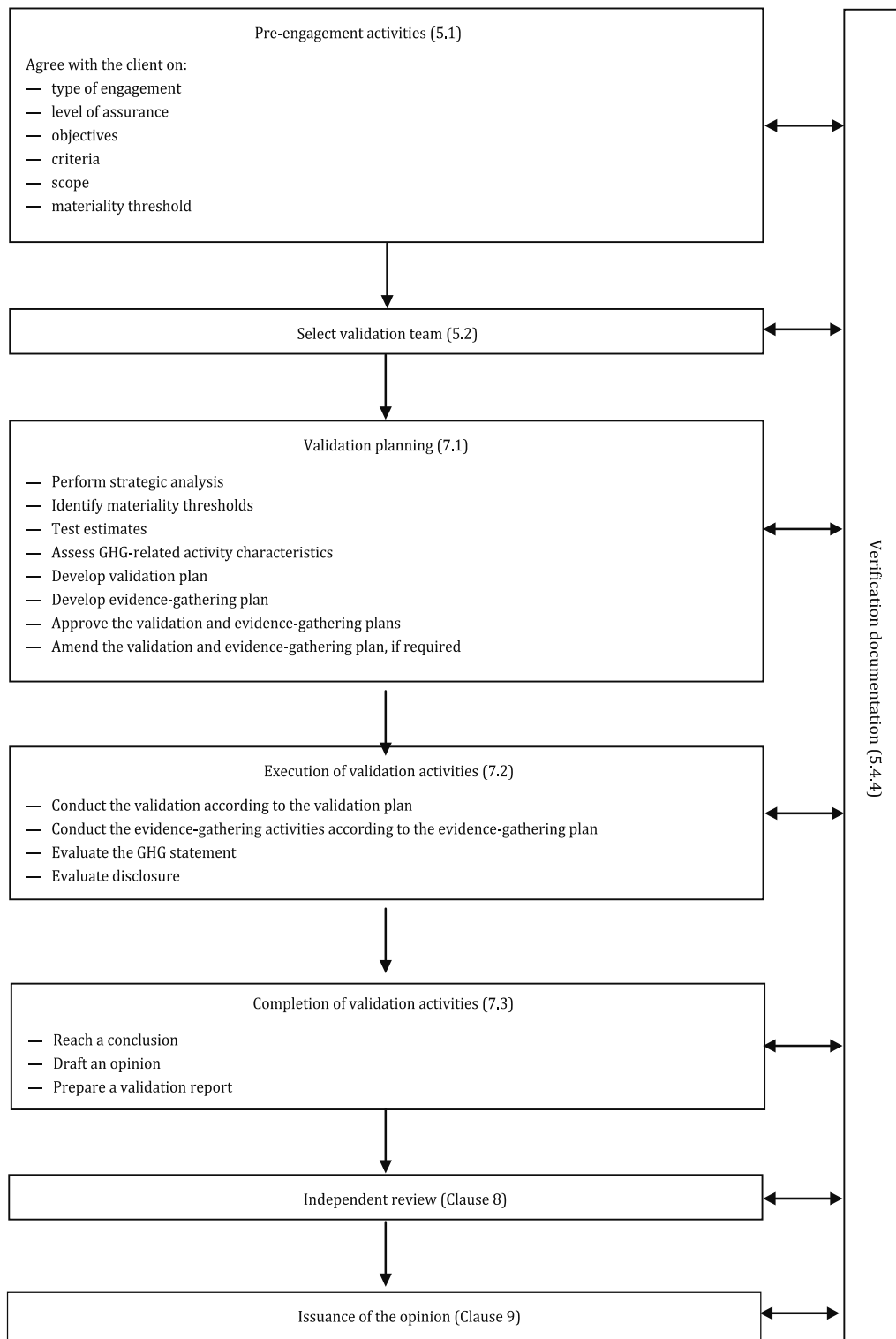


Figure 4 — Validation process

6 Verification

6.1 Planning

6.1.1 Strategic analysis

6.1.1.1 General

The verifier shall perform a strategic analysis to understand the activities and complexity of the organization, project or product, and to determine the nature and extent of the verification activities.

The strategic analysis shall consider:

- a) relevant sector information;
- b) the nature of operations of the facility(ies) or project or product;
- c) the requirements of the criteria, including applicable regulatory and/or GHG programme requirements;
- d) the intended user's materiality threshold, including the qualitative and quantitative components;
- e) the likely accuracy and completeness of the GHG statement;
- f) the scope of the GHG statement and related boundaries;
- g) the time boundary for data;
- h) emissions SSRs and their contribution to the overall GHG statement;
- i) changes in GHG emissions, removals and reservoir quantities from the prior reporting period;

NOTE 1 An example of a changing reservoir is a reservoir with a carbon stock that has changed during the considered time period.

- j) appropriateness of quantification and reporting methods, and any changes;
- k) sources of GHG information;
- l) data management information system and controls;
- m) management oversight of the responsible party's reporting data and supporting processes;
- n) the availability of evidence for the responsible party's GHG information and statement;
- o) the results of previous verifications;
- p) the results of sensitivity or uncertainty analysis (see ISO 14067);
- q) allocation approach;
- r) the type of GHGs (e.g. only CO₂ or also other gases);
- s) the applied monitoring methodology (i.e. direct measurement of GHGs or calculation of GHGs with indirect measurement of activity and calculation data);
- t) other relevant information.

NOTE 2 Some or all the information included above in a) through t) could be included in an organization's or project's monitoring plan.

The results of the strategic analysis shall be used in the risk assessment.

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6.1.1.2 Additional requirements for project GHG statement verification

The strategic analysis shall consider:

- a) the project plan;
- b) the results of the validation report;
- c) the requirements of the monitoring plan;
- d) the applied monitoring methodology;
- e) the monitoring report.

6.1.1.3 Additional requirements for product GHG statement verification

The strategic analysis shall consider:

- a) the results of the life cycle interpretation, including conclusions and limitations;

NOTE See ISO 14044:2006, 3.5.

- b) the functional or declared unit (see ISO 14067);
- c) the characteristics of unit processes;
- d) the life-cycle stages;
- e) cut-offs.

6.1.2 Risk assessment

6.1.2.1 General

The verifier shall perform a risk assessment of the GHG statement to identify the risk of a material misstatement or nonconformity with the criteria. The risk assessment shall consider the results of the materiality assessment.

The verifier shall assess the risk of misstatement and determine the nature and extent of evidence-gathering activities. The verifier shall determine performance materiality taking into account the intended user's quantitative materiality threshold. The verifier shall identify qualitative matters that may be material.

NOTE The performance materiality is a value that is set lower than what might be material to the intended user(s) to identify misstatements that, when aggregated, might be material.

6.1.2.2 Types of risks

Inherent risks, control risks and detection risks shall be identified and assessed for the GHG statement. These risks shall be identified:

- a) for emissions and removals: occurrence, completeness, accuracy, cut-off and classification;
- b) for storage: existence, rights and obligations, completeness, and accuracy and allocation.

6.1.2.3 Risk assessment considerations

The risk assessment shall consider the following:

- a) the likelihood of intentional misstatement in the GHG statement;
- b) the relative effect of emission sources on the overall GHG statement and materiality;

- c) the likelihood of omission of a potentially significant emission source;
- d) whether there are any significant emissions that are outside the normal course of business for the responsible party or that otherwise appear to be unusual;
- e) the nature of operations specific to an organization, facility, project or product;
- f) the degree of complexity in determining the organizational or project boundary or product system boundary and whether related parties are involved;
- g) any changes from prior periods;
- h) the likelihood of non-compliance with applicable laws and regulations that can have a direct effect on the content of the GHG statement;
- i) any significant economic or regulatory changes that might impact emissions and emissions reporting;
- j) selection, quality and sources of GHG data;
- k) the level of detail of the available documentation;
- l) the nature and complexity of quantification methods;
- m) the degree of subjectivity in the quantification of emissions;
- n) any significant estimates and the data on which they are based;
- o) the characteristics of the data management information system and controls;
- p) the apparent effectiveness of the responsible party's control system in identifying and preventing errors or omissions;
- q) any controls used to monitor and report of GHG data;
- r) the experience, skills and training of personnel.

6.1.2.4 Information sources for risk assessment

The verifier may perform an initial site visit to obtain data and information for the risk assessment.

The verifier may perform high-level analytical procedures to determine other areas of risk. These high-level analytical procedures may include:

- a) evaluation of changes in GHG emission intensity;
- b) evaluation of changes in GHG emissions, removals and storage over time;
- c) evaluation of expected GHG emissions, removals and storage against reported emissions.

NOTE "High-level" analytical procedures are performed at the statement level and can compare emissions to industry benchmarks.

6.1.2.5 Additional requirements for project GHG statement verification

The risk assessment shall consider the following:

- a) whether the current operating conditions reflect the assumptions, limitations, methods and uncertainties in the project plan or criteria;
- b) the complexity and data availability of the baseline calculations;
- c) a comparison of actual versus expected emission reductions or removal enhancements.

6.1.2.6 Additional requirements for product GHG statement verification

The risk assessment shall consider the following:

- a) the degree of product complexity and system boundaries;
- b) the contributions of emissions and removals at different lifestages;
- c) the allocation procedures;
- d) the availability of life-cycle results from comparable products;
- e) the representativeness of use and end of life scenarios;
- f) the reliability of any carbon footprint studies used;
- g) the results of any critical review.

6.1.2.7 Uses for risk assessment information

The risk assessment shall be used in developing the verification and evidence-gathering plans. Any input into the risk assessment shall be recorded.

The risk assessment output may address how the verification is planned with respect to the following:

- a) GHG emissions SSRs;
- b) boundaries;
- c) data management details;
- d) management controls.

6.1.3 Evidence-gathering activities

6.1.3.1 General

The verifier shall design evidence-gathering activities to collect sufficient and appropriate evidence upon which to base the conclusion. The verifier shall obtain more persuasive evidence the higher the risk of misstatement. The verifier shall consider inherent risk and detection risk in designing the evidence-gathering activities.

Irrespective of the risks identified, the verifier shall design and perform analytical procedures and tests for each type of material emission or removal.

The verifier shall develop evidence-gathering activities that determine whether the GHG statement conforms to the criteria, taking into account the principles of the standards or GHG programme that apply to the GHG statement.

6.1.3.2 Data trail

The verifier shall design evidence-gathering activities to determine the existence of data trails for material emissions, removals and/or storage.

6.1.3.3 GHG information system and controls

The extent of the assessment of the GHG information system and control shall depend on the results of the risk assessment.

Evidence-gathering activities that assess the design and effectiveness of the GHG information system and controls shall consider:

- a) the selection and management of the GHG data and information;
- b) processes for collecting, processing, consolidating and reporting GHG data and information;
- c) systems and processes that ensure the validity and accuracy of the GHG data and information;
- d) the design and maintenance of the GHG information system;
- e) systems, processes and personnel that support the GHG information system, including activities for ensuring data quality;
- f) the results of instrument maintenance and calibration;
- g) the results of previous verifications, if available and appropriate.

6.1.3.4 GHG data and information

The verifier shall design the evidence-gathering activities to test GHG data and information.

6.1.3.5 Data aggregation process

The verifier shall design evidence-gathering activities that relate to the data aggregation process, including reconciling the GHG statement with the underlying records and examining material adjustments made during the course of preparing the GHG statement.

6.1.3.6 Application of selected verification activities and techniques

6.1.3.6.1 Analytical testing

In designing and performing analytical testing the verifier shall consider:

- a) the ability of the analytical test to reduce or mitigate the risk identified;
- b) the reliability of the data to be analysed;
- c) the likelihood that the analytical testing will identify material misstatements.

If analytical testing identifies fluctuations or relationships that are inconsistent with other relevant information or that differ significantly from expectations, the verifier shall investigate such differences by obtaining additional evidence and performing other evidence-gathering activities.

6.1.3.6.2 Control testing

The verifier shall design and implement evidence-gathering activities to test the operating effectiveness of controls. If deviations are detected, the verifier shall assess whether the deviations affect the ability to rely on those controls, whether additional test of controls are necessary and whether other types of evidence-gathering activities need to be applied.

If the characteristics of the data are such that only tests of control can be used, the verifier shall design and implement evidence-gathering activities to establish the operating effectiveness of those controls. If deviations are detected, the verifier shall assess whether the deviations affect the ability to rely on those controls and whether additional tests of controls are necessary.

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6.1.3.6.3 Estimate testing

If the risk assessment has determined the estimated approach to have material impact on the overall GHG statement, the verifier shall evaluate:

- a) the appropriateness of the estimate methodology;
- b) the applicability of the assumptions in the estimate;
- c) the quality of the data used in the estimate.

The verifier shall develop evidence-gathering activities that test the operating effectiveness of the controls governing the development of the estimate. The verifier shall develop his/her own estimate or range to evaluate the responsible party's estimate.

The verifier shall evaluate whether the estimates, if any, comply with the criteria and whether the methods for making estimates:

- have been applied consistently from prior periods;
- have been changed from prior periods;
- are appropriate.

NOTE Estimates are used in GHG quantification in a variety of situations. For example, the amount of fuel used by a delivery van may not be known, but the distance travelled by the van can be estimated. Assumptions made about the fuel efficiency of the van and the distance travelled can be used to estimate GHG emissions.

6.1.3.6.4 Sampling

If sampling is used, the verifier shall consider the purpose of the evidence-gathering activities and the characteristics of the population from which the sample will be drawn when designing the sample.

6.1.3.6.5 Evaluation of ownership

The verifier shall assess whether the responsible party owns or has the right to claim emission reductions or removal enhancements expressed in the GHG statement.

6.1.4 Site visits

6.1.4.1 Site and facility selection

Site visits shall be planned and performed as appropriate to gather information needed to reduce verification risk and to aid in the design of evidence-gathering activities.

On the basis of the risk assessment, the verifier shall identify the need to visit sites and facilities, including the number and location of individual locations to be visited, considering:

- a) the results of the risk assessment and efficiencies in collecting evidence;
- b) the number and size of sites and facilities associated with the organization, project or product;
- c) the diversity of activities at each site and facility contributing to the GHG statement;
- d) the nature and magnitude of the emissions at different sites and facilities, and their contribution to the GHG statement;
- e) the complexity of quantifying emissions sources generated at each relevant site or facility;
- f) the degree of confidence in the GHG data management system;
- g) any risks identified through the risk assessment indicating the need to visit specific locations;

h) the results of prior verifications or validations, if any.

6.1.4.2 Circumstances requiring a site or facility visit

The verifier shall perform a site or facility visit under any of the following circumstances:

- a) an initial verification;
- b) a subsequent verification for which the verifier does not have knowledge of the prior verification activities and results;
- c) a verification where there has been a change of ownership of a site or facility and where the emissions, removals and storage of the site or facility are material to the GHG statement;
- d) when misstatements are identified during the verification that indicate a need to visit a site or facility;
- e) there are unexplained material changes in emissions, removals and storage since the previous verified GHG statement;
- f) the addition of a site or facility of GHG SSRs that are material to the GHG statement;
- g) material changes in scope or boundary of reporting;
- h) significant changes in the data management involving the specific site or facility.

The verifier may determine that the circumstances specified in a) through h) above do not require a site or facility visit based on the results of the risk assessment and evidence-gathering plan, and considering the results of any prior verification to the same site or facility.

If a verifier determines that a site or facility visit is not necessary, the verifier shall justify and document the rationale for the decision.

6.1.4.3 Activities to perform during site visits

The verifier shall perform evidence-gathering activities at the site or facility to assess, as determined by the risk assessment:

- a) operations and activities relevant to GHG SSRs;
- b) data management and control systems;
- c) physical infrastructure;
- d) equipment, such as measuring devices and instruments, to establish traceability to applicable calibration and monitoring information;
- e) types of equipment and supporting assumptions and calculations (e.g. verifying that manufacturer information used as a basis for emissions calculations matches installed equipment);
- f) processes and material flows that impact emissions;
- g) scope and boundaries;
- h) conformity with operational and data collection procedures;
- i) personnel activities that have a potential to impact materiality;
- j) sampling equipment and sampling methodologies;
- k) monitoring practices against the requirements established by the responsible party or specified in criteria;

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- l) calculations and assumptions made in determining the GHG data, emissions and, as applicable, emission reductions and removal enhancements;
- m) quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

6.1.5 Verification plan

The verifier shall develop a verification plan that describes verification activities and schedules. The verification plan shall be revised as necessary during the verification.

The verification plan shall address the following:

- a) the scope and objectives;
- b) identification of the verification team and their roles on the team;
- c) client/responsible party contact;
- d) schedule of verification activities;
- e) level of assurance;
- f) verification criteria;
- g) materiality;
- h) schedule for site visits.

The verifier shall communicate the verification plan to the responsible party and ensure that relevant responsible party's personnel are notified prior to the beginning of any site visit.

6.1.6 Evidence-gathering plan

The evidence-gathering plan shall be based on the results of the verifier's risk assessment. It shall be designed to lower the verification risk to an acceptable level. The evidence-gathering plan shall specify the type and extent of evidence-gathering activities. The evidence-gathering plan should not be communicated to the client or responsible party.

6.1.7 Approval of verification and evidence-gathering plans

The verification plan and evidence-gathering plan shall be approved by the team leader.

Amendments to the verification plan and evidence-gathering plan shall be approved by the team leader in the following circumstances:

- a) change in scope or timing of verification activities;
- b) change in evidence-gathering procedures;
- c) change in locations and sources of information for evidence-gathering;
- d) the identification during the verification process of new risks or concerns that could lead to material misstatements or nonconformities.

6.2 Execution

The verifier shall conduct the verification according to the verification plan and conduct the evidence-gathering activities according to the evidence-gathering plan.

Whenever the responsible party makes changes to the GHG statement as a result of requests for clarification, misstatements and nonconformities, the verifier shall assess these changes.

6.3 Completion

6.3.1 Evaluation of the GHG statement

6.3.1.1 Evaluation of changes

The verifier shall evaluate any changes in risks and materiality threshold that may have occurred over the course of the verification. The verifier shall evaluate whether any high-level analytical procedures applied remain representative and appropriate.

6.3.1.2 Evaluation of sufficiency and appropriateness of evidence

The verifier shall determine whether the evidence collected is sufficient and appropriate to reach a conclusion. If the verifier determines there is insufficient or inappropriate evidence, the verifier shall develop additional evidence-gathering activities.

6.3.1.3 Evaluation of material misstatements

The verifier shall evaluate and document material misstatements.

6.3.1.4 Evaluation of conformity with criteria

The verifier shall evaluate any nonconformity with the criteria.

For projects, when evaluating conformity, the verifier shall consider the following:

- a) the extent of the project's implementation, including the completeness of the installation of technology, equipment and measurement equipment;
- b) the operation of the project, including the operating characteristics when compared to the limitations and assumptions in the criteria;
- c) the monitoring plan and methodology, including any requirements in the criteria;
- d) changes in the monitoring plan, installed equipment or baseline;
- e) judgements of conservativeness that have a material effect on the GHG statement;
- f) the results of any validations.

6.3.1.5 Evaluation of changes from prior periods

The verifier shall determine whether any changes from prior periods that make the periods incomparable have been disclosed appropriately by the responsible party.

6.3.2 Conclusion and draft opinion

6.3.2.1 General

The verifier shall reach a conclusion based on the evidence gathered and draft a verification opinion.

NOTE For alternate names to verification opinion types, see [Table 1](#).

6.3.2.2 Unmodified opinion

In order to draft an unmodified opinion, the verifier shall ensure that:

- a) there is sufficient and appropriate evidence to support material emissions, removals or storage;

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- b) the criteria are applied appropriately for material emissions, removals or storage;
- c) the effectiveness of controls has been evaluated when the verifier intends to rely on those controls.

6.3.2.3 Modified opinion

In order to draft a modified opinion, the verifier shall ensure that there is no material misstatement at the level of the GHG statement.

When there is a departure from the requirements of the criteria or a scope limitation, the verifier shall decide what type of modification to the verification opinion is appropriate. In addition to materiality, the verifier shall consider:

- the degree to which the matter impairs the usefulness of the GHG statement;
- the extent to which the effects of the matter on the GHG statement can be determined;
- whether the GHG statement is, or could be understood to be, misleading even when read in conjunction with the verifier's opinion.

A modified verification opinion, when read in conjunction with the GHG statement, normally will serve adequately to inform the intended user(s) of any deficiencies or possible deficiencies in the GHG statement.

In this case, the non-material misstatement shall be:

- a) confined to specific elements, classifications or line items of the GHG statement;
- b) even if confined, not representative of a substantial portion of the GHG statement;
- c) not fundamental to the intended user's understanding of the GHG statement.

6.3.2.4 Adverse opinion

In order to draft an adverse opinion, the verifier shall conclude that:

- a) there is insufficient or inappropriate evidence to support an unmodified or modified opinion; or
- b) criteria are not appropriately applied for material emissions, removals or storage; or
- c) the effectiveness of controls cannot be determined when the verifier intends to rely on those controls.

If the responsible party does not correct any material misstatement or nonconformity in an agreed period of time, the verifier shall take this into consideration when reaching the conclusion.

6.3.2.5 Disclaiming the issuance of an opinion

In order to disclaim the issuance of an opinion, the verifier shall ensure that he/she has been unable to obtain sufficient appropriate evidence and can conclude that the possible effects on the GHG statement of undetected material misstatement(s) are material and pervasive.

6.3.3 Verification report

The verifier shall draft a verification report. A verification report shall include as a minimum:

- a) an appropriate title;
- b) an addressee;
- c) a statement that the responsible party is responsible for the preparation and fair presentation of the GHG statement in accordance with the criteria;

- d) a statement that the verifier is responsible for expressing an opinion on the GHG statement based on the verification;
- e) a description of the verification evidence-gathering procedures used to assess the GHG statement;
- f) the verification opinion;
- g) the date of the report;
- h) the verifier's location;
- i) the verifier's signature;
- j) a summary of the GHG statement;
- k) reference to the verification criteria;
- l) verification scope.

7 Validation

7.1 Planning

7.1.1 Strategic analysis

The validator shall have a sufficient understanding of the GHG-related activity and its relevant sector information to plan and conduct the validation. This shall enable the validator to:

- identify the types of potential material misstatements and their likelihood of occurrence;
- select the evidence-gathering procedures that will provide the validator with a basis for his/her assessment and conclusions.

The strategic analysis shall consider:

- a) relevant sector information;
- b) the nature of operations;
- c) the requirements of the criteria, including applicable regulatory and/or GHG programme requirements;
- d) the intended user's materiality threshold, including the qualitative and quantitative components;
- e) the likely accuracy and completeness of the GHG statement;
- f) the proper disclosure of the GHG statement;
- g) the scope of the GHG statement and related boundaries;
- h) the time boundary for data;
- i) emissions SSRs and their contribution to the overall GHG statement;
- j) appropriateness of quantification and reporting methods, and any changes;
- k) sources of GHG information;
- l) data management information system and controls;
- m) management oversight of the responsible party's reporting data and supporting processes;
- n) the availability of evidence for the responsible party's GHG information and statement;

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- o) the results of sensitivity or uncertainty analysis;
- p) other relevant information.

7.1.2 Materiality thresholds

The validator shall identify materiality thresholds for the purposes of concluding on the GHG statement. The validator shall identify qualitative matters that may be material.

NOTE See also [5.1.7](#).

7.1.3 Estimate testing

The validator shall evaluate whether the assumptions applied comply with the criteria and whether the estimates of future values are appropriate.

The validator shall assess:

- a) the appropriateness of the estimate methodology;
- b) the applicability of the assumptions in the estimate;
- c) the quality of the data used in the estimate.

The validator shall develop validation evidence-gathering procedures that test the operating effectiveness of the controls over how the estimate was done. The validator shall develop his/her own estimate or range to evaluate the responsible party's estimate.

7.1.4 Assessment of GHG-related activity characteristics

7.1.4.1 General

The validator shall develop evidence-gathering activities that assess the following characteristics of the GHG-related activity:

- recognition;
- ownership;
- GHG boundaries;
- baseline selection;
- activity measurements;
- secondary effects;
- quantification methodologies and measurements;
- GHG information system and controls;
- functional equivalence;
- calculation of GHG statement;
- future estimates;
- uncertainty;
- sensitivities.

7.1.4.2 Recognition

The validator shall determine whether the intended user(s) recognize the GHG-related activity. In assessing recognition, the validator shall:

- a) determine whether the GHG-related activity is acceptable to the intended user, including whether the GHG-related activity meets any eligibility criteria specified by the intended user;
- b) assess whether there are geographical or temporal restrictions specified by the intended user(s) and whether the GHG-related activity complies with these restrictions;
- c) assess whether the GHG-related activity is real, quantifiable, verifiable, permanent and enforceable;
- d) after the confirmation of the calculations used in the GHG statement, re-assess whether the GHG-related activity will still be recognized.

NOTE Eligibility criteria specified by the intended user(s) can include additionality.

7.1.4.3 Ownership

The validator shall assess whether the responsible party owns or has the right to claim emission reductions or removal enhancements expressed in the GHG statement.

7.1.4.4 GHG boundary

The validator shall assess whether the boundaries as set by the responsible party are appropriate. In assessing the GHG boundaries, the validator shall assess the scope of the boundaries for the GHG-related activity to ensure it contains all relevant SSRs.

7.1.4.5 Baseline scenario selection

For GHG-related activities that assert emission reductions or removal enhancements, the validator shall assess whether the baseline is the most appropriate, plausible and complete hypothetical scenario. In assessing the baseline selection, the validator shall:

- a) determine whether the baseline determined is recognized by the intended user;
- b) assess whether the baseline is established using a credible, documented and repeatable process;
- c) assess whether the baseline is appropriate for the GHG-related activity, for the period referenced in the GHG statement;
- d) assess the baseline selection, including how conservativeness, uncertainty, common practice and the operating environment affect the selection.

7.1.4.6 Activity measurements

The validator shall assess the designed operational conditions and the associated activity levels used in the GHG quantification methodologies for the GHG-related activity to determine how they will produce accurate, complete and conservative estimates.

7.1.4.7 Secondary effects

For GHG-related activities that assert emission reductions or removal enhancements, the validator shall assess the GHG-related activity to determine if material economic effects during the GHG statement period will change emissions outside the GHG-related activity boundary. If the GHG-related activity is required to account for secondary effects, the validator shall assess the completeness and accuracy of these adjustments.

NOTE Secondary effects are sometimes called "leakage".

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7.1.4.8 Quantification methodologies and measurements

The validator shall assess whether the selected quantification methodologies and associated measurements or monitoring are acceptable to the intended user. In assessing the quantification methodologies and measurements, the validator shall:

- a) assess whether these quantification methodologies and associated measurements or monitoring are of acceptable accuracy and reliability;
- b) assess whether these quantification methodologies and associated measurements or monitoring are conservative;
- c) assess whether these quantification methodologies and associated measurements or monitoring have been appropriately applied;
- d) note for disclosure and materiality purposes when operational ranges, operational conditions or assumptions have not been met.

NOTE Quantification methodologies refer to the method of estimating GHG emissions and include calculations, models, mass-balance and their associated indirect measurements, and direct measurements, etc.

7.1.4.9 GHG information system and controls

The validator shall assess the GHG information management system and procedures of the GHG-related activity to determine whether they can be relied upon during verification. In assessing data management, the validator shall:

- a) identify all measured and monitored data and assess whether it corresponds with the calculations, including the measured and monitored data for the GHG-related activity;
- b) identify and confirm the acceptability of all additional information that is used in the GHG outcome calculations including, but not exclusive of, emission factors, conversions and global warming potentials;
- c) assess whether there is sufficient and appropriate planned record keeping to connect the measurements to the reporting;
- d) identify key points in the data management process that have inherently higher risks of misreporting and assess the responsible party's data controls at the key risk points;
- e) identify responsibilities for the data and GHG information management system and assess whether appropriate segregation of duties has occurred and appropriate levels of responsibility and authority have been assigned;
- f) assess whether the data collection and control operation frequencies are appropriate;
- g) assess whether the backup and retrieval systems are sufficiently robust;
- h) assess whether the content of the GHG statement and who it is distributed to are appropriate;
- i) assess whether the data controls and GHG information management system meet the requirements of the intended user.

7.1.4.10 Functional equivalence

For GHG-related activities that assert emission reductions or removal enhancements, the validator shall assess whether the project and baseline are functionally equivalent. In assessing functional equivalence, the validator shall:

- a) assess both quantitative and qualitative aspects of functional equivalence;
- b) identify and document the functional unit used for the quantitative assessment;

- c) assess the comparability of the scope of the GHG-related activity boundaries.

7.1.4.11 Calculation of GHG statement

The validator shall confirm the calculations used in the GHG statement. In confirming the calculations, the validator shall:

- a) confirm the correct application of calculations (e.g. emission factors);
- b) confirm the correct application of conversion of measurement units and global warming potentials;
- c) confirm the calculations have been performed in accordance with the criteria.

7.1.4.12 Future estimates

If applicable, the validator shall evaluate the future estimates associated with the GHG statement. In evaluating forecasts or projections, the validator shall assess:

- a) the proposed approach and assumptions inherent in the projection;
- b) the applicability of scope of the projection to the proposed GHG-related activity;
- c) the sources of data and information used in the projection, including their appropriateness, completeness, accuracy and reliability.

For GHG-related activities that assert emission reductions or removal enhancements, the validator shall assess the comparability between the baseline and the proposed project, including the consistency of assumptions and boundaries across the GHG statement period.

7.1.4.13 Uncertainty

The validator shall assess whether the uncertainty associated with the GHG statement affects disclosure or the ability of the validator to arrive at a conclusion. In assessing uncertainty, the validator shall:

- a) identify uncertainties that are greater than expected;
- b) assess the effect of the identified uncertainties on the GHG statement;
- c) determine the appropriate course of action given the uncertainty.

7.1.4.14 Sensitivity

The validator shall identify assumptions with high potential for change and assess whether these changes are material to the GHG statement.

7.1.5 Validation plan

The validator shall develop a validation plan that addresses the following:

- a) scope and objectives;
- b) identification of the validation team and the roles of team members;
- c) client/responsible party contact;
- d) schedule of validation activities;
- e) validation criteria;
- f) materiality;
- g) schedule for site visits, if any.

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The validator shall communicate the validation plan to the responsible party and ensure that relevant responsible party personnel are notified prior to the beginning of any site visit.

7.1.6 Evidence-gathering plan

The validator shall design evidence-gathering activities to collect sufficient and appropriate evidence for each characteristic of the GHG-related activity to support his/her conclusion. Except in cases where the validator chooses to examine all evidence, the validator shall use a risk-based process to identify evidence to be collected for each characteristic of the GHG-related activity. The validator shall use any validation activities or techniques in designing the evidence-gathering plan including site visits.

7.1.7 Approval of validation and evidence-gathering plans

The validation plan and evidence-gathering plan shall be approved by the team leader.

Amendments to the validation plan and evidence-gathering plan shall be approved by the team leader in the following circumstances:

- a) change in scope or timing of validation activities;
- b) change in evidence-gathering procedures;
- c) change in locations and sources of information for evidence-gathering;
- d) the identification during the validation process of new risks or concerns that could lead to material misstatements or nonconformities.

7.1.8 Amendments to validation and evidence-gathering plans

If evidence collected indicates a material misstatement(s) or identifies a nonconformity with the criteria, the validator shall modify the validation plan and evidence-gathering plan, as required.

7.2 Execution

7.2.1 General

The validator shall conduct the validation according to the validation plan and the evidence-gathering activities according to the evidence-gathering plan.

7.2.2 Evaluation of the GHG statement

The validator shall use his/her assessment and evaluations and the evidence gathered to assess the responsible party's GHG statement against validation criteria. The validator shall assess, individually and in the aggregate, whether uncorrected misstatements are material to the GHG statement. The validator shall assess conformity with the criteria and re-assess recognition.

7.2.3 Proper disclosure

The validator shall evaluate the GHG statement for proper disclosure and shall ensure that material disclosures occur. In assessing proper disclosure, the validator shall:

- a) assess whether the GHG statement is accurate and complete;
- b) assess whether the disclosure is a fair reflection of the GHG-related activity;
- c) assess whether the disclosure contains unintended bias;
- d) assess whether the disclosure addressed the intended users' requirements and needs.

7.3 Completion

7.3.1 General

The validator shall reach a conclusion based on his/her evaluation of the GHG statement and whether the GHG statement has been properly disclosed. If the responsible party does not correct any material misstatement or nonconformity in an agreed period of time, the validator shall take this into consideration when reaching the conclusion.

7.3.2 Opinion

7.3.2.1 General

The validator shall draft a validation opinion based on the evidence gathered during the validation and choose one of the options in [7.3.2.2](#) to [7.3.2.5](#).

NOTE For alternate names to validation opinion types, see [Table 1](#).

7.3.2.2 Unmodified opinion

In order to draft an unmodified opinion, the validator shall ensure:

- a) there is sufficient and appropriate evidence to support the future estimate;
- b) the criteria meet the needs of the intended user;
- c) the criteria are appropriately applied for material emissions, removals or storage.

7.3.2.3 Modified opinion

In order to draft a modified opinion, the validator shall ensure that there is no material misstatement at the level of the GHG statement.

When there is a departure from the requirements of the criteria or deficiencies in the assumptions used to develop future estimates, the validator shall decide what type of modification to the validation opinion is appropriate. In addition to materiality, the validator shall consider:

- the degree to which the matter impairs the usefulness of the GHG statement;
- the extent to which the effects of the matter on the GHG statement can be determined;
- whether the GHG statement is, or could be understood to be, misleading even when read in conjunction with the validator's opinion.

A modified validation opinion, when read in conjunction with the GHG statement, normally will serve adequately to inform the intended user(s) of any deficiencies or possible deficiencies in the GHG statement.

7.3.2.4 Adverse opinion

In order to draft an adverse opinion, the validator shall conclude:

- a) there is insufficient or inappropriate evidence to support a modified or unmodified opinion; or
- b) criteria are not appropriately applied for material emissions, removals or storage; or
- c) the effectiveness of controls cannot be determined when the validator intends to rely on those controls.

7.3.2.5 Disclaiming the issuance of an opinion

In order to disclaim the issuance of an opinion, the validator shall ensure that he/she has been unable to obtain sufficient appropriate evidence and concludes that the possible effects on the GHG statement of undetected material misstatement(s) are material and pervasive.

7.3.3 Validation report

The validator shall draft a validation report. The validation report shall include as a minimum:

- a) an appropriate title;
- b) an addressee;
- c) a statement that the responsible party is responsible for the preparation and fair presentation of the GHG statement in accordance with the criteria;
- d) a statement that the validator is responsible for expressing an opinion on the GHG statement based on the validation;
- e) a description of the validation evidence-gathering procedures used to assess the GHG statement;
- f) the validation opinion;
- g) the date of the report;
- h) the validator's location;
- i) the validator's signature;
- j) description of the validated baseline, or reference to it;
- k) projected emission reductions or removal enhancements;
- l) validation scope.

8 Independent review

An independent reviewer(s) shall be selected that is competent and different from the persons who conducted the verification/validation.

An independent review shall be completed before the opinion is issued. The independent review may be conducted during the verification/validation process to allow significant issues identified by the independent reviewer to be resolved before the opinion is issued.

The independent reviewer(s) shall evaluate:

- a) the appropriateness of team competencies;
- b) whether the verification/validation has been designed appropriately;
- c) whether all verification/validation activities have been completed;
- d) significant decisions made during the verification/validation;
- e) whether sufficient and appropriate evidence was collected to support the opinion;
- f) whether the evidence collected supports the opinion proposed by the verification/validation team;
- g) the GHG statement and the verification/validation opinion;

- h) whether the verification/validation was performed according to this document, including whether:
- 1) the risk assessment, verification/validation plan and evidence-gathering plan address the objective, scope and level of assurance;
 - 2) for verification:
 - i) the evidence-gathering activities address the risks identified;
 - ii) a data trail has been established for material emissions, removals and storage;
 - 3) for validation:
 - i) the evidence-gathering activities address the GHG-related activity characteristics;
 - 4) verification/validation team decisions are supported by sufficient and appropriate evidence;
 - 5) any restatements have been adequately assessed;
 - 6) the GHG statement is in accordance with the criteria;
 - 7) significant issues have been identified, resolved and documented.

NOTE Significant issues are misstatements and nonconformities identified by the verification/validator team that could affect the verifier/validator opinion.

The independent reviewer shall communicate with the verification/validation team when the need for clarification arises. The verification/validation team shall address concerns raised by the independent reviewer.

The independent review results shall be documented.

9 Issuance of opinion

9.1 General

The verifier or validator shall make a decision whether to issue an opinion or to disclaim the issuance of an opinion.

9.2 Types of opinions

After reaching a decision to issue an opinion, the verifier/validator shall issue an opinion of one of the following types:

- a) unmodified;
- b) modified;
- c) adverse.

NOTE See [6.3.2](#) and [7.3.2](#) for requirements associated with the drafting of opinions.

[Table 1](#) provides different terms used by verifiers and validators to describe opinion types for different programmes.

Table 1 — Verification/validation opinion name variants

Programme A	Programme B	Programme C	Programme D	Programme E
Unmodified	Unqualified	Positive	Satisfactory	Positive
Modified	Qualified	Qualified positive	Satisfactory with comments	
Adverse	Adverse	Adverse	Unsatisfactory	Negative
Disclaim the issuance of an opinion				

9.3 Contents of opinion

The opinion shall contain:

- a) identification of the GHG-related activity (e.g. organization, project, product);
- b) identification of the GHG statement, including the date and period covered by GHG statement;
- c) identification of the responsible party and a statement that the GHG statement is the responsibility of the responsible party;
- d) identification of the criteria used to compile and assess the GHG statement;
- e) a declaration that the verification or validation of the GHG statement was conducted in accordance with this document;
- f) the verifier's conclusion including level of assurance, if applicable;
- g) the validator's conclusion;
- h) the date of the opinion.

The opinion may contain statements that limit the liability of the verifier or validator.

For a modified opinion, the opinion shall contain a description of the reason for the modification and place this description before the verifier's or validator's conclusion.

The verifier or validator shall state the reasons for an adverse opinion.

When the issuance of an opinion is disclaimed, the verifier or validator shall state the reasons for the decision.

Where the GHG statement includes a forecast of future emission reductions/removals, the GHG opinion shall explain that actual results may differ from the forecast as the estimate is based on assumptions that may change in the future.

NOTE [Annex D](#) provides examples of verification and validation opinions, including the use of limitation statements.

10 Facts discovered after the verification/validation

The verifier or validator shall obtain sufficient appropriate evidence and identify relevant information up to the date of the verification or validation opinion.

If facts or new information that could materially affect the verification or validation opinion are discovered after this date, the verifier or validator shall take appropriate action, including communicating the matter as soon as practicable to the responsible party, the client and the GHG programme.

The verifier or validator may also communicate to other interested parties the fact that reliance of the original opinion may now be compromised given the discovered facts or new information.

Annex A (normative)

Limited level of assurance verifications

A.1 General

A limited level of assurance verification has a higher acceptable verification risk than a reasonable level of assurance verification (see [Figure A.1](#)).

A verifier does not design and apply as many evidence-gathering activities or pursue evidence trails to the same depth as in a reasonable assurance engagement. This is possible because there is an underlying assumption that the control environment and controls are reliable. A limited level of assurance verification allows the verifier to conclude that nothing has come to his/her attention to cause him/her to believe that the GHG statement is misstated (negative form of conclusion).

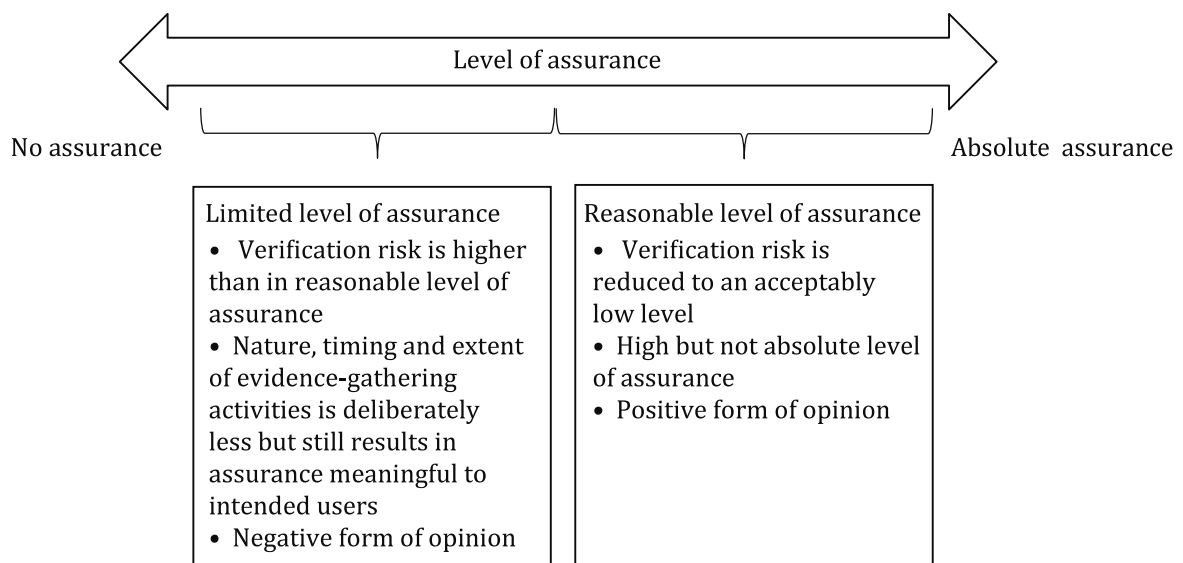


Figure A.1 — Levels of assurance

A.2 Specification of level of assurance

The level of assurance shall be specified prior to the start of the verification because the level of assurance establishes the nature, extent and timing (the design) of the evidence-gathering activities.

A verifier shall not change levels of assurance once an engagement has begun. If a change in level of assurance is justified the verifier shall:

- document the reasons for the change;
- start a new verification at a different level of assurance.

An insufficiency in the criteria or evidence cannot be addressed by changing the level of assurance. Insufficiencies of criteria shall be addressed by communicating with the creator of the criteria. Inadequacy or insufficiency of evidence shall be addressed in the same manner in limited assurance engagements as they are in engagements performed at a reasonable level of assurance (see [5.4.2](#)).

A.3 Limited level of assurance verification process

A.3.1 General

The limited level of assurance verification follows the same general process as the reasonable level of assurance verification with the following clarifications.

A.3.2 Strategic analysis

Limited level of assurance verifications do not require a detailed assessment of the design, existence and effectiveness of controls because of the underlying assumption that the controls are reliable.

A.3.3 Risk assessment

For a limited level of assurance, the risk assessment is performed on the statement as a whole and is not as detailed as a reasonable level of assurance engagement. Limited level of assurance verifications do not require that the risks identified in the risk assessment be identified at the detailed level of:

- a) occurrence, completeness, accuracy, cut-off and classification for emissions and removals; or
- b) existence, rights and obligations, completeness, and accuracy and allocation for storage.

The verifier shall categorize risks as inherent, control and detection risks.

A.4 Evidence-gathering activities

A.4.1 General

The verifier shall design evidence-gathering activities that address all items in the GHG statement and focus on areas where material misstatements are likely to arise. If the verifier becomes aware of potential material misstatements, the verifier shall design appropriate evidence-gathering activities to be able to reach a conclusion about those potential material misstatements.

NOTE Limited level of assurance verifications consist primarily of inquiry and analytical procedures to obtain sufficient and appropriate evidence.

A.4.2 GHG system and controls

The verifier may design evidence-gathering activities for the GHG systems and controls as indicated by the risk assessment.

A.4.3 Data aggregation process

A.4.3.1 General

The verifier shall obtain, through inquiry, an understanding of material changes made during the course of preparing the GHG statement. The verifier may design additional evidence-gathering activities to support the results of the inquiry.

A.4.3.2 Application of verification activities and techniques

A.4.3.2.1 Analytical testing

In designing analytical tests, the verifier shall identify an expectation of quantities and ratios but this expectation does not need to be sufficiently precise to identify potential material misstatements.

If the results of the analytical tests are inconsistent with other information or the verifier's expectations, these results may be resolved through inquiry. The verifier may design additional evidence-gathering activities to support the results of the inquiry.

NOTE Analytical testing is designed for the GHG statement as a whole and does not need to be designed for the occurrence, completeness, accuracy, cut-off and classification for emissions and removals; or the existence, rights and obligations, completeness, and accuracy and allocation for storage unless indicated by the risk assessment or evidence collected during the verification.

A.4.3.2.2 Control testing

The verifier may design additional evidence-gathering activities to test controls as indicated by the risk assessment.

A.4.3.2.3 Sampling

In limited level of assurance verifications, since the risk identification is at the level of the GHG statement as a whole, the sampling is conducted at a higher or in a more aggregate form. The verifier shall design sampling appropriate to the verification risk.

A.4.3.2.4 Site visits

If the verifier includes a site visit in the verification plan, the verifier shall perform activities at the site or facility to assess, as applicable:

- a) operations and activities relevant to GHG SSRs;
- b) physical infrastructure;
- c) processes and material flows that impact emissions;
- d) scope and boundaries;
- e) calculations and assumptions made in determining the GHG data, emissions and, as applicable, emission reductions and removal enhancements.

A.4.3.2.5 Estimate testing

The verifier shall evaluate whether the estimates comply with the criteria. As indicated by the risk assessment, the verifier may design additional evidence-gathering activities that:

- a) evaluate the appropriateness of the estimate methodology, the applicability of the assumptions in the estimate and the quality of the data used in the estimate;
- b) test the operating effectiveness of the controls governing the development of the estimate; or
- c) develop his/her own estimate or range to evaluate the responsible party's estimate.

A.4.3.3 Verification plan

In the limited level of assurance, the facility or site that conducts the aggregation for the GHG statement shall be visited, unless the verifier has prior knowledge of the facility or site's aggregation process. Other facility or site visits shall be determined based on the risk assessment and designed evidence-gathering activities.

A.4.3.4 Evidence-gathering plan

In reasonable level of assurance verifications, the evidence-gathering plan is continually updated until sufficient and appropriate evidence is gathered to allow the verifier to reach a conclusion. In

limited level of assurance verifications, the verifier updates the evidence-gathering plan primarily for potentially material misstatements.

A.5 Issuance of opinion

The opinion shall include a statement that the verification activities applied in a limited level of assurance verification are less extensive in nature, timing and extent than in a reasonable level of assurance verification. The opinion shall be expressed in the negative form.

NOTE The following text is an example of a negative form of opinion.

Based on the process and procedures conducted, there is no evidence that the GHG statement:

- is not materially correct and is not a fair representation of GHG data and information;
- has not been prepared in accordance with related International Standards on GHG quantification, monitoring and reporting, or to relevant national standards or practices.

Annex B **(informative)**

Considerations for verification

B.1 Initial design

Reasonable assurance is the higher of two levels of assurance generally offered by verification bodies. It provides a high level of confidence to intended users of verification opinions that the stated information is accurate and complete. Put another way, a verifier who reaches a reasonable level of assurance must have considered a sufficient amount of evidence to reduce the risk of material misstatement to an acceptably low level. Once this level of assurance has been reached, the verifier is justified in expressing his or her conclusions in a positive way (i.e. to conclude that the responsible party's statement of GHG information "is fairly stated").

Limited assurance provides a lower level of confidence to intended users of verification opinions. A verifier typically accepts an engagement at the limited level of assurance only after she or he has previously performed a verification at the reasonable level of assurance. Having a prior understanding of the organization and its data management systems and controls enables the verifier to plan a subsequent limited assurance engagement.

Verification risk is higher for a limited level of assurance, not because the inherent or control risk is different, but because the detection risk is higher because the level of detail in the verification evidence-gathering activities is lower. Verifiers offering a limited level of assurance expect the responsible party will have fairly rigorous control over their data and information to ensure that the control risk is sufficiently low or have inventory characteristics that have low inherent risks to allow for a design of the evidence-gathering activities for an acceptable verification risk.

Using a limited level of assurance is cost effective for providing assurance on interim reporting periods. A limited and a reasonable level of assurance are generally combined such that the limited level of assurance is provided on GHG statements that occur between significant reports that have a reasonable level of assurance. For example, a GHG programme may require a reasonable level of assurance on reports that are issued every five years and permit a limited level of assurance on reports that are issued in between these times.

A limited level of assurance generally should not be used at the beginning of an assurance programme because the verifier needs to assess the rigor of responsible party's data management systems and ability to manage the control risk.

B.2 Materiality assessment

Materiality is applied in the same manner no matter the level of assurance.

B.3 Risk assessment

B.3.1 General

In an engagement performed at the reasonable level of assurance, the verifier identifies and assesses risks of material misstatement for the GHG statement as a whole, and as well for occurrence, completeness, accuracy, cut-off and classification of material types of emissions and removals. The risks

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of a misstatement as a whole are risks that are not identifiable with a specific emission or removal, but result from circumstances that increase the risk more generally, such as:

- a) inadequate or poorly documented procedures or adherence to procedures for collecting data, quantifying emissions and preparing GHG statements;
- b) lack of staff competence in procedures for collecting data, quantifying emissions and preparing GHG statements;
- c) lack of management involvement in preparing GHG statements;
- d) failure to identify all material emissions and removals;
- e) inconsistent preparation of information from prior periods without disclosure;
- f) misleading presentation of material, such as highlighting favourable data or trends;
- g) inconsistent quantification methods or reporting between sites, division or other segments of the GHG statement;
- h) errors in unit conversions;
- i) inadequate disclosures of uncertainties and assumptions;
- j) inappropriate or out-of-date global warming potentials;
- k) management override of internal controls.

In engagements performed at the reasonable level of assurance, types of emissions should be reported by category in accordance with criteria. Each type of emission or removal refers to the kind of emission or removal and the data control system that controls that data because in the risk assessment the verifier assesses both the inherent and control risks. For example, stationary combustion emissions may not be a sufficient division of type because the operational stationary combustion devices may have a different data management system than the back-up stationary combustion devices or fuels may have fluctuating emission factors.

B.3.2 Classifying risks for types of emissions or removals

The risks for each type of emission or removal can be further divided into the risks of:

- a) occurrence: the emissions and removals recorded have occurred and pertain to the organization or project or product;
- b) completeness: all the emissions and removals that should have been recorded have been recorded;
- c) accuracy: the emissions and removals have been measured and quantified appropriately;
- d) cut-off: the emissions and removals have been reported in the correct time period;
- e) classification: the emissions have been recorded as the proper type.

B.3.3 Considerations for engagements at the limited level of assurance

When verifying at the limited level of assurance, the verifier should identify and assess these risks for the GHG statement as a whole, and for material types of emissions and removals. There is no requirement to further divide risk categories into occurrence, completeness, accuracy, cut-off and classification.

In a limited assurance engagement, the verifier should consider the reasons for the risks and obtain more persuasive evidence when the risk is higher.

B.4 Evidence-gathering plan

The depth of the evidence-gathering activities is less at the limited level of assurance, in particular, tests of control, analytical procedures and the assessment of estimates.

At a reasonable level of assurance, there is an expectation, but not a requirement, that the verifier will use tests of control in the evidence-gathering plan.

At a limited level of assurance, tests of controls are optional.

B.5 Analytical procedures

When designing and performing analytical procedures for use in a reasonable level of assurance engagement, the verifier should determine the likelihood the analytical procedures will identify material misstatements. In order to do so, the designed procedures shall be of sufficient precision to detect material misstatements. If analytical procedures identify fluctuations or relationships that are inconsistent with other relevant information or that differ significantly from expectations, the verifier should investigate such differences by obtaining additional evidence and performing other evidence-gathering activities.

When verifying at the limited level of assurance, analytical procedures do not have to be precise enough to identify likely material misstatements. Instead, inquiry, depending on the responses, may provide sufficient follow-up evidence.

B.6 Estimates

In reasonable level of assurance engagements, the verifier should design evidence-gathering activities and develop verification evidence that test the operating effectiveness of the controls over how estimates were made. The verifier should develop his/her own point estimate or estimate range to evaluate the responsible party's estimate.

In an engagement performed at the limited level of assurance, tests of the operating effectiveness of controls over how an estimate was made may not be carried out, and the verifier may not develop his/her own point estimate or estimate range to evaluate the responsible party's estimate.

B.7 Aggregation of the GHG statement

In a reasonable level of assurance engagement, the verifier should include evidence-gathering activities that relate to the aggregation process, including examining material adjustments made during the course of preparing the GHG statement.

In a limited level of assurance engagement, inquiry, depending on the response, may provide sufficient evidence that any material adjustments were appropriate.

B.8 Determining further evidence-gathering activities

In a reasonable level of assurance engagement, the verifier should design sufficient and appropriate evidence-gathering activities to lower the verification risk to an acceptable level. The evidence-gathering plan should be iterated continually until this state is complete.

In a limited level of assurance engagement, the verifier establishes the initial evidence-gathering plan and resolves any matters that come to his or her attention by either concluding that the matter is or is not material to the GHG statement. Although there is some iteration, it is usually significantly less than in engagements performed at the reasonable level of assurance.

B.9 Interpretations of conservativeness

Conservativeness is a principle that is used to choose between options that are similar in completeness and accuracy. Consequently, the principles of completeness and accuracy always apply and the principle of conservativeness may apply. Additionally, the principles of completeness and accuracy apply before applying the principle of conservativeness.

Conservativeness is interpreted differently depending on the circumstances. For an organizational inventory that is attempting to meet a target, the overstatement of the inventory would be conservative. For an organization that is establishing a base year, an overstatement of the inventory would be conservative. For a project that is claiming emission reductions for monetary value, the understatement of the baseline and overstatement of the project emissions would be conservative.

NOTE This clause is also applicable to validation.

Annex C (informative)

Agreed-upon procedures (AUP)

C.1 General

Verification and validation of GHG statements developed in accordance with ISO 14064-1, ISO 14064-2 and ISO 14067 are performed in accordance with [Clauses 5](#) to [10](#) of this document. AUP shall not be used for this purpose.

A verifier can perform an AUP engagement if the intended user(s) agree on the evidence-gathering activities and take responsibility for the procedures for their purposes.

The verifier shall not provide an AUP engagement when the intended user(s) do not agree to the content and sufficiency of the procedures.

AUP is a type of engagement used when the intended user(s) do not require assurance on the GHG statement but require a qualified verifier to test specific aspects of a subject (see [C.3](#)) using verification techniques. An AUP engagement may be more or less extensive than verification. AUP are determined by the intended user(s). However, the verifier may provide advice on the ability to effectively perform the procedures. The AUP need to be documented and agreed to. The verifier provides a report only on the results of the AUP, no assurance or opinion is expressed. The intended user(s) assess the results of the activities and draw their own conclusions. The report contains the AUP and the results, including the errors and exceptions identified, even if rectified. Where the intended user(s) wish to distribute the results of the AUP engagement to a wider audience (for example, public disclosure), any limitations on disclosure of report information shall be specified in the report and in the agreement with the intended user(s).

C.2 Application of agreed-upon procedures

AUP are only used with verification activities. This document anticipates that this type of engagement can be applied to:

- a) GHG programmes that specify AUP rather than assurance;
- b) specific indirect emissions and removals (indirect emissions in inventories; upstream emissions and removals for product life cycles);
- c) compliance to specifications;
- d) GHG information and data management and controls.

The process for AUP is given in [Figure C.1](#).

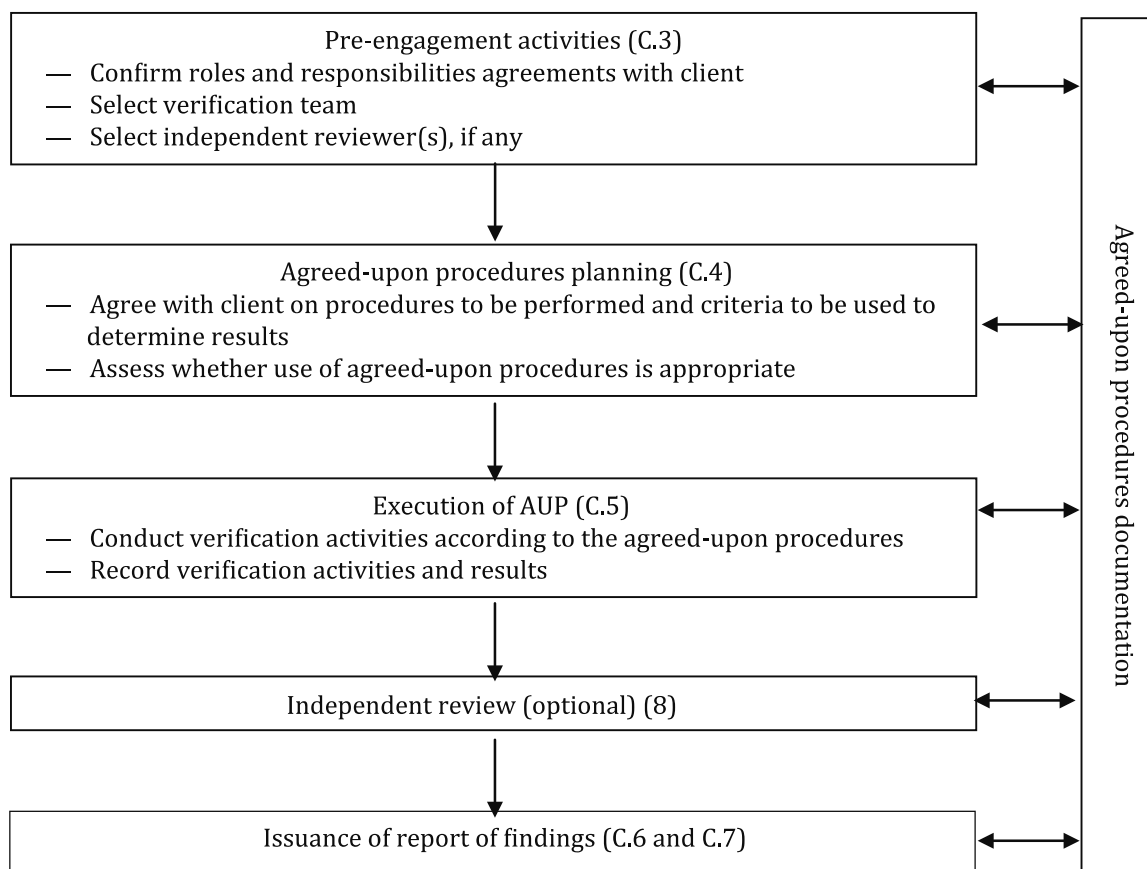


Figure C.1 — Agreed-upon procedures process

C.3 Roles and responsibilities

C.3.1 Roles and responsibilities of the intended user

The intended user(s):

- are responsible for the subject;
- take responsibility for the sufficiency of the AUP for their purposes;
- assume the risk that they might misunderstand or otherwise inappropriately use findings properly reported by the verifier.

C.3.2 Roles and responsibilities of the verifier

The verifier:

- is impartial from the intended user(s) and subject;
- assumes the risk that misapplication of the procedures may result in inappropriate findings being reported;
- assumes the risk that appropriate findings may not be reported or may be reported inaccurately;
- does not have the responsibility for determining the differences between the AUP and an assurance engagement.

C.3.3 Assessments made by the verifier on the design of the agreed-upon procedures

The verifier, in assessing the AUP, shall determine whether:

- a) the subject can be measured in a reasonably consistent manner;
- b) the AUP will produce reasonably consistent results;
- c) the evidence required for the AUP is expected to exist;
- d) the evidence required for the AUP provides a reasonable basis to determine the results.

The verifier should not agree to perform procedures that are subjective and thus possibly open to varying interpretations.

C.4 Planning

The verifier and the intended user(s) shall agree on:

- a) the procedures to be performed;
- b) the criteria used to determine results.

The verifier shall obtain from the intended user(s) written agreement for each procedure. The verifier shall not perform an AUP engagement when the intended user(s) do not agree upon the procedures and do not take responsibility for the procedures for their purposes. The concept of materiality does not apply to findings to be reported in an AUP engagement unless the definition of materiality is agreed to by the user(s) and verifier.

C.5 Execution of agreed-upon procedures

C.5.1 General

The verifier shall perform the AUP and report the findings. The nature, extent and timing of the procedures may be as limited or as extensive as the intended user(s) specify.

The AUP may evolve or may be modified over the course of the engagement if the intended user(s) acknowledge responsibility for the sufficiency of such procedures for their purposes.

Appropriate AUP may include:

- a) execution of a sampling technique after agreeing on relevant parameters;
- b) inspection of specified documents evidencing certain types of measurements;
- c) confirmation of specific information with third parties;
- d) comparison of documents, schedules or analyses with certain specified attributes;
- e) performance of specific procedures on work performed by others;
- f) performance of mathematical computations.

C.5.2 Inappropriate agreed-upon procedures

Inappropriate AUP include:

- a) simply reading work performed by others that only describes or contains their findings with no other supporting material;
- b) evaluating the competency or objectivity of another party;

- c) obtaining an understanding about a particular subject;
- d) interpreting documents outside the scope of the verifier's professional expertise.

C.5.3 Agreed-upon procedures process

The verifier shall obtain evidence from applying the AUP to provide a reasonable basis for findings.

If circumstances exist that prevent the verifier from implementing the procedures, the verifier shall attempt to obtain agreement from the intended user(s) to modify the procedures. If agreement cannot be reached, the verifier shall describe the restriction in the report or withdraw from the engagement.

An independent review process may be completed prior to the presentation of AUP results.

C.6 Presentation of the agreed-upon procedures results

The verifier shall not issue an opinion on evidence-gathering activities in an AUP type engagement.

C.7 Presentation of the agreed-upon procedures findings

The verifier reports all findings from application of AUP.

The verifier may include explanatory language, such as:

- a) disclosure of stipulated facts, assumptions or interpretations (including the source thereof) used in the application of AUP;
- b) description of the condition of records, controls or data to which the procedures were applied;
- c) explanation that the verifier has no responsibility to update the AUP report;
- d) explanation of sampling risk.

The verifier shall use the date of completion of the AUP as the date of the AUP report.

C.8 Agreed-upon procedures examples

Examples of AUP are given in Tables [C.1](#) and [C.2](#).

Table C.1 — Example of an agreed-upon procedures report content

Name	Description
Title	Title that includes the word "impartial" Addressee [ordinarily the intended user(s)]
Content and roles	Identification of the responsible party Identification of the subject A statement that the subject is the responsibility of the responsible party A statement that the sufficiency of the procedures is solely the responsibility of the intended user(s) A disclaimer of verifier responsibility for the sufficiency of those procedures
Methodology	A statement that the procedures performed were those agreed to A statement that the verification was performed in accordance with ISO 14064-3:2019, Annex C A statement that the verification report is to be used solely by the intended user(s) that have agreed upon the procedures

Table C.1 (continued)

Name	Description
Procedures and results	<p>Identification of the purpose for which the AUP were performed</p> <p>A listing of the specific procedures performed</p> <p>Where applicable, a description of any agreed-upon materiality thresholds</p> <p>A description of the verifier's factual findings including sufficient details of errors and exceptions found</p>
Caveats to the methodology	<p>Where applicable, reservations or restrictions concerning procedures or findings</p> <p>Where applicable, a description of the nature of the assistance provided by a specialist</p>
Caveats to the AUP report	<p>A statement that the activities performed do not constitute either a verification or validation and, as such, no assurance is expressed</p> <p>A statement that had the verifier performed additional activities, a verification or validation, other matters might have come to light that would have been reported</p> <p>A statement that the report is designed for the intended user(s) and may not be suitable for any other purposes</p>
Verifier	<p>Date of the report</p> <p>Verifier's address</p> <p>Verifier's signature</p>

Table C.2 — Examples of appropriate and inappropriate descriptions of findings resulting from the application of certain agreed-upon procedures

Agreed-upon procedures	Appropriate description of findings	Inappropriate description of findings
Inspect the invoice dates for a sample (agreed-upon) of specified invoices, and determine whether any such dates were subsequent to 20XX-12-31.	No invoice dates shown on the sample of invoices were subsequent to 20XX-12-31.	Nothing came to my attention as a result of applying that procedure.
Calculate the amount of natural gas consumed based on invoiced amounts during the year ending 20XX-09-30; compare the resultant number to the total natural gas value in the GHGSummary.xls spreadsheet.	The amount of natural gas consumed based on invoices was 34,5 m ³ more than the total natural gas value in the GHGSummary.xls.	The amount of natural gas consumed approximated the total natural gas value in the GHGSummary.xls.
Inspect the classification of GHG source types identified in the GHG inventory during a specified period; compare classification to those specified by the GHG programme.	<p>All classification of sources types inspected in the GHG inventory for the specified period were the same as those specified by the GHG programme with the exception of the following:</p> <p><i>[List all exceptions.]</i></p>	All GHG source classification appeared to comply with the GHG programme.

Annex D (informative)

Mixed engagement

D.1 Background and application

A mixed engagement is an engagement combining verification and validation activities performed at the same time and on the same GHG statement.

NOTE The mixed engagement is not applicable for GHG projects.

Verification is applied when the emissions, removals and/or storage are historical, and the verifier can obtain sufficient evidence about the emissions, removals and/or storage, and if a controls approach is used or a limited level of assurance is applied, the verifier has access to the controls for testing.

Validation is applied when the emissions, removals and/or storage will occur in the future, and the validator can obtain sufficient evidence that the emissions, removals and/or storage are likely to occur, and the design of the data management systems, including the controls, are likely to be effective.

AUP are applied when the intended user(s) require the results of verification evidence-gathering activities but do not require the opinion of the verifier.

A mixed engagement may apply in the following instances:

- a) emissions, removals or storage where the data and associated data management system for the sources or sinks is controlled by an entity other than the responsible party or client and the verifier does not have access to the data and its associated data management system;
- b) emissions, removals or storage in a GHG statement that occur in the past and will occur in the future;
- c) an inventory where some emissions, removals or storage are specified by the criteria without the verifier's ability to obtain sufficient evidence to assess any part of appropriateness, responsibility, completeness, accuracy, cut-off, classification and consistency;
- d) a project where the baseline is hypothetical and the project's emissions, removals and/or storage have occurred or will occur;
- e) a project validation where an operational period is included.

A mixed engagement is two or three types of engagements conducted at the same time. The boundary of each engagement shall be delineated and the appropriate methodology used (e.g. verification is risk based, validation is conceptual design based, AUP is execution of verification activities). A mixed engagement shall clearly report to the intended user(s) the boundaries, the methodology and the results obtained from executing each type of engagement. When areas of a GHG statement are not addressed by the mixed types of engagements, these areas should be identified.

D.2 Example of a verification and validation opinion for an organization's GHG statement

<p>Impartial mixed engagement opinion</p> <p>To XYZ's Department of Environment</p> <p><i>Verification</i></p> <p>We have verified the onsite GHG emissions, removals and storage in ABC's GHG statement for the period 1 January 2017 to 31 December 2017, which comprise the following:</p> <ul style="list-style-type: none"> — stationary combustion; — mobile combustion; — process emissions; — fugitive emissions; — flaring and venting. <p>Management is responsible for the preparation and fair presentation of the GHG statement in accordance with XYZ's climate change regulations. This responsibility includes designing, implementing and maintaining a data management system relevant to the preparation and fair presentation of a GHG statement that is free from material misstatement.</p> <p>Our responsibility is to express an opinion on the onsite GHG inventory based on our verification. We conduct our verification in accordance with the ISO specification with guidance for the verification and validation of greenhouse gas statements, i.e. ISO 14064-3. This International Standard requires that we comply with ethical requirements and plan and perform the verification to obtain reasonable assurance that the onsite GHG emissions, removals and storage in the GHG statement are free from material misstatement.</p> <p>Our verification strategy used a combined data and controls testing approach. Evidence-gathering procedures included but were not limited to:</p> <ul style="list-style-type: none"> — a site visit to: <ul style="list-style-type: none"> — inspect the completeness of the inventory; — interview site personnel to confirm operational behaviour and standard operating procedures; — re-perform access controls to onsite records; — sampling of fuel records to confirm accuracy of source data into calculations; — recalculation of emissions; — analytical procedures between production and energy consumption. <p>The data examined during the verification were historical in nature.</p> <p>In our opinion, the onsite GHG inventory in ABC's GHG statement present fairly, in all material respects, the GHG emissions, removals and storage of ABC's organization in accordance with XYZ's climate change regulations as of 31 December 2017.</p> <p><i>Validation</i></p> <p>We have examined the forecast of GHG emissions, removals and storage related to downstream product use for product produced during 1 January 2017 to 31 December 2017 in ABC's GHG statement dated 31 December 2017, which comprise the following:</p>
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- transportation;
- product use;
- product disposal.

Management is responsible for the preparation and fair presentation of the GHG statement in accordance with XYZ's climate change regulations. The forecast is based on the following assumptions:

- all products are consumed in one year;
- once fully used, 80 % of products is recycled and 20 % is disposed of in landfill;
- transportation averages 100 km to reach the consumer and diesel is used as a fuel;
- storage periods are on average six months;
- emission factors specified in XYZ's climate change regulations reflect actual events.

Our responsibility is to express an opinion on the forecast based on our validation. We conduct our validation in accordance with the ISO specification with guidance for the verification and validation of greenhouse gas statements, i.e. ISO 14064-3. This International Standard requires that we comply with ethical requirements and plan and perform the validation to reach a conclusion as to whether the forecast in the GHG statement is based on reasonable assumptions.

Our validation assessed the:

- recognition;
- GHG boundary;
- activity estimates;
- secondary effects;
- calculation methodologies and measurements;
- data management;
- conservativeness;
- calculation outcomes;
- future estimates;
- uncertainty;
- sensitivity of the forecast to the assumptions.

The data examined during the validation were projected in nature.

Based on our examination of the evidence, nothing comes to our attention which causes us to believe that these assumptions do not provide a reasonable basis for the forecast. Further, in our opinion, the forecast is properly prepared on the basis of the assumptions and in accordance with XYZ's climate change regulations.

Actual results are likely to be different from the forecast since anticipated events frequently do not occur as expected and the variation may be material.

The upstream GHG emissions, removals and storage in ABC's GHG statement were not addressed by either our verification or validation.

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D.3 Example of a verification, validation and agreed-upon procedures for a product's GHG statement

<p>Impartial mixed engagement opinion on verification and validation and report on findings To XYZ's Department of Environment</p> <p><i>Verification</i></p> <p>We have verified the onsite GHG emissions, removals and storage; and the material and energy requirements and production in ABC's GHG statement (dated 31 January 2018) for the period 1 January 2017 to 31 December 2017, which comprise the following:</p> <ul style="list-style-type: none"> — onsite GHG emissions, removals and storage: <ul style="list-style-type: none"> — stationary combustion; — mobile combustion; — process emissions; — fugitive emissions; — flaring and venting; — material used in production; — electricity and fuel used in production; — amount of production. <p>Management is responsible for the preparation and fair presentation of the GHG statement in accordance with XYZ's climate change regulations. This responsibility includes designing, implementing and maintaining a data management system relevant to the preparation and fair presentation of a GHG statement that is free from material misstatement.</p> <p>Our responsibility is to express an opinion on onsite GHG emissions, removals and storage; and the material and energy requirements and production in ABC's GHG statement (dated 31 January 2018) for the period 1 January 2017 to 31 December 2017 based on our verification. We conduct our verification in accordance with the ISO specification with guidance for the verification and validation of greenhouse gas statements, i.e. ISO 14064-3. This International Standard requires that we comply with ethical requirements and plan and perform the verification to obtain reasonable assurance that the onsite GHG emissions, removals and storage in the GHG statement are free from material misstatement.</p> <p>Our verification strategy used a combined data and controls testing approach. Evidence-gathering procedures included but were not limited to:</p> <ul style="list-style-type: none"> — a site visit to: <ul style="list-style-type: none"> — inspect the completeness of the inventory; — interview site personnel to confirm operational behaviour and standard operating procedures; — re-perform access controls to onsite records; — sampling of electricity, fuel and production records to confirm accuracy of source data into calculations; — recalculation of emissions; — analytical procedures between production and energy consumption. <p>The data examined during the verification were historical in nature.</p>
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In our opinion, the onsite GHG emissions, removals and storage; and the material and energy requirements and production in ABC's GHG statement (dated 31 January 2018) for the period 1 January 2017 to 31 December 2017 present fairly, in all material respects, the GHG emissions, removals and storage and the materials and energy used and the production of ABC's product in accordance with XYZ's climate change regulations as of 31 December 2017.

Validation

We have examined the forecast of GHG emissions, removals and storage related to downstream product use in ABC's GHG statement (dated 31 January 2018) for the period 1 January 2017 to 31 December 2017, which comprise the following:

- transportation;
- product use;
- product disposal.

Management is responsible for the preparation and fair presentation of the GHG statement in accordance with XYZ's climate change regulations. The forecast is based on the following assumptions:

- all products are consumed in one year;
- once fully used, 80 % of products is recycled and 20 % is disposed of in landfill;
- transportation averages 100 km to reach the consumer and diesel is used as a fuel;
- storage periods are on average six months;
- emission factors specified in XYZ's climate change regulations reflect actual events.

Our responsibility is to express an opinion on the forecast based on our validation. We conduct our validation in accordance with the ISO specification with guidance for the verification and validation of greenhouse gas statements, i.e. ISO 14064-3. This International Standard requires that we comply with ethical requirements and plan and perform the validation to obtain limited assurance that the forecast in the GHG statement is based on reasonable assumptions.

Our validation assessed the:

- recognition;
- GHG boundary;
- activity estimates;
- secondary effects;
- calculation methodologies and measurements;
- data management, conservativeness;
- calculation outcomes;
- future estimates;
- uncertainty;
- sensitivity of the forecast to the assumptions.

The data examined during the validation were projected in nature.

Based on our examination of the evidence, nothing comes to our attention which causes us to believe that these assumptions do not provide a reasonable basis for the forecast. Further, in our opinion, the forecast is properly prepared on the basis of the assumptions and in accordance with XYZ's climate change regulations.

Actual results are likely to be different from the forecast since anticipated events frequently do not occur as expected and the variation may be material.

Agreed-upon procedures

We have performed the evidence-gathering procedures agreed with XYZ's Department of Environment and enumerated below with respect to the upstream GHG emissions, removals and storage in ABC's GHG statement (dated 31 January 2018) for the period 1 January 2017 to 31 December 2017. Our engagement was undertaken in accordance with the ISO specification with guidance for the verification and validation of greenhouse gas statements, i.e. ISO 14064-3. These procedures were performed solely to assist you in evaluating the upstream GHG emissions, removals and storage in ABC's GHG statement and can be summarized as follows.

- 1) We obtained and checked the addition of the electricity purchased (kWh) for the period 1 January 2017 to 31 December 2017 from third-party invoices and compared the total balance to the value used in ABC's GHG statement (dated 31 January 2018).
- 2) We obtained and checked the addition of the natural gas purchased (GJ) for the period 1 January 2017 to 31 December 2017 from third-party invoices and compared the total balance to the value used in ABC's GHG statement (dated 31 January 2018).

We report our findings below.

- a) With respect to item 1 we found the addition to be correct and the total amount to be in agreement.
- b) With respect to item 2 we found the addition to be correct and the total amount to be in agreement.

Because the above procedures do not constitute either a verification or validation in accordance with the ISO specification with guidance for the verification and validation of greenhouse gas statements, i.e. ISO 14064-3, we do not express any assurance on the upstream GHG emissions, removals and storage in ABC's GHG statement (dated 31 January 2018).

Had we performed additional evidence-gathering procedures or had we performed a verification or validation of the upstream activity data in ABC's GHG statement (dated 31 January 2018) in accordance with the ISO specification with guidance for the verification and validation of greenhouse gas statements, i.e. ISO 14064-3, other matters might have come to our attention that would have been reported.

Our report is solely for XYZ's Department of Environment and may not be suitable for any other purposes.

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