The Carbon Capture, Utilization and Storage Credit Standard

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Summary of Revisions

Version	Date of Revision	Summary of Revisions
1.0	May 2023	This is the first version of this standard.
1.1	May 2024	Minor edits have been made throughout the document. **Definitions Revision:** Definitions have been updated and expanded to encompass CO_2 liability, limited liability threshold, and natural phenomena. Definition of reversal has been updated. **Structural Reorganization:** Sections have been reorganized for clarity and coherence. **New Section on CO_2 Liability:** A new section has been introduced to address liability associated with CO_2 released into the atmosphere. Corresponding updates have been applied throughout the document to accommodate these changes. **Introduction of CCUS Credit Trading:** A new section has been incorporated to address the trading of CCUS Credits among regulated emitters. Minor amendments have been made throughout the document to accommodate CCUS Credit trading provisions. **Holdback Factor:** The application of the holdback factor has been updated to a three-year duration. **Equations Review:** Equations have been updated, reorganized, or eliminated for clarity and accuracy. **Expansion of Registration:** Section 3 has been expanded to encompass deregistration procedures. **Addition to Concerning Emissions:** Section 8 has been expanded to address biomass-related emissions. **Liability Modification for CCUS Credits:** The original seller is now held liable in the event of an invalid CCUS credit. **Amendment to Compliance Obligations:** Subsection 14(4) has been updated to specify the sequence in which regulated emitters must fulfill compliance obligations.

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1. Introduction

1(1) This standard is adopted under *The Management and Reduction of Greenhouse Gases (Standards and Compliance) Regulations, 2023*.

1(2) Any terms defined in *The Management and Reduction of Greenhouse Gases Act,* or the regulations hold the same definition in this standard.

1(3) Any conflict or inconsistency in the provisions of this standard will be resolved by giving precedence in the following order: (1) the act, (2) the regulations, (3) the standard, (4) any other document incorporated as part of the standard.

1(4) For greater certainty, any conflict or inconsistency in the provisions of this standard and the ISO 14064-3 or ISO 14065 standards will be resolved by giving precedence to this standard.

2. Definitions

2(1) In this standard:

"Act" means *The Management and Reduction of Greenhouse Gases Act.*

"Accredited verification body" means a verification body that meets the following accreditation requirements:

(a) is accredited to ISO 14065 by the Standards Council of Canada, the American National Standards Institute or any other accreditation organization that is a member of the International Accreditation Forum;

(b) has a scope of accreditation that is sufficient to verify the information contained in a return or submission; and

(c) is not suspended by an accreditation organization that issued an accreditation.

"Authorized signing officer" means a person who has authority to accept legal responsibility on behalf of the regulated facility**.**

"CCUS credit" means an instrument that is certified by the Minister, representing a greenhouse gas (GHG) emission reduction, equivalent to one tonne of carbon dioxide equivalent (CO_2e) of GHG emissions.

"CCUS project" means a Carbon Capture, Utilization and Storage (CCUS) project that includes all operating equipment and processes that capture, transport, and inject CO_2 into a containing reservoir; this encompasses both Enhanced Oil Recovery (EOR) and Carbon Capture and Storage (CCS) projects.

"CCUS project partners" means the regulated emitters who:

(a) are identified in the CCUS Project Registration Form; and

(b) are either:

(i) an owner or operator of a capture, transport, or injection facility that is part of a registered CCUS project; or

(ii) are a working interest owner in the containing reservoir that is part of a registered CCUS project.

"Containing reservoir" means a reservoir, trap or other geological structure in the subsurface within which injected CO_2 will remain in permanent containment.

"CO_2 liability" means a liability associated with a release of CO_2 to the atmosphere, as determined in Section 12 of this Standard, that a CCUS project or project partners are responsible for fulfilling.

"Credit Plan" means a document prepared in accordance with this standard for the purposes of:

(a) registering the CCUS project under the standard;

(b) demonstrating that the project developer has authorization in accordance with necessary registration criteria as required by the Ministry of Energy and Resources; and

(c) demonstrating how the project developer will monitor, measure, and verify the quantity of CO_2 contained within the CCUS project.

"CCUS Project Registration Form" means a document prepared in accordance with this standard for the purposes of:

(a) registering the CCUS project under the standard; and

(b) providing the distribution of CCUS credits among the CCUS project partners.

"Credit report" means a document prepared in accordance with this standard for the purposes of demonstrating how the project developer has ensured compliance with the standard and the Credit Plan in order to earn CCUS credits.

"**CO_2 storage project**" means a project considered a CO_2 storage project by the Ministry of Energy and Resources pursuant to the applicable directives and guidelines provided by that ministry.

"Discount factor" means a set percentage of the injected CO_2 deducted from the emissions reduction to account for the risk of the release of CO_2 from the CCUS project.

"Blowout" means an unintended flow of wellbore fluids (oil, gas, water or other substance) at the surface that cannot be controlled by existing wellhead and/or blowout prevention equipment or a flow from one pool to another pool(s) (underground blowout) that cannot be controlled by increasing the fluid density.

"Drilling kick" means any unexpected entry of water, gas, oil, or other formation fluid into a wellbore that is under control and can be circulated out.

"Emissions reduction" means the quantified decrease in GHG emissions between the injected CO_2 and the project emissions.

"Enhanced oil recovery" or "EOR" means oil recovery where production is increased by injection of fluids other than water. For the purposes of this standard, CO_2 enhanced oil recovery increases production of oil from a reservoir using the injection of CO_2.

"Holdback" means a set percentage of the injected CO_2 deducted and held back from the emissions reduction to account for reversals from the CCUS project during its lifetime.

"Injected CO_2" means the total quantity of new CO_2 injected into the containing reservoir. Injected CO_2 does not include any quantity of reinjected CO_2 (i.e. recycled CO_2).

"Injection meter" means a meter used for quantifying injected CO_2.

"Invalid" means a CCUS credit that was earned in error by a regulated emitter.

"ISO" means the International Organization for Standardization.

"ISO 14064-3" means the 2019 version of the Standard ISO 14064-3, published by the ISO.

"ISO 14065" means the 2020 version of the Standard ISO 14065, published by the ISO.

"Level of assurance" means the depth of detail that a verification team designs into the verification process and the relative degree of confidence required by a verification team to make conclusions as to whether there are any misstatements.

"Limited liability threshold" is the threshold that limits the CO_2 liability for which a CCUS project or project partners are responsible.

"Materiality" means the assessment of individual errors, omissions and misstatements that would misrepresent a CCUS project's emissions reduction.

"Natural phenomenon" means events or occurrences that are part of the natural environment and are not caused by human activity. This can include phenomena such as earthquakes, floods, lightning strikes and other naturally occurring events.

"Original Seller" means the CCUS project partner who originally generated the credit.

"Permanent containment" means the isolation of CO_2 in subsurface geological formations.

"Project emissions" means the quantity of GHG emissions that occur due to implementing a proposed project.

"Project developer" means:

(a) the individual or organization that:

(i) operates the injection facilities in a CCUS project;

(ii) is responsible for submitting all required information associated with the CCUS project to the Minister; and

(iii) is a regulated emitter as defined in the act; or

(b) a regulated emitter involved in a CCUS project that the Minister may designate.

"Regulations" means *The Management and Reduction of Greenhouse Gases (Standards and Compliance) Regulations, 2023**.***

"Retired" means the act of remitting a CCUS credit for the purposes of fulfilling a compliance obligation.

"Reversal" means a release of CO_2 from subsurface to atmosphere or the intentional removal of previously injected and reported CO_2 from a CCUS project.

"Serial number" refers to the individual identification number assigned to a CCUS credit when it is earned by a regulated emitter.

"Sink" means a feature, process or activity that removes a GHG from the atmosphere.

"Source" means a feature, process or activity that releases a GHG into the atmosphere.

"Standard temperature and pressure" or "STP" means the conditions at a temperature of 15.0 degrees Celsius and one atmosphere of absolute pressure.

"Venting" means releasing GHG emissions into the atmosphere due to planned or emergency injection well workovers, mechanical integrity checks and maintenance.

"Verification report" means a written report prepared by a verification team during the verification process with respect to a CCUS project.

"Verification team" means a team consisting of one or more qualified persons who satisfy the criteria in Subsection 15(2) that conducts a verification of a CCUS project.

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3. Registration

3(1) A project developer who intends to register a CCUS project pursuant to this standard must:

(a) submit a CCUS Project Registration Form and Credit Plan to the Minister as prescribed by the Minister; and

(b) provide the Minister with any information that the Minister requires to:

(i) confirm the project developer's eligibility; and

(ii) determine whether the project developer's proposed CCUS project meets the requirements of this standard.

3(2) To be considered eligible for registration, a proposed CCUS project must:

(a) capture CO_2 directly from a facility in Saskatchewan;

(b) inject the captured CO_2 into a containing reservoir, in Saskatchewan, capable of permanently storing CO_2;

(c) have authorization as a CO_2 storage project, an enhanced oil recovery project, or other applicable project from the Saskatchewan Ministry of Energy and Resources pursuant to applicable directives and guidelines provided by that ministry; and

(d) be in good standing with all operating permits and regulations applicable to the injection of CO_2 in Saskatchewan.

3(3) The CCUS project must have a designated project developer who is responsible for submitting and completing all registration and reporting requirements.

3(4) A CCUS project that has completed its ten-year monitoring period and has had any applicable holdback returned, will be considered terminated and will be deregistered and no longer subject to this standard.

4. CCUS Project Registration Form and Credit Plan

4(1) In accordance with this standard, the project developer must submit:

(a) a CCUS Project Registration Form that includes a declaration by each CCUS project partner's authorized signing officer; and

(b) a Credit Plan.

4(2) Each CCUS project must undertake monitoring activities to ensure permanent containment of CO_2 in accordance with the approved Credit Plan.

4(3) If a change to the Credit Plan is required, the project developer must submit any amendments to the Saskatchewan Ministry of Environment and Ministry of Energy and Resources pursuant to applicable directives and guidelines provided by those ministries.

4(4) If a change to the CCUS Project Registration Form is required, including the allocation of credits, the project developer must submit any amendments to the Saskatchewan Ministry of Environment.

4(5) On receipt of a CCUS Project Registration Form and Credit Plan pursuant to this section, the project developer will be provided a written response from the Minister that:

(a) approves the registration of the proposed CCUS project; or

(b) indicates that the proposed CCUS Project Registration Form and Credit Plan is incomplete or has errors and details the problem(s) or issue(s) and/or any action required by the project developer, including:

(i) providing additional information that may be requested or required;

(ii) any corrective action that may be required.

4(6) Upon receipt of the written response sent pursuant to clause 4(5)(b), a project developer must fulfil any actions required and resubmit the required information prior to the deadline indicated in the written response.

4(7) Upon resubmission of required information requested pursuant to clause 4(5)(b) the information will be reviewed, and the project developer will be provided with a written response from the Minister that provides a statement in accordance with Subsection 4(5).

4(8) The Minister may require the project developer to apply changes to the CCUS Project Registration Form or Credit Plan at any time at the Minister's discretion.

5. CO_2 Injection by Multiple Project Developers

5(1) A CCUS project may be integrated within a CO_2 network that includes injection facilities outside the CCUS project. In this scenario, all emissions associated with common capture and transport facilities must be prorated between the CCUS projects. Each project developer must apply the following equation on a monthly basis for each set of common capture and transport facilities shared with one or more CCUS projects in the CO_2 network:

Equation 1:

$$Upstream\ Emissions_{\ Allocated\ to\ Project\ i} = \sum_{y}\left[\frac{InjectedCO_{2,Project\ i}}{Injected\ CO_{2,Total}} \times Emissions_{onsite\ combustion,y}\right]$$

Variable	Description	Units of Measure	Measurement Frequency
i	A CCUS project within a set of CCUS projects in the CO_2 network that share a common capture facility or transport facility y.	N/A	N/A
y	Each capture or transport facility that exists upstream of and is shared by the same set of CCUS projects in the CO_2 network.	N/A	N/A
$Upstream\ Emissions$ Allocated to Project i	Project emissions from all capture and transport facilities y upstream of and shared by the same set of CCUS projects in the CO_2 network that are allocated to CCUS project i.	tonne CO_2e	Calculated value. Must be calculated monthly.
$Injected\ CO_2$ Project i	The total quantity of new CO_2 injected into the containing reservoir by CCUS project i.	tonne CO_2e	Calculated value. Must be calculated monthly.
$Injected\ CO_2$ Total	The total quantity of new CO_2 injected into the containing reservoir from the set of CCUS projects sharing a common capture or transport facility y.	tonne CO_2e	Calculated value. Must be calculated monthly.
$Emissions$ Onsite combustion, y	Onsite combustion emissions associated with the operation of common capture or transport facility y that exists upstream of and is shared by the set of CCUS projects in the CO_2 network.	tonne CO_2e	Calculated value. Must be calculated monthly.

6. Credit Report

6(1) In accordance with this standard, the project developer must submit a Credit Report that includes a declaration by each CCUS project partner's authorized signing officer.

6(2) The project developer shall ensure that all information contained within the Credit Report, Part 1, is verified by a qualified person.

6(3) Subject to Section 6(2), if injected CO_2 and project emissions are equal to zero then verification of Part 1 of the Credit Report is not required.

6(4) The project developer must submit the completed Credit Report for the compliance year by June 1 of the following year.

6(5) A discount factor of 0.1 per cent for a CCS project and 0.5 per cent for an EOR project will be applied to the injected CO_2 and deducted from the emissions reduction.

6(6) A CCUS project will only be subject to a holdback factor for years five, six and seven of injection following registration of the CCUS project, during which:

(a) a holdback factor of 0.5 per cent for a CCS project must be applied; or

(b) a holdback factor of 2 per cent for an EOR project must be applied.

6(7) The project developer shall specify the procedures used to estimate data for periods when actual data are unavailable. These procedures should avoid overestimations of the amounts of CO_2 that may be contained.

6(8) All reversals must be reported on a Credit Report and submitted by the project developer to the Minister. Intentional injection and recycle of CO_2 between containing reservoirs within the approved CCUS project is not considered a reversal.

7. Holdback

7(1) Following the cessation of new or recycled CO_2 injection, the project developer must monitor containment for a minimum period of ten years to demonstrate permanent containment conformance is consistent with expectations.

7(2) After completing the ten-year minimum monitoring period, the project developer may submit an application for the release of an associated holdback in accordance with the holdback process established by the Minister.

7(3) The Minister may release the holdback if the Minister is satisfied that the stored CO_2 is behaving in a stable and predictable manner with no significant risk of future leakage.

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7(4) The method to determine whether the holdback may be returned is as follows:

Equation 2: Holdback Release

$$HB_{Release} = HB_{Total} - Reversals_{Post-injection}$$

$$where, \qquad HB_{Total} = \sum_{i=1}^{3} Holdback_i$$

Variable	Description	Units of Measure
$HB_{Release}$	Total volume of the holdback released to the CCUS project partners. Note that $HB_{Release}$ cannot exceed HB_{Total}.	tonne CO_2e
HB_{Total}	Total cumulative holdback from the CCUS project	tonne CO_2e
i	A compliance year in which a holdback was collected	N/A
$Holdback_i$	Volume of holdback collected in compliance year i	tonne CO_2e
$Reversals_{Post-injection}$	Reversals of CO_2 post injection, including transfer out of the CCUS project.	Tonne CO_2e

7(5) If permanence cannot be verified, all holdbacks accumulated for a given CCUS project will be considered expired.

7(6) In the event that the regulations are repealed, the Government of Saskatchewan will not assume liability for the accumulated holdback value for a CCUS project at the time the regulations are repealed.

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8. Concerning Emissions

8(1) The project developer must quantify the injected CO_2 emissions using direct measurement from an injection meter that is expected to be as close as possible to the injection field and wells, but that takes measurement prior to the injected CO_2 being combined with any recycled CO_2.

8(2) The project emission sources described in Table 1 must be quantified.

Table 1
Selected Project Sources
[Subsection 8(2)]

Sources	Description
Well Drilling Activity	Emissions from kick or blowout events that release hydrocarbons during the drilling of injection and monitoring wells must be quantified.
Onsite Fossil Fuel Combustion	Fossil fuels consumed by the capture, transport and storage facilities result in GHG emissions that must be tracked, including fuels combusted to generate electricity to be used onsite.
Venting of CO_2 at Injection Wells	Planned and emergency CO_2 venting may be necessary for injection well workovers, mechanical integrity checks and maintenance. Instances of venting must be logged, including the duration of the venting event and the estimated volume of CO_2 vented.
Fugitive Emissions at Injection Well Sites	Unintended gas leaks at the CO_2 injection well sites may occur through valves, flanges, pipe connections, mechanical seals or related equipment. These gases will be composed primarily of CO_2 with trace amounts of other greenhouse gases, CH_4 and N_2O. These emissions must be quantified.
Flare at Injection, Production Wells and Recycle Stream during EOR projects	Planned and emergency flaring during EOR activities may be necessary for injection or production well sites or during workovers, mechanical integrity checks and re-injection stream flaring. These flare volumes and subsequent emissions are additional to flaring related to injected CO_2 due to EOR scheme oil production. Instances of flaring are logged, including the flaring event's duration, sources of gases flared, including any additional natural gas, and the estimated quantities flared.

8(3) For certainty, emissions released at a regulated facility that are directly related to the activities of a registered CCUS project will not be reported as regulated emissions for the regulated facility but shall:

(a) be included in the project emissions described in Table 1 of this Standard, or;

(b) be reported as a reversal in 11(2) equation 10.

8(4) For certainty, emissions released at a regulated facility that are directly related to an unregulated source of CO_2 injected into a containing reservoir shall be included in the regulated emissions for the regulated facility, quantified in accordance with the applicable standard.

8(5) For certainty, CO_2 emissions that are captured during a compliance year at a regulated facility are excluded from reporting under this Standard and must be reported as direct emissions for that regulated facility under the applicable standard.

8(6) Subject to 8(5), a regulated emitter shall not report CO_2 emissions from the following emission sources:

(a) the combustion of biomass;

(b) the aerobic decomposition of biomass;

(c) the fermentation of biomass.

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9. Injected CO_2 Quantification Methodology

9(1) A project developer shall determine the injected CO_2 emissions by applying one of the following equations:

Equation 3-1: Injected CO_2 (Volumetric Flow Approach)

$$Emissions_{\ Injected\ CO_2} = \sum_{i}^{n} \left(V_{Injected\ Fluid} \times \%_{CO_2} \times \rho_{CO_2}\right) x\ 0.001$$

Variable	Description	Units of Measure	Measurement Requirement
$Emissions_{\ \text{Injected CO2}}$	The injected quantity of CO_2 measured at the metering point (excludes CH_4 and N_2O).	tonnes CO_2e	Calculated value.
$V_{\ \text{Injected fluid}}$	The volume of CO_2 delivered to each metering point, i.	M^3	Direct, continuous metering, measured as close as possible to the injection field and wells, but prior to the injection point of any recycled CO_2.
n	The total number of metering points in the CCUS project.	N/A	N/A
$\%_{\ CO2}$	The monthly weighted average concentration of CO_2 delivered to the transport facility from all capture facilities.	%	Each capture facility must measure CO_2 daily or calculate a straight daily average of values recorded by an online analyzer.
$\rho_{\ CO2}$	The density of injected CO_2 at STP.	Kg / m^3	Density must be used consistently throughout the CCUS project.
0.001	Conversion from kg to tonnes.	Tonnes/kg	N/A

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Equation 3-2: Injected CO_2 (Mass Flow Approach)

$$Emissions_{Injected\ CO_2} = \sum_{i}^{n} \left(M_{Injected\ Fluid} \times \%_{CO_2} \right)$$

Variable	Description	Units of Measure	Measurement Requirement
$Emissions_{\text{Injected CO2}}$	The injected quantity of CO_2 measured at the metering point (excludes CH_4 and N_2O).	tonnes CO_2e	Calculated value.
$M_{\text{Injected fluid}}$	The mass of CO_2 delivered to each metering point, i.	Tonnes CO_2e	Direct, continuous metering, measured as close as possible to the injection field and wells, but prior to the injection point of any recycled CO_2.
n	The total number of metering points in the CCUS project.	N/A	N/A
$\%_{\text{CO2}}$	The monthly weighted average concentration of CO_2 delivered to the transport facility from all capture facilities.	%	Each capture facility must measure CO_2 daily or calculate a straight daily average of values recorded by an online analyzer.

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10. Project Emissions Quantification Methodology

10(1) A project developer shall determine the total emissions for each source in Subsection 8(2), Table 1 by applying equations 4 through 10:

Equation 4: Well Drilling Activity

$$Emissions_{Drilling} = \sum_{i=1}^{n} \left(V_i \times \%_{CO_2,CH_4} \times \rho_{CO_2,CH_4} \, x \, GWP_{CO_2,CH_4} \right) x \, 0.001$$

Variable	Description	Units of Measure	Measurement Frequency
$Emissions_{Drilling}$	GHG emissions from the potential kick or blowout event could release hydrocarbons during the drilling of injection and monitoring wells.	Tonnes CO_2e	Calculated value.
V_i	If the drilling activity resulted in a kick or blowout, the values reported to the Government of Saskatchewan in accordance with Directive PNG014 should be used to estimate the volume of gas released.	M^3	The volume must be measured for each event, i.
n	The total number of reported events.	N/A	N/A
i	The individual reported event.	N/A	N/A
$\%_{CO2, CH4}$	The concentration of vented CO_2, CH_4 reported.	% volume	The measurement should be as frequent as the event.
$\rho_{CO2, CH4}$	The density of vented CO_2, CH_4 at STP.	Kg / m^3	Density must be used consistently throughout the project.
0.001	Conversion from kg to tonnes.	Tonnes/kg	N/A
$GWP_{CO2, CH4}$	Global Warming Potentials, as listed in the Industrial Facility Standard.	Tonne/tonne	N/A

Equation 5: Onsite Fossil Fuel Combustion

$$Emissions_{Onsite\ Combustion} = \sum_{i}^{n} \left(Fuel_i \times EF_{Fuel\ CO_2, CH_4, N_2O} \right)$$

Variable	Description	Units of Measure	Measurement Frequency
$Emissions$ Onsite Combustion	GHG emissions from the combustion of fossil fuels.	Tonnes CO_2e	Calculated value.
$Fuel$	The volume of fossil fuels consumed.	L, m3, other	Direct, continuous metering or quantity supplied by a fuel supplier.
I	The type of fossil fuel consumed,	N/A	N/A
n	The number of fossil fuel types consumed.	N/A	N/A
EF Fuel CO2, CH4, N2O	Fossil fuel combustion emission intensity factor.	Tonnes CO_2e / unit volume	Must use the fuel combustion emission intensity factors published in the most recent version of *Canada's Greenhouse Gas Quantification Requirements* for the compliance period in which CCUS credits are created. The Variable Fuels Methodology may be utilized to calculate CO_2 emissions.

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Equation 6: Venting at Injection Wells

$$Emissions_{Venting} = \sum_{i=1}^{n} \left(V_{vent} \times \%_{CO2,CH4} \times \rho_{CO2,CH4} x\ GWP_{CO2,CH4}\right)\ x\ 0.001$$

Variable	Description	Units of Measure	Measurement Frequency
$Emissions_{Venting}$	The emissions from gas vented during maintenance blowdowns.	Tonnes CO_2e	Calculated value.
V_{vent}	The volume of vented gas downstream of the injection meter is estimated based on the pressure, length and diameter of the pipe serviced during blowdowns.	M^3	It should be as frequent as the maintenance event.
n	The total number of services.	N/A	N/A
i	The individual reported service.	N/A	N/A
$\%_{CO2, CH4}$	The monthly average concentration of CO_2, CH_4 delivered to the transport facility from all capture facilities is weighted by the mass of CO_2, CH_4 delivered by each capture facility.	%	Each capture facility must measure CO_2, CH_4 concentration daily or calculate a straight daily average of values recorded by an online analyzer.
$\rho_{CO2, CH4}$	Reference density of vent gas at STP.	Kg / m^3	Densities must be used consistently throughout the project.
0.001	Conversion from kg to tonnes.	Tonnes/kg	N/A
$GWP_{CO2, CH4}$	Global Warming Potentials, as listed in the Industrial Facility Standard.	Tonne/tonne	N/A

Equation 7: Fugitive Emissions at Injection/Production Wells and Recycle Stream

$$Emissions_{Fugitive} = \sum_{i}^{n} \left(Fitting_i \times ER_{Fitting,i} \right) + Other\ Fugitive\ Releases$$

Variable	Description	Units of Measure	Measurement Frequency
$Emissions_{\text{Fugitive}}$	The emissions from unintended leaks of gas at the CO_2 injection well, production well and recycle stream sites. These gases will be composed primarily of CO_2 with trace amounts of other greenhouse gases, CH_4 and N_2O.	tonnes CO_2e	Calculated value.
$Fitting_{\text{i}}$	Fittings in place after the injection meter.	N/A	Estimate based on the number of fittings after the injection meter, piping and re-injection equipment, above the surface.
n	The total number of fitting types.	N/A	N/A
i	The individual fitting type.	N/A	N/A
ER_{Fitting}	Emission rate based on industry best practices for determining typical fitting emissions based on actual field equipment and measurement (fitting sizes, types, operating pressure and gas properties).	Tonnes CO_2e / fitting / year	Project specific emission factors may be developed, survey results may be utilized, or factors may be referenced from the *2009 American Petroleum Institute Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Natural Gas Industry.*
$Other\ Fugitive\ Releases$	Engineering estimate from unintended/unplanned events. Accounts for CO_2 released after the meter and wellbore but not from the storage basin.	Tonnes CO_2e	This is from unintended/unplanned events, and accounts for CO_2 released after the meter but not from the containing reservoir. Estimated based on the most detailed information available.

Equation 8: Flare at Injection, Production Wells, and Recycle Stream During EOR Projects

$$Emissions_{CO_2\ Flare} = V_{flare} \times \left(\sum_{j=1}^{n} y_j C_j \times FE + y_{CO_2}\right) \times \frac{MW_{CO_2}}{MVC} \times 0.001$$

$$Emissions_{CH_4\ Flare} = V_{flare} \times (1 - FE) \times \frac{y_{CH_4} \times MW_{CH_4}}{MVC} \times 0.001\ x\ GWP_{CH_4}$$

$$Emissions_{N_2O\ Flare} = V_{flare} \times EF_{N_2O} \times 0.001\ x\ GWP_{N_2O}$$

Or

$$Emissions_{N_2O\ Flare} = V_{flare} \times HHV \times EF_{N_2O} \times 0.001\ x\ GWP_{N_2O}$$

Variable	Description	Units of Measure	Measurement Requirement
$Emissions_{CO2\ Flare}$ $Emissions_{CH4\ Flare}$ $Emissions_{N2O\ Flare}$	N/A	tonne CO_2e	Calculated value.
V_{flare}	Flared gas volume.	M^3	Engineering estimates may be used to estimate the volume of gas flared. All flaring events must be included.
y_j	Mole fraction of hydrocarbon compound j.	Mole fraction	Gas composition for each flaring event is the preferred method. An engineering estimate of the gas composition is acceptable.
y_{CO2}	Mole fraction of carbon dioxide in the flared gas.	Mole fraction	Gas composition for each flaring event is the preferred method. An engineering estimate of the gas composition is acceptable.
y_{CH4}	Mole fraction of methane in the flared gas.	Mole fraction	Gas composition for each flaring event is the preferred method. An engineering estimate of the gas composition is acceptable.
C_j	Carbon number of hydrocarbon compound j.	Unitless	N/A

FE	Flare combustion efficiency.	Unitless	Manufacturer-specified value or 98% default value.
n	The number of hydrocarbon compounds present in the combusted gas.	Unitless	N/A
MW_{CO2}	The molecular weight of CO_2.	Kg / kmole	44.01 (physical constant)
MW_{CH4}	Molecular weight of CH_4.	Kg / kmole	16.04 (physical constant)
MVC	The volume occupied by 1 kmole of gas at 15˚C, 101.325 kPa.	M3 / kmole	23.6445 (physical constant)
HHV	High heat value of the flare gas	GJ/m^3	Gas composition for each flaring event is the preferred method. An engineering estimate of the gas composition is acceptable.
EF_{N2O}	Default emission factor for N_2O.	kg N_2O/m^3 or kg N_2O/GJ[3]	Must use either the natural gas fuel combustion N_2O emission factor (kg N_2O/m^3) or the default N_2O emission factor for petroleum products (kg N_2O/GJ[3]) published in the most recent version of *Canada's Greenhouse Gas Quantification Requirements* for the compliance period in which CCUS credits are created.
0.001	Conversion from kg to tonnes.	Tonnes/kg	N/A
GWP_{CH4}	Global Warming Potential of CH_4, as listed in the Industrial Facility Standard.	Tonne/tonne	N/A
GWP_{N2O}	Global Warming Potential of N_2O, as listed in the Industrial Facility Standard.	Tonne/tonne	N/A

11. Earning a CCUS Credit

11(1) The Emissions Reduction associated with the project shall be quantified as follows:

Equation 9:

$$Emissions\ Reduction = \sum Emissions_{Injected} - \sum Emissions_{Project}$$

Variable	Description	Units of Measure
$\Sigma\ Emissions_{\text{ Injected}}$	$Emissions_{\text{ Injected CO2}}$	tonne CO_2e
$\Sigma\ Emissions_{\text{ Project}}$	$Emissions_{\text{ Drilling}} + Emissions_{\text{ Onsite Combustion}} + Emissions_{\text{ Venting}} + Emissions_{\text{ Fugitive}} + Emissions_{\text{ Flare For EOR}}$	tonne CO_2e

[Remainder of this page intentionally left blank]

11(2) Subject to 8(3) and 12(7), if previously injected CO_2 leaks from the subsurface to the atmosphere, the CCUS projects injecting CO_2 into that containing reservoir will report an unintentional reversal that will be apportioned to each CCUS project as follows:

Equation 10:

$$Reversal_j = \frac{\sum_i^n Injected\ CO_{2_{j,i}}}{\sum_j^m \sum_i^n Injected\ CO_{2_{j,i}} + \sum_k^u \sum_i^n Injected\ CO_{2_{k,i}}} \times CO_{2_{Leak}}$$

Variable	Description	Units of Measure
$Reversal_j$	The portion of the total CO_2 leak for which a CCUS project j is responsible.	Tonnes CO_2e
$Injected\ CO_{2_{j,i}}$	The amount of CO_2 injected by CCUS project j into the containing reservoir in year i.	Tonnes CO_2e
$Injected\ CO_{2_{k,i}}$	The amount of unregulated CO_2 from source k injected into the containing reservoir in year i.	Tonnes CO_2e
$CO_{2_{Leak}}$	The total amount of CO_2 leaked from the containing reservoir.	Tonnes CO_2e
j	A CCUS project injecting CO_2 into the containing reservoir from which the CO_2 leaked.	N/A
k	An unregulated source of CO_2.	N/A
m	The number of CCUS projects injecting CO_2 into the containing reservoir from which the CO_2 leaked.	N/A
u	The number of unregulated sources of CO_2 injected into the containing reservoir from which the CO_2 leaked.	N/A
i	A year in 2023 or a later year, in which a CCUS project j or unregulated source k is injecting CO_2 into the containing reservoir from which the CO_2 leaked.	N/A
n	The number of years from 2023 to the current year that CCUS Project j or unregulated source k has injected CO_2 into the containing reservoir.	N/A

11(3) For the purposes of equation 10, each leakage event must be estimated with a maximum overall uncertainty of ±7.5 per cent over the reporting period using the absolute value of the uncertainty. If the overall uncertainty exceeds ±7.5 per cent, equation 11 must be applied.

Equation 11:

$$CO_{2\ Leak,Adjusted} = CO_{2\ Leak}\ x\ (1 + (\frac{Uncertainty_{System}}{100})$$

Variable	Description	Units of Measure
$CO_{2\ Leak,Adjusted}$	Amount of CO_2 to be reported as $CO_{2\ Leak}$ in equation 12, if applicable.	tonnes CO_2e
$CO_{2\ Leak}$	Amount of CO_2 determined through the quantification approach used for the leakage event in question.	tonnes CO_2e
$Uncertainty_{\ System}$	The uncertainty level is associated with the quantification approach used for the leakage event in question.	%

11(4) The quantity of CCUS credits earned in a compliance year shall be quantified as follows:

Equation 13:

$$CCUS\ Credits = Emissions\ Reduction - \ Discount\ - Holdback - Reversal$$

Variable	Description	Units of Measure
$Discount$	$Discount\ = \sum Emissions_{injected\ CO_{2\ CCS,EOR}} \times Discount\ \%_{CCS,EOR}$ The discount factor is set at 0.1% for a CCS project and 0.5% for an EOR project.	tonne CO_2e
$Holdback$	$Holdback\ = \sum Emissions_{injected\ CO_{2\ CCS,EOR}} \times Holdback\ \%_{CCS,EOR}$ Beginning in year 5, a holdback factor of 0.5% for a CCS project and 2% for an EOR project will be applied.	tonne CO_2e
$Reversal$	is the reversal for which the CCUS Project is responsible, if applicable.	tonnes CO_2e

11(5) The quantity of CCUS credits earned by the CCUS Project shall be rounded to the nearest tonne of CO_2e.

11(6) Subject to Subsection 11(7), CCUS credits that are earned by an approved CCUS project will be distributed by the Minister to the CCUS project partners in accordance with the approved CCUS Project Registration Form.

11(7) In the case of a CCUS project involving an electricity facility in which carbon capture operations were commenced before January 1, 2023, all CCUS credits earned by the CCUS project resulting from the CO_2 that is captured from that electricity facility and permanently stored as part of a CCUS project shall be allocated to the regulated emitter who owns or operates that electricity facility.

11(8) A CCUS project may be eligible to receive CCUS credits from CO_2 that has been transferred from an approved CCUS project for which CCUS credits have been previously granted but have been subsequently reversed.

12. CO_2 Liability

12(1) The limited liability threshold for a CCUS project is determined as follows:

Equation 12:

$$LL = Y \times \frac{\sum_i^n Injected\ CO_{2_i}}{n}$$

Variable	Description	Units of Measure
$\sum_i^n Injected\ CO_{2_i}$	The amount of CO_2 injected by the CCUS project into the containing reservoir in year i.	tonnes CO_2e
i	A year in 2023 or a later year, in which the CCUS project is injecting CO_2 into the containing reservoir from which the CO_2 leaked.	N/A
n	The number of years from 2023 to the current year that the CCUS project has injected CO_2 into the containing reservoir.	N/A
Y	The lesser of three (3) and the number of years n that the CCUS project has been injecting CO_2 into the containing reservoir.	N/A

12(2) If, during an active CCUS project, the result of the calculation in subsection 11(4) is a negative value, the CO_2 liability for a CCUS -project shall be limited to the lesser of:

(a) the absolute value of the negative number calculated in 11(4); and

(b) the limited liability threshold calculated in 12(1).

12(3) If a CCUS project reports an unintentional reversal as determined in 11(2) during the monitoring period, the CO_2 liability shall be the lesser of:

(a) the reversal calculated in 11(2); or

(b) the limited liability threshold calculated in 12(1).

12(4) The CO_2 liability for a CCUS project determined in accordance with 12(2) shall be apportioned between the CCUS project partners based on the current allocation of credits in effect for the CCUS project based on the approved CCUS Project Registration Form.

12(5) The CO_2 liability incurred by a CCUS project during the monitoring period, as determined in 12(3), shall be fulfilled by retiring any remaining Holdback collected from the CCUS project. If the holdback held by the regulated emitter is not sufficient to fulfil the CO_2 liability, the remaining CO_2 liability shall be apportioned between the CCUS project partners based on the current allocation of credits in effect for the CCUS Project based on the approved CCUS Project Registration Form.

12(6) A regulated emitter that is apportioned part of the CO_2 liability in accordance with 12(4) or 12(5) shall fulfil their CO_2 liability by retiring CCUS credits that the regulated emitter owns at the time the CO_2 liability is incurred. If the number of CCUS credits held by the regulated emitter is not sufficient to fulfil the CO_2 liability, the regulated emitter must then do one or a combination of the following:

(a) retire performance credits that the regulated emitter owns at the time the CO_2 liability is incurred; or

(b) make a payment to the Government of Saskatchewan for deposit in accordance with the act at the price per tonne CO_2e that applied for the compliance year in which the CO_2 liability is reported.

12(7) For the purposes of 11(2), a CCUS project shall not incur a CO_2 liability in the event of a loss of containment of CO_2 if the project developer provides empirical evidence satisfactory to the Minister demonstrating that the loss of containment was the result of an event unrelated to the selection, operation, or maintenance of the containing reservoir, such as a natural phenomenon or terrorist attack.

13. Retiring a CCUS Credit

13(1) Pursuant to Section 20 of the regulations, regulated emitters may retire CCUS credits for the purpose of fulfilling compliance obligations at any regulated facility that is owned or operated by that regulated emitter.

13(2) A CCUS credit is retired at a rate of one CCUS credit for each tonne of CO_2e.

13(3) A CCUS credit that is retired for the purposes of satisfying a compliance obligation must be identified by its individual serial number in the compliance return for the compliance year in which the compliance obligation was incurred.

13(4) A CCUS credit must be held by the regulated emitter in the credit registry on the date that the regulated emitter retires the CCUS credit for the purposes of fulfilling a compliance obligation.

13(5) A CCUS credit is non-divisible and the entirety of the CCUS credit must be retired when fulfilling a compliance obligation.

13(6) A CCUS credit that is retired for a compliance obligation may not be earned, retired, bought or sold again for any purpose.

14. Buying and Selling a CCUS Credit

14(1) A CCUS credit can only be bought from or sold to another regulated emitter who is subject to the regulations.

14(2) The buyer of a CCUS credit shall submit a transaction record to the Minister in the manner specified by the Minister within 30 days from the date the transaction occurred to finalize the transaction of a CCUS credit between two regulated emitters.

14(3) When preparing a transaction record, the buyer of the CCUS credit shall:

(a) complete any required forms;

(b) provide the individual serial number or the range of serial numbers of the CCUS credits involved in the transaction;

(c) provide the date of the transaction;

(d) identify the regulated emitter who is the buyer of the CCUS credit;

(e) identify the regulated emitter who is the seller of the CCUS credit; and

(f) provide a signed declaration from the authorized signing officers from both the buying and selling parties of the CCUS credit attesting to the accuracy and completeness of the transaction record.

14(4) More than one CCUS credit may be bought or sold within a single transaction.

14(5) A CCUS credit is non-divisible and the entirety of the CCUS credit must be transferred between regulated emitters through a transaction.

15. CCUS Credits Terms and Conditions

15(1) If a CCUS credit is sold to another regulated emitter and is later found to be invalid, the original seller of the CCUS credit assumes the risk that the CCUS credit may be revoked.

15(2) Pursuant to Subsection 4(3) of this standard, if a CCUS Project Registration Form is amended during the compliance year, the following shall be considered earned by the CCUS project partners listed in the CCUS Project Registration Form on December 31 of the compliance year:

(a) any CCUS credits determined in accordance with Section 11;

(b) any holdback released in accordance with Section 7.

15(3) If a CCUS credit previously retired by a regulated emitter to fulfil a compliance obligation is later found to be invalid, the Minister shall notify the regulated emitter that the portion of the compliance obligation that was fulfilled by retiring the CCUS credit is no longer fulfilled.

15(4) A regulated emitter shall fulfil the portion of the unfulfilled compliance obligation identified in Subsection 15(3) by retiring CCUS credits that the regulated emitter owns at the time the compliance obligation was determined to be unfulfilled. If the number of CCUS credits held by the regulated emitter is not sufficient to fulfil the compliance obligation, the regulated emitter must then do one or a combination of the following:

(a) retire performance credits that the regulated emitter owns at the time the compliance obligation was determined to be unfulfilled; or

(b) make a payment to the Government of Saskatchewan for deposit in accordance with the act at the price per tonne CO_2e that applied for the compliance year in which the original compliance obligation was incurred.

15(5) A regulated emitter shall fulfil the portion of the unfulfilled compliance obligation mentioned in Subsection 15(3) by the deadline established by the Minister in the communication notifying the regulated emitter that the retired CCUS credit is invalid under Subsection 15(3).

15(6) If there is a dispute regarding the ownership of a CCUS credit, the Minister will determine ownership.

15(7) At the discretion of the Minister, if a regulated emitter is in arrears on a compliance obligation for a period of more than six months from the compliance obligation deadline, the Minister may retire on the credit registry one or more CCUS credits owned by the regulated emitter to cover any outstanding compliance obligations.

15(8) The Minister does not guarantee the availability of CCUS credits for purchase from another regulated emitter to fulfill a regulated emitter's compliance obligation.

15(9) A CCUS credit does not have an expiration date**.**

15(10) In the event that the regulations are repealed, the Government of Saskatchewan will not assume liability for the value of any CCUS credits that a regulated emitter may have in their account at the time that the regulations are repealed.

16. Verification Requirements

16(1) For the purpose of performing the verification of a CCUS project under the regulations, a qualified person is a person employed by an accredited verification body.

16(2) A project developer shall ensure that all members of the verification team performing verification on a CCUS project are employed by an accredited verification body that meets the requirements of and is accredited under ISO 14065.

16(3) For the purpose of verifying a CCUS project in accordance with the regulations and this standard, a project developer shall provide access to the CCUS project, any personnel, records and other information or resources as requested by the verification team conducting the verification.

16(4) A project developer shall ensure that a verification report is prepared for the CCUS project in the format specified by the Minister in an applicable template and in accordance with this standard and the ISO 14064-3 Standard.

16(5) A project developer shall ensure that before an unmodified, modified or adverse opinion is prepared for a statement of verification, the determination that forms the basis of the opinion is reviewed by an independent reviewer who meets the following qualifications:

(a) the person is employed by an accredited verification body;

(b) the person is not a member of the verification team carrying out the verification with respect to the CCUS project;

(c) the person has not been a member of a verification team that has performed a verification with respect to the CCUS project for at least three compliance years unless impartiality can be demonstrated by the accredited verification body.

16(6) A project developer shall ensure that the verification of injection emissions and project emissions data associated with the Credit Report for a CCUS project is completed to a reasonable level of assurance in accordance with the ISO 14064-3 standard.

16(7) Materiality is determined according to the following formula:

$$Materiality = \frac{A}{B}\ x\ 100\%$$

where:

A is the sum of the absolute value of all errors, omissions, and misstatements identified by source/sink in the emissions reduction, in tonnes of CO_2e.

B is the absolute value of the emissions reduction, in tonnes of CO_2e, as corrected by the third-party verifier.

16(8) For the purpose of completing a verification opinion for a CCUS project, a material discrepancy in the emissions data reported by the project developer will exist if the level of materiality exceeds five per cent of the corrected emissions reduction in the given compliance year.

16(9) A project developer shall ensure that at the end of the verification process, a statement of verification is prepared reflecting a type of opinion in Column 1 of Table 2 based on the corresponding determination made by the verification team in Column 2 of Table 2.

Table 2
Types of Opinion
[Subsection 16(9)]

Type of Verification	Determination of Verification Team
Unmodified	Both of the following circumstances apply: (i) there is a reasonable level of assurance that the Credit Report contains no material discrepancy in emissions; and (ii) the Credit Report was prepared in accordance with this standard.
Modified	Both of the following circumstances apply: (i) there is a reasonable level of assurance that the Credit Report contains no material discrepancy in emissions; and (ii) the Credit Report was prepared substantially in accordance with this standard.
Adverse	One or both of the following circumstances apply: (i) there is a reasonable level of assurance that the Credit Report contains a material discrepancy in emissions; and/or (ii) the Credit Report was not prepared substantially in accordance with this standard.

16(10) To ensure impartiality with respect to a CCUS project undergoing verification, a project developer shall ensure that a verification team does not perform verification for the CCUS project if there is known to be a current or potential threat to compromise the impartiality of:

(a) a member of the verification team; or

(b) the accredited verification body for which the verification team is employed.

16(11) For the purposes of performing verification concerning a CCUS project, a site visit to the CCUS project is required if:

(a) no verification team visited the CCUS project for the purposes of conducting a verification in the most recent three compliance years;

(b) the most recent verification concerning the CCUS project resulted in an adverse verification opinion being submitted to the Minister; or

(c) the verification is the first by the accredited verification body concerning the CCUS project.

16(12) A site visit conducted at a CCUS project including a regulated facility under the requirements of the regulations is also considered a site visit for the purposes of this standard.

16(13) A site visit conducted by an accredited verification body under the requirements of the Government of Canada's *Output-Based Pricing System Regulations* while that facility was subject to the Government of Canada's *Output-Based Pricing System Regulations* is also considered a site visit by that accredited verification body for the purposes of these regulations and this standard.

16(14) For the purposes of Subsection 16(11) the verification team conducting a verification on a CCUS project may undertake a virtual site visit if:

(a) an in-person site visit has previously been undertaken for the CCUS project as part of a verification;

(b) the accredited verification body conducting the verification also conducted the most recent verification for the CCUS project; and

(c) the virtual site visit enables the verification team to complete the verification to a reasonable level of assurance.

16(15) A project developer shall ensure that all records and information respecting the verification of a CCUS project are retained and accessible upon request for at least seven years after the date on which the records or information are created.

17. Audits and Inspections

17(1) The Minister may perform an audit or inspection on an approved CCUS project and any associated documentation in accordance with Section 67 of the act.