

CDM-EB78-AA-A09

Draft package of documents due to introduction of provisions related to carbon dioxide capture and storage project activities

Version 01.0

DRAFT



United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. At its seventh session, the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (hereinafter referred to as the CMP) adopted decision 10/CMP.7; "Modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities" (hereinafter referred to as the carbon dioxide capture and storage (CCS) modalities and procedures).
2. The Board, at its seventy-sixth meeting, considered a package of documents on the introduction of provisions related to carbon dioxide capture and storage (CCS) project activities and provided feedback, including with regard to the options proposed. The Board requested the secretariat to revise the documents, for consideration by the Board at a future meeting, taking into account its feedback, in particular:
 - (a) The Board agreed to further consider the issue of:
 - (i) How a possible CDM geological storage site that is also suitable for potable water supply should be dealt with;
 - (ii) Whether an Expression of Agreement from the host Party "shall" or "may" list, as an appendix, the host Party's laws and regulations that satisfy the requirements set out in section 4.1 bis 2 of the CDM Project cycle procedure (PCP) (reflecting paragraphs 8 of the CCS modalities and procedures), and whether this appendix should be updated to add, amend or remove laws or regulations from the list, as applicable, when such changes occur;
 - (b) The CCS amendments to the CDM Project standard (PS), CDM Validation and verification standard (VVS) and PCP should be reviewed and redrafted to ensure consistency with:
 - (i) The language used in other sections of the PS, VVS and PCP;
 - (ii) The level of detail across various provisions.
3. The preparation of the package of regulatory documents benefitted from electronic consultation with the CCS Working Group. A table setting out the comments from CCS Working Group members is included as appendix 6 to this package.

2. Purpose

4. The purpose of this package of documents is to incorporate, to the extent possible, CCS-related requirements into existing CDM standards and procedures, and where necessary, introduce new regulatory documents to support the implementation of CCS under the CDM.

3. Key issues and proposed solutions

5. The issues referred to in paragraph 1 above are incorporated in the attached draft documents as follows:
- (a) Templates for letters of approval for CCS project activities and EoAs: appendix 4 and appendix 5, respectively;
 - (b) Issuance for EoA: paragraph 2, 3 and 3.bis of section 4.1 bis.1, "Expression of host Party agreement for CCS project activities", in the PCP; appendix 3;
 - (c) Validation and registration: section 8.4 bis.1, "Participation requirements for CCS project activities", in the validation and verification standard; appendix 2;
 - (d) Monitoring: paragraph 16 in section 11.bis.7, "Monitoring", in the PS; appendix 1;
 - (e) Requirement for financial provisions: section 8.4 bis.6, "Requirements for financial provision" in the VVS; appendix 2;
 - (f) Liability: paragraph 30 in section 11.bis.9, "Liability" in the PS;
 - (g) Options for:
 - (i) Listing of host Party laws and regulations: paragraph 3 and 3.bis in section 4.1 bis.1, "Expression of host Party agreement for CCS project activities", in the PCP; (appendix 3) and appendix 5 "Draft example expression of agreement form for CCS project activities";
 - (ii) Potable water site: paragraph 6, 6.bis and 6.ter in section 11.bis.4, "Selection and characterization of the geological storage site", in the project standard (appendix 1).

4. Impacts

6. Inclusion and description of the CCS-related requirements in the standards and procedures will facilitate the implementation of CCS project activities.

5. Subsequent work and timelines

7. If approved, work will commence on assessing and implementing any changes required to the secretariat's information technology system to accommodate the new provisions. In case of adoption of 'Revisions of regulatory documents due to introduction of standardized baselines' this package documents will come into effect on 25th April 2014¹ otherwise immediately i.e. 4th April 2014.

6. Recommendations to the Board

8. The secretariat recommends that the Board adopt the following:
- (a) The proposed amendments to the PS, VVS and PCP;

¹ This date is consistent with the proposed effective date of "Revisions of regulatory documents due to introduction of standardized baselines" considered by the Board at its seventy-eighth meeting.

- (b) The draft guidelines:
 - (i) Letter of approval for carbon dioxide capture and storage project activities;
- (c) The draft form:
 - (i) Expression of Agreement (EoA) for CCS project activities.

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Appendix 1. Amendments to the “Clean development mechanism project standard (version 05.0)”

1. Changes to Section 1. Introduction

1. The following paragraphs shall read as follows:

1. The Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (hereinafter referred to as the CMP), at its first session, established the basis of the regulatory framework for the clean development mechanism (hereinafter referred to as the CDM) to implement Article 12 of the Kyoto Protocol through the following:
 - (a) Annex to decision 3/CMP.1: Modalities and procedures for a clean development mechanism (hereinafter referred to as the CDM M&Ps);
 - (b) Annexes to decision 4/CMP.1, including annex II: Simplified modalities and procedures for small-scale clean development mechanism project activities (hereinafter referred to as the CDM SSC M&Ps);
 - (c) Annex to decision 5/CMP.1: Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism (hereinafter referred to as the CDM A/R M&Ps);
 - (d) Annex to decision 6/CMP.1: Simplified modalities and procedures for small-scale afforestation and reforestation project activities under the clean development mechanism (hereinafter referred to as the CDM SSC A/R M&Ps);
 - (e) Decision 7/CMP.1;
 - (f) Annex to decision 10/CMP.7: Modalities and procedures for carbon dioxide capture and storage in geological formations under the clean development mechanism (hereinafter referred to as the CDM CCS M&Ps).

2. Changes to Section 2. Scope and applicability

2. The following paragraphs shall read as follows:

8. In addition to requirements in chapters 6 and 7, requirements in chapters 8, 9, 10, 11 and 12 specifically apply to small-scale project activities, large-scale afforestation and reforestation (A/R) project activities, small-scale A/R project activities, carbon dioxide capture and storage (CCS) project activities and PoAs, respectively.

9. Therefore, requirements in chapters 6, 7, 8, 9, 10 and 11 applicable to project participants for CDM project activities apply, where applicable, to coordinating/managing entities for CDM PoAs.
10. Requirements in chapter 12 13 apply to any type of CDM project activities and, as applicable, to CDM PoA. However, as experience with PoA is evolving, the applicability of certain requirements to PoA are yet to be defined and will be addressed in the future.

3. Changes to Section 6. General requirements

3. The following paragraph shall read as follows:

22. Project participants shall determine the type of CDM project activity or PoA they want to design and implement:
 - (a) Large-scale project activity;
 - (b) Small-scale project activity;
 - (c) Large-scale afforestation or reforestation project activity;
 - (d) Small-scale afforestation or reforestation project activity;
 - (e) CCS project activity; or
 - (f) Programme of activities, either large-scale, small-scale, large-scale A/R, small-scale A/R, or CCS.

4. Changes to Section 7. Design requirements for all project types

4. The following paragraph shall read as follows:

76. Project participants shall select a DOE for the validation of the proposed CDM project activity that is accredited for the validation function and sectoral scopes(s)¹² of the project activity. Project participants shall have a contractual arrangement with the DOE for the validation.

¹² The list of all 15 16 sectoral scopes, the DOEs accredited in each scope as well as the approved baseline and monitoring methodologies linked with these sectoral scopes are given on the UNFCCC CDM website.

5. Introduction of Section 11. bis: Specific design requirements for carbon dioxide capture and storage project activities

5. The following new paragraphs shall be inserted under the new section:

11.bis.1 Definitions for CCS project activities

- (a) **Carbon dioxide capture and storage** - the capture and transport of carbon dioxide from anthropogenic sources of emissions, and the injection of the captured carbon dioxide into an underground geological storage site for long-term isolation from the atmosphere;

- (b) **Geological storage site** - a paired geological formation, or a series of such formations, consisting of an injection formation of relatively high porosity and permeability into which carbon dioxide can be injected, coupled with an overlying cap rock formation of low porosity and permeability and sufficient thickness which can prevent the upward movement of carbon dioxide from the storage formation;
- (c) **Operational phase** - the period that begins when carbon dioxide injection commences and ends when carbon dioxide injection permanently ceases;
- (d) **Closure phase** - the phase that follows the operational phase and is the period that begins when carbon dioxide injection permanently ceases and ends when the geological storage site has been closed;
- (e) **Closure of a geological storage site** - the completion of the sealing of the geological storage site, including the appropriate plugging of wells relating to the geological storage site;
- (f) **Post-closure phase** - the phase that follows the closure phase and is the period that begins when the geological storage site has been closed;
- (g) **Seepage** - a transfer of carbon dioxide from beneath the ground surface or seabed ultimately to the atmosphere or ocean;
- (h) **Site development and management plan** - the documented description of how a geological storage site will be operated and managed;
- (i) **History matching** - the process of comparing observed results from the monitoring and measurement of a geological storage site with the results of the predictive numerical modelling of the behaviour of carbon dioxide injected into the geological storage site, and the use of the observed results to calibrate and update numerical models and modelling results. It can involve multiple iterations;
- (j) **Liability** - the legal responsibility arising from the CCS project activity or the relevant geological storage site, with the exception of the obligations arising from a net reversal of storage as set out in section 8.4 of the Project cycle procedure but including all obligations related to the operation of the storage site (e.g. monitoring, remedial measures, etc.), to compensate for or remedy any significant damages, including damage to the environment, such as ecosystem damage, other material damages or personal injury;
- (k) **Remedial measures** - actions and measures intended to stop or control any unintended physical leakage or seepage of carbon dioxide, to restore the integrity of a geological storage site, or to restore long-term environmental quality significantly affected by a CCS project activity;
- (l) **Net reversal of storage of carbon dioxide** means that:
 - (i) For a verification period during the crediting period, the accumulated verified reductions in anthropogenic emissions by sources of greenhouse gases (GHGs) that have occurred as a result of a registered CDM project activity are negative (i.e. the

seepage from the geological storage site of the CCS project activity exceeds the remainder of the emission reductions achieved by the CCS project activity);

- (ii) For a verification period after the end of the last crediting period, seepage has occurred from the geological storage site of the CCS project activity.

11.bis.2 Description of project activity or programme of activities

1. In addition to the requirements mentioned in section 7.1 of the Project standard, for CCS project activities the project participants shall:

- (a) Provide a description and analysis of the environmental conditions in the area of the geological storage site prior to any storage of carbon dioxide, including a description of the following:

- (i) The hydrology, aquifer and groundwater properties, such as acidity and dissolved gases;
- (ii) Where appropriate, the soils and soil gas properties, such as a carbon dioxide isotope analysis and carbon dioxide flux rate;
- (iii) The ecosystems and the possible presence of rare or endangered or sensitive species and their habitats;
- (iv) Climatic data;

- (b) Demonstrate that the proposed project activity² does not involve:

- (i) The transport of carbon dioxide from one country to another; and/or
- (ii) A geological storage site that is located in more than one country.

11.bis.3 Host Party participation requirements

2. Project participants implementing a CCS project activity shall demonstrate that the host Party of the CCS project activity has:

- (a) Submitted an expression of its agreement to the UNFCCC secretariat to allow the implementation of CCS project activities on its territory; and
- (b) Established laws or regulations in accordance with the host Party participation requirements set out in section 4.1.bis of the Project cycle procedure, which state that, prior to hosting CDM CCS project activities on its territory, a host Party shall ensure that it has established laws and/or regulations which:

² As per paragraphs 10 and 41 of decision 5/CMP.8; the CMP decided that the eligibility of these types of project activities shall be considered by the Subsidiary Body for Scientific and Technological Advice at its forty-fifth session, and also decided that although these types of project activities would merit inclusion under the CDM, more practical experience of carbon dioxide capture and storage project activities in geological formations under the CDM would be beneficial.

- (i) Set procedures that include provisions for the appropriate selection, characterization and development of geological storage sites, recognizing the project requirements for CCS project activities under the CDM set out in section 11.bis.4 below;
 - (ii) Define means by which rights to store carbon dioxide in, and gain access to, a subsurface pore space can be conferred to project participants;
 - (iii) Provide for timely and effective redress for affected entities, individuals and communities for any significant damages, such as environmental damage, including damage to ecosystems, other material damages or personal injury, caused by the project activity, including in the post-closure phase;
 - (iv) Provide for timely and effective remedial measures to stop or control any unintended seepage of carbon dioxide, to restore the integrity of a geological storage site, and to restore long-term environmental quality significantly affected by a CCS project activity;
 - (v) Establish means for addressing liability arrangements for carbon dioxide geological storage sites, taking into account the provisions set out in section 11.bis.8 below;
 - (vi) For a host Party that accepts the obligation to address a net reversal of storage, establish measures to fulfil such an obligation.
3. In addition to the requirements for approval and authorization set out section 7.6 above, project participants shall seek written confirmation of the following from the DNA of the host Party:
- (a) That the right to store carbon dioxide in, and gain access to, the proposed geological storage site has been conferred to them;
 - (b) That the host Party agrees to the financial provision described in the PDD (see section 11.bis.8 below);
 - (c) That the host Party accepts the allocation of liability as proposed in the PDD and the transfer of liability (see section 11.bis.9 below);
 - (d) Whether the host Party accepts the obligation to address a net reversal of storage in the situation referred to in section 8.4 of the Project cycle procedure.

11.bis.4 Selection and characterization of the geological storage site

4. The project participants shall describe the selection and characterization of geological storage site. Projects participants shall demonstrate that they have selected a geological storage site:
- (a) In which, under the proposed conditions of use:

(i) There is no significant risk of seepage (as evidenced by the results of the risk and safety assessment carried out in accordance with section 11.bis.6);

(ii) No significant environmental or health risks exist (as evidenced by the risk and safety assessment carried out in accordance with section 11.bis.6); and

(iii) The selected geological storage site complies with all laws and regulations of the host Party, as applicable;

(b) That is not located in international waters.

5. When selecting a geological storage site, projects participants shall evaluate:

(a) All available evidence, such as data, analysis and history matching, indicating that the injected carbon dioxide will be completely and permanently stored such that, under the proposed or actual conditions of use, no significant risk of seepage or risk to human health or the environment exists. The results of this evaluation should be supported by, and consistent with, the results of the risk and safety assessment carried out in accordance with section 11.bis.6 below;

(b) Whether the geological storage site is suitable for potable water supply.

6. Option 1: If the proposed geological storage site is suitable for potable water supply, a decision about whether the site is eligible for geological storage shall be made by the host Party.

6.bis Option 2: If the proposed geological storage site is suitable for potable water supply, a decision about whether the site is eligible for geological storage shall be made by the host Party, taking into account the results of the site characterization and the risk and safety assessment of the proposed geological storage site, following the procedures outlined in the CCS modalities and procedures.

6.ter. Option 3: If the proposed geological storage site is suitable for potable water supply, the project participants shall confirm by the risk and safety assessment as defined in the CCS modalities and procedures that no negative effect (on the environmental or human health) of the project activity exists or would exist in the potable water site.

7. When characterizing the geological storage site, project participants shall take the following steps:

(a) Step 1: data and information collection, compilation and evaluation. The project participant shall collect sufficient data and information to characterize the geological storage site and determine potential seepage pathways. The project participant shall evaluate (i) the collected data and information in order to make a preliminary assessment of the site's storage capacity and to assess the viability of monitoring and (ii) the quality of the data and information and, where required, collect new data;

(b) Step 2: characterization of the geological storage site architecture and surrounding domains. The project participant shall assess the known and

inferred structures within the injection formation(s) and cap rock formation(s) that would act as barriers to, or facilitators of, the migration of injected carbon dioxide. The project participant shall compile a numerical three-dimensional static earth model (or models) of the geological storage site. The project participant shall assess the uncertainty associated with key parameters used to build the model. The model shall be used by the project participant to characterize, inter alia:

- (i) The structure of the geological containment;
- (ii) All relevant geological properties of the injection formation(s);
- (iii) The cap rock formation(s) and overburden;
- (iv) The fracture system;
- (v) The areal and vertical extent of the geological storage site (e.g. the injection formation, the cap rock formation, overburden, secondary containment zones and surrounding domains);
- (vi) The storage capacity in the injection formation(s);
- (vii) The fluid distribution and physical properties;
- (viii) Other relevant characteristics;

(c) Step 3: characterization of dynamic behaviour, sensitivity characterization and risk assessment. The project participant shall assess how the injected carbon dioxide can be expected to behave within the geological storage site architecture and surrounding domains, with a particular focus on the risk of seepage. The project participant shall utilize numerical dynamic modelling of the injected carbon dioxide using the static model developed in step 2 above to assess:

- (i) Coupled processes (i.e. the interaction between each single process in the model);
- (ii) Where possible, reactive processes (e.g. the interaction of injected carbon dioxide with in situ minerals in the numerical model); and
- (iii) Short-term and long-term simulations.

Such numerical modelling shall be used to provide insight into the pressure and extent of carbon dioxide in the geological storage site over time, the risk of fracturing the cap rock formation(s) and the risk of seepage. Multiple simulations shall be conducted to identify the sensitivity of the assessments to assumptions made. The simulations carried out in this step shall form the basis for risk and safety assessments, detailed in section 11.bis.6 below;

(d) Step 4: establishment of a site development and management plan. Drawing on steps 1–3 above, the project participant shall establish a site development and management plan. The development and management

plan shall address the proposed conditions of use for the geological storage site and include, inter alia, descriptions of:

- (i) The preparation of the site;
- (ii) Well construction, such as materials and techniques used, and the location, trajectory and depth of the well;
- (iii) Injection rates and the maximum allowable near-wellbore pressure;
- (iv) Operating and maintenance programmes and protocols;
- (v) The timing and management of the closure phase of the proposed CCS project activity, including site closure and related activities.

8. When characterizing and selecting a geological storage site, project participants shall use a wide range of data and information, including, inter alia:

- (a) Geological information, such as descriptions of the overburden and cap rock formation(s) and injection formation(s), locations of mapped faults, subsurface well and wellbore information, permeability and porosity, which are important in determining the injectivity of the injection formation, and the cap rock formation containment capacity, and information about regional tectonics, including the stress field and historical seismic activity;
- (b) Geophysical information, such as the thickness and lateral extent of the storage and cap rock formation(s), pressure, temperature, the existence of faults, and reservoir heterogeneity. Sources of data may include, inter alia, well logs, sonic logs and seismic surveys;
- (c) Geomechanical information, such as the stress state and the rock fracture pressure within the injection formation(s) and the cap rock formation(s). Sources of data include borehole data, such as breakouts inferred from calliper and televiwer logs, minifrac results, information about anisotropy within the reservoir, and mud loss events;
- (d) Geochemical information, such as information on rock and fluid properties and mineralogy. Fluid properties, such as the brine salinity, should also be used to determine dissolution trapping rates;
- (e) Hydrogeological information, such as aquifer characteristics and aquifer flow direction and rates within the geological storage site, the overburden and surrounding domains.

9. Project participants shall demonstrate that they have selected and characterized the geological storage site in accordance with the requirements referred to in paragraphs 4–8 above and provide all relevant supporting documents.

11.bis.5 Project boundary

10. The following applies in addition to paragraphs 39 and 40 above [Project standard]: The project participants shall define the boundary of a CCS project activity to include:

- (a) Where applicable, the following:
 - (i) The installation where the carbon dioxide is captured;
 - (ii) Any treatment facilities;
 - (iii) Transportation equipment, including pipelines and booster stations along a pipeline, or offloading facilities in the case of transportation by ship, rail or road tanker;
 - (iv) Any reception facilities or holding tanks at the injection site;
 - (v) The injection facility;
 - (vi) Subsurface components, including the geological storage site and all potential sources of seepage, as determined during the characterization and selection of the geological storage site;
- (b) The vertical and lateral limits of the carbon dioxide geological storage site that are expected when the carbon dioxide plume stabilizes over the long term during the closure phase and the post-closure phase.

11.bis.6 Risk and safety assessment

- 11. Project participants shall carry out a comprehensive risk and safety assessment in order to assess the integrity of the geological storage site and potential impacts on human health and ecosystems in proximity to the proposed CCS project activity. The risk and safety assessment shall also be used to inform environmental and socioeconomic impact assessments. The risk and safety assessment shall:
 - (a) Consider specific risks associated with containment failure resulting in emissions of greenhouse gases from above-ground installations and seepage from subsurface installations, and the potential effects on, inter alia:
 - (i) The contamination of underground sources of drinking water;
 - (ii) The chemical properties of seawater;
 - (iii) Human health and ecosystems (e.g. as a result of carbon dioxide accumulations at dangerous levels in non-turbulent air);
 - (b) Consider the risk of continuous slow seepage from a geological storage site. This type of event can arise due to, inter alia:
 - (i) Seepage along injection well(s) or abandoned well(s);
 - (ii) Seepage along a fault or fracture;
 - (iii) Seepage through the cap rock formation;
 - (c) Consider the risk of sudden mass release of carbon dioxide from surface CCS installations, for example due to pipeline rupture;
 - (d) Cover the full chain of CCS, including surrounding environments;

- (e) Provide assurance of safe operational integrity regarding the containment of carbon dioxide, based on site-specific information about the geological storage site, potential seepage pathways, and secondary effects of storing carbon dioxide in the geological storage site, such as brine migration;
 - (f) Be used to determine operational data for the application of the site development and management plan, such as to set the appropriate maximums of injection pressure that will not compromise the confining cap rock formation(s) and the overburden of the geological storage site;
 - (g) Take account of the effects of potential induced seismicity or other geological impacts, as well as any other potential consequences for the environment, including on local ecosystems, property and public health, and global environmental effects on the climate directly attributable to the CCS project activity, including effects due to seepage;
 - (h) Be used to help prioritize locations and approaches for enhanced monitoring activities;
 - (i) Provide a basis for remedial measures, including plans for responses that can stop or control any unintended emissions from surface CCS installations and seepage of carbon dioxide, restore the integrity of a geological storage site, and restore long-term environmental quality significantly affected by a CCS project activity. Such measures and plans shall accompany monitoring plans;
 - (j) Include a communication plan.
12. In order to assess the potential risks of carbon dioxide capture, transportation and storage in a geological storage site, project participants shall take the following steps:
- (a) Step 1: hazard characterization. The project participant shall analyse the following:
 - (i) Potential hazards resulting from the capture, transportation and injection of carbon dioxide;
 - (ii) Potential seepage pathways from the geological storage site;
 - (iii) The magnitude of potential seepage for identified potential seepage pathways;
 - (iv) Critical parameters affecting potential seepage, such as the maximums of injection formation pressure, injection rates and temperature;
 - (v) The sensitivity to various assumptions made during numerical modelling;
 - (vi) Any other factors which could pose a hazard to human health and the environment;

- (b) Step 2: exposure assessment. The project participant shall undertake an exposure assessment based on the characteristics of surrounding populations and ecosystems, the potential fate and behaviour of any seeped carbon dioxide, and other factors;
- (c) Step 3: effects assessment. The project participant shall undertake an effects assessment based on the sensitivity of species, communities or habitats linked to potential seepage events identified during the hazard characterization and the effects of elevated carbon dioxide concentrations in the atmosphere, biosphere and hydrosphere;
- (d) Step 4: risk characterization. The project participant shall assess the safety and integrity of the geological storage site in the short-, medium- and long-term, including an assessment of the risk of seepage under the proposed conditions of use set out in the site development and management plan;
- (e) Step 5: contingency plan for large incidents, including seepage. The project participant shall prepare all the necessary plans that are to be put in place in case of large incidents, including availability of trained personnel, materials and equipment and financial means to mitigate adverse impacts of the incident and teams prepared to act as swiftly as possible.

13. Project participants shall provide:

- (a) A detailed description of the risk and safety assessment referred to in paragraphs 11 and 12 above;
- (b) A copy of the communications and contingency plans referred to in paragraphs 11 and 12 above; and
- (c) References to all relevant supporting documents.

11.bis.7 Monitoring

- 14. Project participants shall include in the PDD provisions for monitoring the proposed CCS project activity that meet the following objectives:**
- (a) To provide assurance of the environmental integrity and safety of the geological storage site;
 - (b) To confirm that the injected carbon dioxide is contained within the geological storage site and within the project boundary;
 - (c) To ensure that injected carbon dioxide is behaving as predicted in order to minimize the risk of any seepage or other adverse impacts;
 - (d) To ensure that good site management is taking place, taking account of the proposed conditions of use set out in the site development and management plan, established in step 4 of section 11.bis.4 above;
 - (e) To detect and estimate the flux rate and total mass of carbon dioxide from any seepage;

- (f) To determine whether timely and appropriate remedial measures have been carried out in the event of seepage;
 - (g) To determine the reductions in anthropogenic emissions by sources of greenhouse gases that have occurred as a result of the registered CCS project activity.
15. In developing the monitoring plan for the proposed CCS project activity, project participants shall meet the objectives set out above by:
- (a) Reflecting the principles and criteria of international good practice for the monitoring of geological storage sites and consider the range of technologies described in the relevant sections of the Intergovernmental Panel on Climate Change (IPCC) 2006 Guidelines for National Greenhouse Gas Inventories and other good practice guidance;
 - (b) Transparently specifying which parameters and information will be monitored and collected, and the location and frequency of application of different monitoring techniques during the operational phase, closure phase and post-closure phase;
 - (c) Providing for specific techniques and methods that can:
 - (i) Detect and estimate the quantity of the carbon dioxide stored in the geological storage site;
 - (ii) Detect potential seepage via pathways in the cap rock formation(s) and in the overburden and surrounding domains in the geological storage site;
 - (iii) Estimate the flux rate and total mass of carbon dioxide from any seepage;
 - (d) Including provisions for history matching, by using the monitoring results to calibrate and update the numerical models that were used to characterize the geological storage site;
 - (e) Providing for measurement of the carbon dioxide stream and composition, including impurities, at various points in the carbon dioxide capture, transportation and storage chain, including at the point(s) of injection into the geological storage site, at an appropriate frequency;
 - (f) Providing for measurement of the temperature and pressure at the top and bottom of the injection well(s) and observation well(s), at an appropriate frequency;
 - (g) Providing for the monitoring and measurement of various geological, geochemical and geomechanical parameters, such as fluid pressures, displaced fluid characteristics, fluxes and microseismicity, at an appropriate frequency;
 - (h) Providing for the monitoring and measurement of relevant parameters in the overburden and surrounding domains of the geological storage site, such as the monitoring of groundwater properties, soil gas measurements

and measurements of the surface concentrations of carbon dioxide in the air, which shall be calibrated to detect signs of seepage, at an appropriate frequency;

- (i) Providing for the detection of corrosion or degradation of the transport and injection facilities;
- (j) Providing for an assessment of the effectiveness of any remedial measures taken in the event of seepage.

16. Project participants shall, for each verification period, carry out history matching and, where necessary, update the numerical models used to characterize the geological storage site by conducting new simulations using the monitored data and information. Project participants shall adjust the numerical models if significant deviations (as defined in the approved CCS methodology used by the CCS project activity) occur between observed and predicted behaviour. The project participants shall immediately notify the host Party and the CDM Executive Board in writing if a significant deviation occurs at any stage of the project cycle.

17. Where significant deviations are observed during history matching or when requesting a renewal of the crediting period, the project participants shall, as appropriate:

- (a) Recharacterize the geological storage site, in accordance with section 11.bis.4 above;
- (b) Revise the project boundary;
- (c) Update the risk and safety assessment, in accordance with section 11.bis.6 above;
- (d) Update the environmental and socioeconomic impact assessments, referred to in section 11.bis.10 below;
- (e) Revise the monitoring plan, in order to improve the accuracy and/or completeness of data and information, taking into account observed deviations determined during history matching, changes to the project boundary, changes to the risk and safety assessment, changes to the environmental and socioeconomic impact assessments, new scientific knowledge and improvements in the best available technology;
- (f) Update the site development and management plan, taking account of the results of the activities described in subparagraphs (a–e) above, where appropriate.

18. Where the information prepared in accordance with paragraph 17 above indicates that the geological storage site no longer meets the requirements set out in paragraphs 4 and 5 above, the issuance of CERs shall cease.

19. Project participants shall account for any seepage that occurs during the crediting period(s) of a CCS project activity as project or leakage emissions in the calculation of the monitored reductions in anthropogenic emissions by sources of greenhouse gases that have occurred as a result of the registered CDM CCS

project activity. Any seepage that occurs after the end of the last crediting period shall be quantified and reported in monitoring reports.

20. The monitoring of the geological storage site shall:

- (a) Begin before injection activities commence, to ensure adequate time for the collection of any required baseline data;
- (b) Be conducted at an appropriate frequency during and beyond the crediting period(s) of the proposed CCS project activity;
- (c) Not be terminated earlier than 20 years after the end of the last crediting period of the CDM project activity or after the issuance of CERs has ceased, whichever occurs first;
- (d) Only be terminated if no seepage has been observed at any time in the past 10 years and if all available evidence from observations and modelling indicates that the stored carbon dioxide will be completely isolated from the atmosphere in the long term. This may be demonstrated through the following evidence:
 - (i) History matching confirms that there is agreement between the numerical modelling of the carbon dioxide plume distribution in the geological storage site and the monitored behaviour of the carbon dioxide plume;
 - (ii) Numerical modelling and observations confirm that no future seepage can be expected from the geological storage site.

21. The project participant(s) liable for the geological storage site, or an entity that is under contract to the project participant(s), shall conduct the monitoring of the geological storage site unless and until the transfer of liability to the host Party is effected in accordance with section 11.bis.9 below.

11.bis.8 Requirements for financial provision

22. Project participants shall establish a financial provision that:

- (a) Meets all obligations in accordance with the laws and regulations of the host Party arising from the establishment and operation of the proposed CCS project activity;
- (b) Allows for the ongoing safe operation of the geological storage site in accordance with the laws and regulations of the host Party;
- (c) Addresses the risk of project participant insolvency in accordance with the laws and regulations of the host Party;
- (d) Offers a means of redress for affected communities and ecosystems in the event of seepage from a geological storage site of a CCS project activity in accordance with the laws and regulations of the host Party;
- (e) Enables the host Party to discharge its obligations arising in connection with the transfer of liability.

23. The financial provision shall cover:

- (a) The cost of ongoing monitoring, at an appropriate frequency, of the geological storage site and of verification and certification by a DOE for at least 20 years after the end of the last crediting period of the CCS project activity or after the issuance of CERs has ceased, whichever occurs first;
- (b) In the event of seepage, the cost associated with the obligations set out in section 8.4 of the Project cycle procedure;
- (c) The cost of any remedial measures required by laws and regulations of the host Party;
- (d) Any other requirements determined by the host Party that are agreed at the time of the host Party approval and described in the PDD.

24. Project participants shall describe the type and amount of the financial provision and provide a detailed cost estimate for each of the requirements referred to in paragraph [23] above, including underlying assumptions and justifications.

25. The financial provision shall, in accordance with the laws and regulations of the host Party, be transferable to the host Party upon fulfilment of all obligations of the project participants in accordance with the CDM rules and requirements and the laws and regulations of the host Party, or upon insolvency of the project participant(s).

11.bis.9 Liability

26. Project participants shall clearly document in the PDD how the liability obligations arising from the proposed CCS project activity or its geological storage site are allocated during the operational phase, closure phase and post-closure phase.

27. Relevant provisions of laws and regulations of the host Party, including those referred to in section 11.bis.3 above, shall apply to matters related to liability.

28. During the operational phase and any time thereafter until a transfer of liability to the host Party has been effected in accordance with paragraph 299 below, liability shall reside with the project participants.

29. A transfer of liability from a project participant(s) to the host Party shall be effected after:

- (a) The monitoring by the project participant of the geological storage site has been terminated in accordance with the conditions for such termination, as set out in section 11.bis.7 above;
- (b) The host Party has established that the conditions set out by the DNA in its letter of approval, referred to in section 11.bis.3 above, and those set out in the relevant laws and regulations applicable to the geological storage site, have been complied with.

30. Project participants shall notify the Board in writing, through the relevant DNA, not less than six months before the transfer of liability is scheduled to occur.

11.bis.10 Environmental and socioeconomic impact assessments

31. The following applies instead of paragraphs [63 and 64] above [Project standard]:
The project participants shall carry out comprehensive environmental and socioeconomic impact assessments in accordance with the laws and regulations of the host Party, including with regard to potential transboundary impacts, drawing upon the risk and safety assessment referred to in section 11.bis.6 above. Such assessments shall:
- (a) Include a detailed description of the planned monitoring and remedial measures to address any environmental and socioeconomic impacts identified, and be compiled in accordance with procedures as required by the host Party;
 - (b) Analyse thoroughly and exhaustively air emissions (e.g. nitrogen oxides, sulphur oxides, dust, mercury, polycyclic aromatic hydrocarbons), solid waste generation, and water use associated with current CCS technologies;
 - (c) Be conducted applying the best available techniques in order to facilitate a high level of protection for the environment as a whole and for communities;
 - (d) Include at least a comprehensive analysis of the environmental and socioeconomic impacts including consideration of the potential impacts of carbon dioxide storage on potable water supply.
32. Project participants shall provide a detailed summary of the environmental and socioeconomic impact assessment and provide references to all relevant supporting documents.

11.bis.11 Verification and certification

33. Project participants may select the time for the initial verification and certification of a CCS project activity by a DOE, taking into account that subsequent verification and certification reports shall be submitted by the DOE to the Executive Board not later than five years after the end of the previous verification period.
34. Verification and certification of a CCS project activity shall continue, in accordance with paragraph 30 above, beyond the end of the last crediting period by the DOE appointed by project participants and until such time as the monitoring of the geological storage site has been terminated in accordance with the conditions for the termination of monitoring, as set out in paragraph 20 above.

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Appendix 2. Amendments to the “Clean development mechanism validation and verification standard (version 05.0)”

1. Change to Section 1: Introduction

1. The following paragraph shall read as follows:

1. The Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (hereinafter referred to as the CMP), at its first session, established the basis of the regulatory framework for the clean development mechanism (hereinafter referred to as the CDM) to implement Article 12 of the Kyoto Protocol through the following:
 - (a) Annex to decision 3/CMP.1: Modalities and procedures for a clean development mechanism;
 - (b) Annexes to decision 4/CMP.1, including annex II: Simplified modalities and procedures for small scale clean development mechanism project activities;
 - (c) Annex to decision 5/CMP.1: Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism;
 - (d) Annex to decision 6/CMP.1: Simplified modalities and procedures for small scale afforestation and reforestation project activities under the clean development mechanism;
 - (e) Decision 7/CMP.1;
 - (f) Decision 10/CMP.7: Modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities.

2. Changes to Section 2: Scope and applicability

2. The following paragraphs shall read as follows:

7. Principles in chapter 5 and requirements in chapters 6, 7 and 9 apply to any type of CDM project activities and as applicable, to CDM PoAs. In addition, requirements in chapters 8 and 10 specifically apply to small-scale (SSC) project activities, large scale afforestation/reforestation (A/R) project activities, small scale A/R project activities, carbon dioxide capture and storage (CCS) project activities and PoAs.

3. Changes to Section 7: General validation requirements

3. The following paragraphs shall read as follows:

20. In carrying out its validation work, the DOE shall:

Determine whether the proposed project activity complies with the requirements of paragraph 37 of the CDM M&Ps (with the exception of paragraph 37 (c) for CCS project activities), the applicability conditions of the selected methodology and guidance issued by the Board;

Assess the claims and assumptions made in the project design document (PDD). The evidence used in this assessment shall not be limited to that provided by the project participants.

4. Changes to Section 8: Specific validation requirements

4. The following paragraphs shall read as follows:

149. For certain specific validation activities such as SSC, A/R, CCS and PoA, the DOE shall comply with the general validation requirements described in the sections above as well as those that follow, including the simplified modalities and procedures for small scale project activities, the modalities and procedures for afforestation and reforestation project activities¹⁷, the modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities¹⁸ and Standards for PoA.

¹⁷. See decision 5/CMP.1, annex.

¹⁸. See decision 10/CMP.7, annex.

5. Introduction of Section 8.4 bis: CCS project activities in Section 8. Specific validation requirements

5. The following new paragraphs shall be inserted under the new section:

8.4 bis. CCS project activities

1. The DOE shall determine whether specific requirements as defined in the modalities and procedures for CCS project activities have been followed, including:

- (a) Participation requirements for CCS project activities;
- (b) Selection and characterization of the geological storage site;
- (c) Risk and safety assessment;
- (d) Environmental and socioeconomic impact assessment;
- (e) Liability;
- (f) Requirements for financial provision;
- (g) Monitoring for CCS project activities;

(h) Project boundary for CCS project activities;

(i) Authorization for CCS project activities.

8.4 bis.1 Participation requirements for CCS project activities

8.4 bis.1.1 Validation requirement

1. The DOE shall determine whether the participation requirements as set out in section 4.1.bis of the Project cycle procedure are satisfied.

8.4 bis.1.2 Means of validation

2. The DOE shall check, through document review and/or interviews, to determine whether:

(a) The host Party has submitted the expression of its agreement to the UNFCCC secretariat to allow the implementation of CCS project activities on its territory;

(b) The host Party has established laws and/or regulations which meet the requirements set out in section 4.1.bis of the Project cycle procedure.

8.4 bis.1.3 Reporting requirements

3. The DOE shall describe how the host Party's laws and/or regulations meet the requirements set out in section 4.1.bis.2 of the Project cycle procedure.

8.4 bis.2 Selection and characterization of the geological storage site

8.4 bis.2.1 Validation requirement

4. The DOE shall determine whether:

(a) The geological storage site has been characterized and selected in accordance with section 11.bis.4 of the Project standard; and

(b) The conditions set out in section 11.bis.4 of the Project standard have been fulfilled.

8.4 bis.2.2 Means of validation

5. The DOE shall check and assess, through document review and/or interviews, to determine whether:

(a) The selection and characterization of the geological storage site fulfils the requirements set out in section 11.bis.4, paragraphs 4–6 of the Project standard;

(b) All the steps mentioned in section 11.bis.4, paragraph 7 of the Project standard have been performed for the project activity;

(c) Relevant information is used for the selection and characterization of the geological storage site, in accordance with section 11. bis.4, paragraph 8 of the Project standard.

8.4 bis.2.3 Reporting requirements

6. The DOE shall describe all the steps taken, and sources of information used to validate the PDD. The DOE shall describe how it has determined that the evidence assessed is credible, where appropriate.
7. The DOE shall also describe how the requirements set out in section 11.bis.4 of the Project standard have been fulfilled.

8.4 bis.3 Risk and safety assessment**8.4 bis.3.1 Validation requirement**

8. The DOE shall determine whether the risk and safety assessment has been carried out:
 - (a) In accordance with the laws and regulations of the host Party, as applicable; and
 - (b) The provisions set out in section 11.bis.6 of the Project standard.

8.4 bis.3.2 Means of validation

9. The DOE shall check and assess, through document review and/or interviews, to determine whether:
 - (a) The risk and safety assessment has been carried out in accordance with the laws and regulations of the host Party;
 - (b) All the requirements set out in section 11.bis.6 of the Project standard have been performed for the project activity;
 - (c) The five steps for assessing the potential risk of the CCS project activity, as set out in section 11.bis.6 of the Project standard, have been followed.

8.4 bis.3.3 Reporting requirements

10. The DOE shall indicate whether the project participants have undertaken a risk and safety assessment in accordance with the laws and regulations as required by the host Party.
11. The DOE shall describe how the requirements set out in section 11.bis.6 of the Project standard have been fulfilled.

8.4 bis.4 Environmental and socioeconomic impact assessment**8.4 bis.4.1 Validation requirement**

12. The DOE shall confirm whether the environmental and socioeconomic impact assessment has been carried out:
 - (a) In accordance with the laws and regulations of the host Party, as applicable; and
 - (b) In accordance with the provisions set out in section 11.bis.10 of the Project standard.

13. The DOE shall determine whether the results of the assessments referred to in paragraphs 8 and 12 above confirm the technical and environmental viability of the proposed CCS project activity.

8.4 bis.4.2 Means of validation

14. The DOE shall use official sources and its local and sectoral expertise to:

- (a) Determine whether the environmental and socioeconomic impact assessment has been carried out as per the requirements mentioned in the paragraphs above;
- (b) Determine whether the results of the risk and safety assessment and environmental and socioeconomic impact assessment confirm the technical and environmental viability of the proposed CCS project activity.

8.4 bis.4.3 Reporting requirements

15. The DOE shall:

- (a) Describe how the environmental and socioeconomic impact assessment complies with the laws and regulations of the host Party;
- (b) Describe how it has assessed the requirements set out in section 11.bis.10 of the Project standard;
- (c) Describe how it has validated the compliance of the detailed description of the planned monitoring and remedial measures to address any environmental and socioeconomic impacts identified in accordance with the procedures as required by the host Party;
- (d) State whether the results of the assessments confirm the technical and environmental viability of the proposed CCS project activity.

8.4 bis.5 Liability

8.4 bis.5.1 Validation requirement

16. The DOE shall determine whether the allocation and transfer of liability have been agreed:

- (a) In accordance with the laws and regulations of the host Party, as applicable; and
- (b) In accordance with the requirements set out in section 11.bis.9 of the Project standard.

8.4 bis.5.2 Means of validation

17. The DOE shall use official sources and its local and sectoral expertise to determine whether, in accordance with the requirements mentioned above:

- (a) The allocation and transfer of liability has been agreed;
- (b) The proposed allocation and transfer of liability is feasible and implementable.

8.4 bis.5.3 Reporting requirements

18. The DOE shall:

- (a) Describe how the proposed allocation and transfer of liability complies with the requirements mentioned in section 11.bis.9 in the Project standard;
- (b) Describe how it assessed whether the allocation and transfer of liability is feasible and implementable;
- (c) Confirm whether the obligation of liability shall reside with the project participant(s) during the operational phase and any time thereafter until a transfer of liability to the host Party has been effected.

8.4 bis.6 Requirements for financial provision

8.4 bis.6.1 Validation requirement

19. The DOE shall determine whether financial provisions have been put in place by the project participants in accordance with the requirements set out in section 11.bis.8 of the Project standard.

8.4 bis.6.2 Means of validation

20. The DOE shall use official sources and its local and sectoral expertise to:

- (a) Confirm that the project participants have established financial provisions in accordance with the requirements mentioned above;
- (b) Confirm that the financial provision is sufficient to cover all aspects defined in section 11.bis.8 of the Project standard;
- (c) Confirm that the type and amount of financial provision is described in the PDD;
- (d) Confirm that the financial provision shall, in accordance with the laws and regulations of the host Party, be transferable to the host Party upon fulfilment of all obligations of the project participants in accordance with the CCS-related requirements in the Project standard and the laws and regulations of the host Party, or upon insolvency of the project participants.

8.4 bis.6.3 Reporting requirements

21. The DOE shall:

- (a) Describe the steps taken to assess the relevant information contained in the PDD against the criteria set out in section 11.bis.8 of the Project standard;
- (b) Describe how the financial provision is sufficient to cover all aspects defined in section 11.bis.8 of the Project standard;
- (c) Describe the type and amount of the financial provision;

- (d) Describe the sources of information used to confirm how the financial provision shall be transferred to the host Party, upon fulfilment of all obligations of the project participants in accordance with CCS-related requirements in the Project standard and the laws and regulations of the host Party, or upon insolvency of the project participants;
- (e) Confirm that the financial provision is guaranteed to be transferable to the host Party upon insolvency of the project participant(s).

8.4 bis.7 Monitoring for CCS project activities

8.4 bis.7.1 Validation requirement

22. The following applies instead of paragraph [54] of the Project standard:

- 23. The DOE shall confirm whether the provisions in the PDD for monitoring, including the monitoring plan, are in accordance with the selected methodology, the requirements set out in section 11.bis.7 of the Project standard and all other applicable CDM rules and requirements.

8.4 bis.7.2 Means of validation

24. The DOE shall apply a two-step process to meet the requirement mentioned in paragraph 23 above:

- (a) In order to assess the compliance of the monitoring plan with the CCS modalities and procedures, the DOE shall:
 - (i) Identify the list of parameters, information, provisions for history matching and numerical models used to characterize the geological storage site required as set out in section 11.bis.7 of the Project standard by means of a document review;
 - (ii) Confirm that the description of the monitoring plan contains all necessary parameters, information, provisions for history matching and numerical models used to characterize the geological storage site and that the means of monitoring described in the plan complies with the requirements of section 11.bis.7 of the Project standard;
- (b) In order to assess the implementation of the plan the DOE shall, by means of reviewing the documented procedure, interviewing relevant personnel, reviewing project plans and any physical inspection of the proposed project activity site, determine whether:
 - (i) The monitoring arrangements described in the monitoring plan are feasible within the project design;
 - (ii) The means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the monitoring plan is in accordance with section 11.bis.7 of the Project standard and in all other CDM rules and requirements and the parameters can be reported ex post and verified.

25. The DOE shall use official sources and its local and sectoral expertise to confirm that the project participants have provided the description and analysis of the environmental conditions in the area of geological storage site prior to any storage of carbon dioxide in accordance with paragraph 24 above.

8.4 bis.7.3 Reporting requirements

26. The DOE shall:

- (a) State its opinion on the compliance of the described monitoring plan with the requirements of section 11.bis.7 of the Project standard;
- (b) Describe the steps taken to assess whether the monitoring arrangements described in the monitoring plan are feasible within the project design;
- (c) State its opinion on the project participants' ability to implement the described monitoring plan;
- (d) State its opinion on the description and analysis of environmental conditions in the area of the geological storage site prior to any storage of carbon dioxide.

8.4 bis.8 Project boundary for CCS project activities

8.4 bis.8.1 Validation requirement

27. The DOE shall confirm that the PDD description of the project boundary of a CCS project activity includes all above-ground components, including, where applicable, the following:
- (a) The installation where the carbon dioxide is captured;
 - (b) Any treatment facilities;
 - (c) Transportation equipment, including pipelines and booster stations along a pipeline, or offloading facilities in the case of transportation by ship, rail or road tanker;
 - (d) Any reception facilities or holding tanks at the injection site;
 - (e) The injection facility;
 - (f) Subsurface components, including the geological storage site and all potential sources of seepage, as determined during the characterization and selection of the geological storage site.
28. The DOE shall also confirm that the project boundary of a CCS project activity also encompasses the vertical and lateral limits of the carbon dioxide geological storage site that are expected when the carbon dioxide plume stabilizes over the long term during the closure phase and the post-closure phase.

8.4 bis.8.2 Means of validation

29. The DOE shall confirm the project boundary based on the documented evidence and shall corroborate it by a site visit.

30. The DOE shall confirm that the project boundary covers all the relevant elements in accordance with section 11.bis.5 of the Project standard.

8.4 bis.8.3 Reporting requirements

31. The DOE shall describe how the validation of the project boundary has been performed, by detailing the documentation assessed (e.g. an engineering design report) and by describing its observations during the site visit undertaken (i.e. observations of the physical site or equipment used in the process).

8.4 bis.9 Approval and authorization for CCS project activities

8.4 bis.9.1 Validation requirement

32. The DOE shall determine whether the project participants have received written confirmation by the DNA of the host Party of the following:

- (a) That the right to store carbon dioxide in, and gain access to, the proposed geological storage site has been conferred to the relevant project participants;
- (b) That the host Party agrees to the financial provision, in accordance with section 11.bis.8 of the Project standard, described in the project design document;
- (c) That the host Party accepts the allocation of liability as proposed in the project design document and the transfer of liability referred to in section 11.bis.9 of the Project standard;
- (d) Whether the host Party accepts the obligation to address a net reversal of storage in the situation referred to in section 8.4 of the Project cycle procedure.

8.4 bis.9.2 Means of validation

33. The DOE shall confirm that the approval of participation has been issued from the relevant DNA and covers all the points mentioned in paragraph 32 above. If the DOE is in doubt, it shall verify with the DNA that the approval is valid for the proposed CDM project participants.

8.4 bis.9.3 Reporting requirements

34. The validation report shall, for each participant:

- (a) Indicate whether the participation has been authorized by a host Party mentioning all the conditions as specified in the paragraph above;
- (b) Describe the means of validation employed to support the conclusions.

6. Introduction of Section 10.2 bis. CCS project activities in Section 10. Specific verification requirements

6. The following new paragraphs shall be inserted under the new section:

10.2 bis. CCS project activities

1. In accordance with section 11.bis.10 of the Project standard, the DOE contracted by the project participants to perform the verification shall:
 - (a) Determine whether monitoring was conducted in accordance with the monitoring plan and the provisions for monitoring set out in section 11.bis.7 of the Project standard;
 - (b) Determine whether the site development and management plan is being adhered to;
 - (c) Determine whether any significant deviations were observed during history matching and whether, in such a case, a recharacterization of the geological storage site, an update of the risk and safety assessment, an update of the environmental and socioeconomic impact assessments, a revision to the project boundary, and a revision to the monitoring plan have been conducted, as necessary, in accordance with the CCS-related provisions set out in the Project standard;
 - (d) Determine whether seepage occurred from the geological storage site of the CCS project activity during the verification period;
 - (e) In the case that such seepage occurred:
 - (i) Determine whether the remedial measures and plans described in the risk and safety assessment were implemented and effective;
 - (ii) Determine whether a net reversal of storage occurred as a result of the seepage;
 - (f) In the case that a net reversal of storage occurred, quantify the amount of the net reversal of storage that occurred as a result of the seepage;
 - (g) Determine whether there have been any unintentional transboundary effects;
 - (h) Where applicable, determine whether the geological storage site has been successfully closed.
2. The DOE shall check, for each verification period, whether the project participants have carried out history matching and, where necessary, updated the numerical models used to characterize the geological storage site by conducting new simulations using the monitored data and information. The numerical models shall be adjusted in the event of significant deviations between observed and predicted behaviour.
3. Where the information prepared in accordance with section 11.bis.7 of the Project standard indicates that the geological storage site no longer meets the requirements set out in section 11.bis.4 of the Project standard, the DOE shall provide a negative opinion on validation and/or verification.
4. The initial verification and certification of a CCS project activity may be undertaken at a time selected by the project participants. Subsequent verification and certification reports shall be submitted to the Executive Board not later than five years after the end of the previous verification period. Verification and

certification shall continue beyond the end of the last crediting period of the proposed CCS project activity and shall only cease after the monitoring of the geological storage site has been terminated in accordance with the conditions for the termination of monitoring, as set out in section 11.bis.7 of the Project standard.

10.2.bis.1 Issuance of certified emission reductions for CCS project activities

5. A certification report submitted for a verification period during the crediting period shall constitute a request to the Executive Board for issuance of certified emission reductions (CERs) equal to the verified reductions in anthropogenic emissions by sources of GHGs that have occurred as a result of the registered CCS project activity.
6. A certification report submitted for a verification period after the end of the last crediting period shall not constitute a request for issuance but shall provide, where applicable, information on the amount of any net reversal of storage that occurred during the verification period as a result of seepage from the geological storage site of a CCS project activity, in accordance with the Project standard and Project cycle procedure and any decisions of the Executive Board.
7. The last certification report, submitted after the monitoring of the geological storage site has been terminated in accordance with the conditions for the termination of monitoring, as set out in section 11.bis.7 of the Project standard, may constitute a request to forward any remaining CERs in the reserve account established for the purpose of accounting for any net reversal of storage to the registry accounts of the Parties and project participants involved.

7. Introduction of Section 11.2 bis: Renewal of crediting period of CCS project activities in Section 11. Renewal of crediting period

7. The following new paragraphs shall be inserted under the new section:

11.2 bis. Renewal of crediting period of CCS project activities

1. In accordance with section 11.bis.7 of the Project standard, the DOE shall determine whether the project participants have carried out the following updates to ensure that they meet the requirements related to CCS project activities:
 - (a) Recharacterize the geological storage site, in accordance with section 11.bis.4 of the Project standard;
 - (b) Revise the project boundary;
 - (c) Update the risk and safety assessment, in accordance with section 11.bis.6 of the Project standard;
 - (d) Update the environmental and socioeconomic impact assessments;
 - (e) Revise the monitoring plan, in order to improve the accuracy and/or completeness of data and information, taking into account observed deviations determined during history matching, changes to the project boundary, changes to the risk and safety assessment, changes to the

environmental and socioeconomic impact assessments, new scientific knowledge and improvements in the best available technology;

- (f) Update the site development and management plan, taking account of the results of the activities described in subparagraphs a–e above, where appropriate.

2. Where the information prepared in accordance with paragraph 1 above indicates that the geological storage site no longer meets the requirements set out in section 11.bis.4 of the Project standard, the issuance of CERs shall cease and the DOE shall issue a negative validation opinion.

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Appendix 3. Amendments to the “Clean development mechanism project cycle procedure” (version 05.0)”

1. Change to Section 1. Introduction

1. The following paragraphs shall read as follows:

1. The Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP), at its first session, established the basis of a regulatory framework of the clean development mechanism (CDM) to implement Article 12 of the Kyoto Protocol through the annex to decision 3/CMP.1, the annexes II, III and IV to decision 4/CMP.1, the annex to decision 5/CMP.1, and the annex to decision 6/CMP.1 and the annex to decision 10/CMP.7. The CMP revised provisions in these decisions through new decisions in subsequent sessions. In addition, the Executive Board of the clean development mechanism (hereinafter referred to as the Board) operationalized the CDM process by adopting various standards, procedures and guidelines and revised them, as appropriate, with a view to improving the CDM process

2. Introduction of Section 4.1 bis: Participation requirements of host Party for CCS project activities in Section 4. Pre-registration activities

2. The following new paragraphs shall be added in the new section:

4.1 bis.1. Expression of host Party agreement for CCS project activities

1. If a Party wishes to host CDM CCS project activities on its territory, it shall submit to the UNFCCC secretariat, through its DNA, an expression of its agreement (EoA) to allow the implementation of CCS project activities on its territory. A host Party's EoA shall be submitted prior to the PDD for the first proposed CCS project activity on the host Party's territory being published for global stakeholder consultation. A DNA shall submit the EoA by email to [Moderator-DNA@unfccc.int].
2. A host Party's EoA shall apply to all CCS project activities implemented on its territory.
3. [The EoA may list the host Party's laws and regulations that satisfy the requirements [set out in section 4.1 bis.2 below] as an appendix.]
- 3.bis. [The EoA shall list the host Party's laws and regulations that satisfy the requirements [set out in section 4.1.bis.2 below] as an appendix. The appendix shall be updated to add, amend or remove laws or regulations from the list, as applicable, when such changes occur.]

4.1 bis.2. Laws and regulations of host Party for CCS project activities

1. Prior to the publication of the PDD for global stakeholder consultation for the first proposed CCS project activities on its territory, a host Party shall ensure that it has established laws and/or regulations that:
 - (a) Set procedures that include provisions for the appropriate selection, characterization and development of geological storage sites, recognizing the project requirements for CCS project activities under the CDM set out in section 11.bis.4 of the Project standard;
 - (b) Define means by which rights to store carbon dioxide in, and gain access to, a subsurface pore space can be conferred to project participants;
 - (c) Provide for timely and effective redress for affected entities, individuals and communities for any significant damage, such as environmental damage, including damage to ecosystems, other material damage or personal injury, caused by the project activity, including in the post-closure phase;
 - (d) Provide for timely and effective remedial measures to stop or control any unintended seepage of carbon dioxide, to restore the integrity of a geological storage site, and to restore long-term environmental quality significantly affected by a CCS project activity;
 - (e) Establish a means for addressing liability arrangements for carbon dioxide geological storage sites, taking into account the provisions set out in section 11.bis.9 of the Project standard;
 - (f) For a host Party that accepts the obligation to address a net reversal of storage, establish measures to fulfil such an obligation.

3. Change to Section 4.2.1. Submission of project design document

2. The following paragraph shall read as follows:

17. If the DOE is accredited for the validation function in all sectoral scope(s)¹ to which the proposed CDM project activity or PoA is linked through the application of baseline and monitoring methodology(ies), the secretariat, through the CDM information system, shall make the PDD or PoA DD publicly available on the UNFCCC CDM website. The period for submission of comments for global stakeholder consultation on the PDD or PoA DD shall commence at midnight GMT subsequent to the publication of the PDD or PoA DD. The CDM information system shall inform the DOE of the location of the PDD or PoA DD on the UNFCCC CDM website and the opening and closing dates of the period for submission of comments.

¹ There are ~~45~~ 16 sectoral scopes in the CDM and these are used in the accreditation of DOEs. The list of sectoral scopes, the DOEs accredited in each scope as well as the approved baseline and monitoring methodologies linked with these sectoral scopes are given on the UNFCCC CDM website.

4. Introduction of Section 7.2 bis: History matching and significant deviation for CCS project activities in Section 7. Pre-issuance activities

1. The following new paragraphs shall be added in the new section:

1. The project participants shall, for each verification period, carry out history matching in accordance with the Project standard. If during history matching a significant deviation is observed (as defined by the methodology used by the project activity), the project participant shall immediately notify the host Party and CDM Executive Board in writing.
2. The project participants shall follow the procedure for “changes to registered CDM project activity or programme of activities” as set out in section 6.2 above [project cycle procedure] for changes that require the prior approval of the Board.

5. Change to Section 8: Issuance of certified emission reductions

2. The following paragraph shall read as follows:

204. If the secretariat does not receive a request for review from a Party involved or at least three members of the Board in accordance with the modalities described in paragraphs 200–203 above, the Board shall instruct the CDM registry administrator to issue a quantity of CERs claimed in the request for issuance into the pending account of the Board in the CDM registry:

- (a) For project activities other than CCS: in accordance with decision 3/CMP.1, annex, paragraph 66;
- (b) For CCS project activities: in accordance with decision 7/CMP.1, annex, paragraph 21 which requires that for CCS project activities upon such issuance, the CDM Registry Administrator shall promptly:
 - (i) Forward the quantity of CERs corresponding to the share of proceeds to cover administrative expenses and to assist in meeting the costs of adaptation, respectively, in accordance with Article 12, paragraph 8, of the Kyoto Protocol, to the appropriate accounts in the CDM registry for the management of the share of proceeds;
 - (ii) Forward 5 per cent of the CERs issued to a reserve account of the CDM registry, established for the CCS project activity for the purpose of accounting for any net reversal of storage;
 - (iii) Forward the remaining CERs to the registry accounts of the Parties and project participants involved, in accordance with their request.

226. If the Board’s final decision made in accordance with paragraph 221 or 225 above is to issue the CERs, the Board shall instruct the CDM registry administrator to issue a specified quantity of CERs into the pending account of the Board in the CDM registry:

- (a) For project activities other than CCS: in accordance with decision 3/CMP.1, annex, paragraph 66;

- (b) For CCS project activities: in accordance with decision 7/CMP.1, annex, paragraph 21 which requires that for CCS project activities upon such issuance, the CDM Registry Administrator shall promptly:
 - (i) Forward the quantity of CERs corresponding to the share of proceeds to cover administrative expenses and to assist in meeting the costs of adaptation, respectively, to the appropriate accounts in the CDM registry for the management of the share of proceeds;
 - (ii) Forward 5 per cent of the CERs issued to a reserve account of the CDM registry, established for the CCS project activity for the purpose of accounting for any net reversal of storage;
 - (iii) Forward the remaining CERs to the registry accounts of the Parties and project participants involved, in accordance with their request.

6. Introduction of Section 8.4 Addressing non-permanence in CCS project activities in Section 8. Issuance of certified emission reductions

- 3. The following new paragraphs shall be added in the new section:

8.4 Addressing non-permanence in CCS project activities

1. To address the non-permanence in CCS project activities, the monitoring of the geological storage site shall follow the criteria specified in section 11.bis.7 of the Project standard. The monitoring shall not be terminated earlier than 20 years after the end of the last crediting period of the CCS project activity or after the issuance of the CERs has ceased, whichever occurs first.
2. The monitoring of the geological storage site shall be conducted by the entity or Party that is liable for the geological storage site, or by an entity that is under contractual arrangement with the liable entity or Party.
3. A certification report submitted for a verification period after the end of the last crediting period shall not constitute a request for issuance but shall provide, where applicable, information on the amount of any net reversal of storage that occurred during the verification period as a result of seepage from the geological storage site of a CCS project activity.
4. The last certification report, submitted after the monitoring of the geological storage site has been terminated in accordance with the conditions for the termination of monitoring, as set out in section 11.bis.7 of the Project standard, may constitute a request to forward any remaining CERs in the reserve account established for the purpose of accounting for any net reversal of storage to the registry accounts of the Parties and project participants involved.
5. Upon submission of the last certification report, referred to in paragraph 4 above, and upon finalization of the consideration of the certification report by the Executive Board, the CDM Registry Administrator shall promptly forward any CERs remaining in the reserve account established for the purpose of accounting

for any net reversal of storage to the registry accounts of the Parties and project participants involved, in accordance with their request.

6. Where a verification report determines that a net reversal of storage occurred during the verification period as a result of seepage from the geological storage site of a CCS project activity, the Executive Board shall:
 - (a) Notify the CDM Registry Administrator to cancel, up to the amount of the net reversal of storage, the CERs issued for the CCS project activity held in the CDM registry:
 - (i) Firstly, from the reserve account established for the purpose of accounting for any net reversal of storage;
 - (ii) Secondly, from the pending account;
 - (iii) Finally, from the holding accounts of the project participants, proportional to the amount of CERs for the CCS project activity held in each holding account;
 - (b) Determine any outstanding amount of the net reversal of storage for which no units were cancelled under paragraph 6(a) above and, where such an amount is outstanding, request the project participants to transfer, within 30 days after the notification, an amount of assigned amount units (AAUs), CERs, emission reductions units (ERUs) or removal units (RMUs) equivalent to the outstanding amount to a cancellation account of the CDM registry established for this purpose or a cancellation account of the national registry of any Party.
7. Where a verification report is not submitted within the time frame specified in section 11.bis.11 of the Project standard, the Executive Board shall forthwith request the project participants to provide the outstanding verification report. If the verification report is not received within six months of the receipt of the request by the project participants, the Executive Board shall:
 - (a) Instruct the CDM Registry Administrator to cancel all CERs that were issued for the CCS project activity and are being held in the CDM registry;
 - (b) Subsequently request the project participants to cancel, within one year after the request, an amount of AAUs, CERs, ERUs or RMUs equivalent to the amount of CERs issued from the start of the CCS project activity:
 - (i) Minus any AAUs, CERs, ERUs or RMUs that were transferred to a cancellation account for the purpose of compensating for a net reversal of storage, prior to the request to the CDM Registry Administrator referred to in paragraph 6(a) above;
 - (ii) Minus any CERs issued for the CCS project activity that were cancelled in accordance with paragraph 6(a) above.
8. If the project participants do not fully comply with the requirements set out in paragraphs 6 or 7(b) above, the outstanding amount of units shall be transferred to a cancellation account of the national registry of a Party included in Annex I to

the Convention (Annex I Party) or the CDM registry, within one year of the request by the Executive Board, by:

- (a) The host Party, if the host Party has accepted the obligation to address a net reversal of storage in such a situation in its letter of approval;
- (b) The Annex I Parties which hold CERs issued for the CCS project activity in accounts of their national registries, if the host Party has not accepted the obligation to address a net reversal of storage in such a situation in its letter of approval.

9. If the host Party has accepted the obligation to address a net reversal of storage in such a situation in its letter of approval, the Executive Board shall determine the outstanding amount of units that must be cancelled and notify the host Party concerned of the requirement for cancellation. To meet this requirement, the host Party shall transfer an amount of AAUs, CERs, ERUs or RMUs equivalent to the outstanding amount to the cancellation account established for this purpose in the CDM registry or a cancellation account of the national registry of any Party.

10. If the host Party has not accepted the obligation to address a net reversal of storage in such a situation in its letter of approval, the Executive Board shall:

- (a) Determine the outstanding amount of units that must be cancelled;
- (b) Request the international transaction log administrator to identify the quantity of CERs issued for the CCS project activity held in each national registry, distinguishing between units in holding accounts and other accounts, for the current and previous commitment periods;
- (c) Immediately notify the international transaction log that the CERs identified as being in holding accounts are ineligible for transfers other than for the purpose of the requirement set out in paragraph 8 above. When the requirement for cancellation, as set out in paragraph 8 above, has been satisfied, the CERs issued for the CCS project activity in holding accounts shall be again eligible for transfer;
- (d) Determine the outstanding amount of units that must be cancelled by each Annex I Party proportionally, by dividing the amount identified in paragraph 10(b) above by the total outstanding amount;
- (e) Notify each Annex I Party that holds CERs issued for the CCS project activity in accounts of its national registry of the requirement for cancellation, as determined in paragraph 10(d) above. To meet this requirement, the relevant Annex I Parties shall transfer an amount of AAUs, CERs, ERUs or RMUs equivalent to the outstanding amount to the cancellation account established for this purpose in the CDM registry or a cancellation account of their national registries.

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DRAFT

Appendix 4. Draft guideline on “Letter of approval for carbon dioxide capture and storage project activities”

1. Introduction

1.1. Background

1. At its seventh session, the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol adopted decision 10/CMP.7; "Modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities". This decision enables carbon dioxide capture and storage (CCS) projects to be implemented under the clean development mechanism (CDM).

1.2. Objectives

2. To assist designated national authorities (DNAs) of host Parties of proposed CDM CCS project activities in preparing letters of approval (LoA) for such project activities.

2. Scope, applicability, and entry into force

2.1. Scope

3. This document describes the elements of a written approval by host Parties to allow CDM CCS project activities on their territory.

2.2. Applicability

4. This document is applicable to DNAs of host Parties of proposed CDM CCS project activities.

2.3. Entry into force

5. On the date that the CCS provisions enter into force in the PS, VVS and PCP.

3. Definitions

6. The definitions contained in the Glossary of CDM terms and CDM project standard apply to this guideline.

4. Elements of written approval for CDM CCS project activities

7. In accordance with the CDM project cycle procedure, when issuing a letter of approval to a project participant the DNA of a host Party involved in a proposed CDM CCS project activity is required to include the following information, that:

- (a) The country has ratified the Kyoto Protocol;

- (b) The approval of voluntary participation in the proposed CDM project activity;
 - (c) The proposed CDM project activity contributes to sustainable development;
 - (d) The host Party has submitted its expression of agreement (EoA) to the UNFCCC secretariat confirming that it agrees to allow the implementation of CDM CCS project activities in its territory;
 - (e) The right to store carbon dioxide in, and gain access to, the proposed geological storage site has been conferred to the project participants;
 - (f) The host Party agrees to the project participant's proposed financial provisions as set out in the project design document (PDD) [, in accordance with [the modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities (decision 10/CMP.7)];
 - (g) The host Party Agrees to accept the allocation of liability and the transfer of liability as set out in the PDD [in accordance with the modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities [(decision 10/CMP.7)];
 - (h) The host Party either accepts or does not accept the obligation to address a net reversal of storage [in accordance with the modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities (decision 10/CMP.7)].
8. A template for an LoA from a host Party of a proposed CDM CCS project activity is set out in attachment. A host Party may wish to use this template when preparing such an LoA.

Attachment. Draft template for host Party letter of approval for CCS project activities

Letter of Approval

To: [Project participants]

[Place, date]

Dear [____],

Ref: Letter of approval to [Project name/reference number] by [designated national authority] of [host Party].

Madam or Sir,

[Designated national authority] approves the [Project name/reference number] as a clean development mechanism project, on the following basis:

1. [Host Party] is a Party to the Kyoto Protocol;
2. Participation in the proposed CDM project activity is voluntary;
3. The project contributes to sustainable development in [host Party];
4. [Host Party] submitted its expression of agreement (EoA) to the UNFCCC secretariat to allow the implementation of CCS project activities on its territory on [date];
5. The right to store carbon dioxide in, and gain access to, the [proposed geological storage site] has been conferred to the [relevant project participants];
6. The host Party agrees to the financial provisions, in accordance with the modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities (decision 10/CMP.7), described in the project design document [version] [date];
7. [Host Party] accepts the allocation of liability as proposed in the project design document [version] [date] and the transfer of liability in accordance with the modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities (decision 10/CMP.7) for the above mentioned project activity;
8. [Host Party] [accepts]/[does not accept] the obligation to address a net reversal of storage in accordance with the modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities (decision 10/CMP.7).

Sincerely

By _____

Authorized Representative of the Designated National Authority for the CDM

[Name of Signatory]

[Title]


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Appendix 5. Draft example Expression of Agreement (EoA) form for CCS project activities

 CDM: Form for Expression of Agreement for carbon dioxide capture and storage (CCS) project activities by DNAs (Version 01.0)	
<i>(To be used by DNAs for submitting expression of agreement for CCS project activities)</i>	
Host Party:	
Name and title of the authorized representative of the DNA:	
Contact information:	Address: Tel: Email:
Signature of the authorized representative of host Party:	
Date:	
<u>Information for completing the form</u> The information in square brackets should be completed as appropriate.	
Expression of Agreement (EOA) for CCS project activities	
>> <u><i>[[Designated national authority]]</i></u> on behalf of <i>[[host Party]]</i> confirms that: <ol style="list-style-type: none"> 1. [The <i>[[host Party]]</i> agrees to allow the implementation of CDM carbon capture and storage (CCS) project activities on its territory; and 2. [The <i>[[host Party]]</i> has established laws or regulations in accordance with the modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities (decision 10/CMP.7) [as set out in the attached appendix]. 	

Appendix – applicable host Party laws and regulations (leave blank if host Party does not wish to complete, increase the number of rows wherever required)	
>>	
The following host Party laws or regulations fulfill the requirements set out in section 4bis.2 of the Project cycle procedure:	
1. Selection and characterization of geological storage site	
Name of law(s) and/or regulation(s)	Effective date
2. Rights to store carbon dioxide	
Name of law(s) and/or regulation(s)	Effective date
3. Timely and effective redress for any damages	
Name of law(s) and/or regulation(s)	Effective date
4. Time and effective remedial measures to stop or control any unintended seepage of carbon dioxide	
Name of law(s) and/or regulation(s)	Effective date
5. Liability for storage sites	
Name of law(s) and/or regulation(s)	Effective date
6. Obligation to net reversal of storage where applicable	
Name of law(s) and/or regulation(s) / agreements(s)	Effective date

INFORMATION TO BE COMPLETED BY THE UNFCCC SECRETARIAT	
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Appendix 6. Comments from CCS WG members

1. The CDM Executive Board in accordance with its workplan, requested the secretariat to gather input from the Carbon Dioxide Capture and Storage Working Group (CCS WG) on the draft package of regulatory documents for implementing CCS under the CDM. The package of documents was submitted to CCS WG on 05 February 2014 for comments. Four out of five members of the CCS WG commented on the draft documents. Secretariat organized the call with CCS WG members to understand and explain any issues with the draft packaged document.
2. Based on this, the table below provides an overview of the comments received from the CCS WG members. The table provides the original comments, the rationale for incorporating the comment or not in the document, and if so, how it has been incorporated.

Table: CCS WG members' comments

#	Para no.	Comment (with justification for change)	Response	Recommendation
1	PS/section 11.bis.4/paragraph 6	<p>Option 3 includes the condition “no negative effect” which may not always be reasonable, achievable or even desirable. What could be assessed is whether there is a significant likelihood that there will be a significant adverse impact resulting from CCS activities on potable water supply. Options 3 is not consistent with the International Organization for Standardization’s draft standards for geological storage of CO₂ (as discussed below).</p> <p>Options 1 and 2 respect the sovereignty of the host country to determine their resource and development priorities. Options 1 and 2 are also consistent with the draft ISO standard for geological storage of CO₂. Option 2 is, however, more consistent with the modalities and procedures for CCS, and offers the likelihood of a more transparent outcome than Option 1. I therefore prefer option 2.</p>	No action required.	Board to decide on the option.

#	Para no.	Comment (with justification for change)	Response	Recommendation
2	PS/section 11.bis.4/paragraph 6	<p>Additional information and considerations</p> <p>1. Regulatory impact of the options</p> <p>The primary objective of CO₂ injection into geological formations is to retain the CO₂ in a dense phase. As a rule of thumb, this is achieved by storing the CO₂ at depths greater than 800 metres. By contrast, in most parts of the world, potable water is only present at much shallower depths. While CO₂ injection wells may need to pass through freshwater aquifers to reach CO₂ storage formations, freshwater aquifers would not be an objective for CO₂ injection, and so the options under consideration above would not apply.</p> <p>There are, however, a few regions in the world, where vast pools of high quality potable water are present within deeper geological formations which could also be prospective for CO₂ storage. For example, in southern Libya, water wells are being drilled to depths of between 700m and 1,000m. In South America, the Guarani Aquifer, which extends across Argentina, Brazil, Paraguay and Uruguay, contains potable groundwater to depths approaching 1,800m. The Great Artesian Basin lies beneath the deserts of central Australia and contains potable water down to 2,000m. For these regions, host countries will need to carefully consider the potential impact of CO₂ injection on their potable water supply.</p>	No action required. Board may consider this information while deciding on an option.	Board to decide on the option.

#	Para no.	Comment (with justification for change)	Response	Recommendation
3	PS/section 11.bis.4/paragraph 6	<p>Additional information and considerations</p> <p>2. <i>Compatibility with international requirements</i></p> <p>The International Organization for Standardization (ISO) formed a Technical Committee (ISO/TC 265) to develop standards for Carbon Dioxide, Capture, Transportation and Geological Storage with 6 technical sub-groups working on development of standards. Working Group 3 is developing standards for geological storage based on the standard for geological storage of carbon dioxide developed by the Canadian Standards Organization's (Z741-12). The Canadian standard lists factors that should exclude a site from geological storage. Excluded from CO₂ injection are "horizons of protected groundwater as defined in the respective jurisdiction" (clause 5.2, site screening, sub-clause b, i). In the language and context of the CDM this would mean that CO₂ could not be injected into a geological formation that the host Party has declared by law to contain "protected groundwater". Note that groundwater does not have to be potable to be protected, and some formations containing potable water may not be protected. Under the draft ISO standard the decision to protect a geological formation from CO₂ injection would be made by the host country.</p>	No action required. Board may consider this information while deciding on an option.	Board to decide on the option.

#	Para no.	Comment (with justification for change)	Response	Recommendation
4	PS/section 11.bis.4/paragraph 6	<p>Current Practice</p> <p>Drilling deep wells to produce potable water is an expensive practice, and only undertaken if there is a significant need, and if no lower cost options are available.</p> <p>The presence of deep potable fresh water does not usually preclude the drilling of oil and gas exploration wells. Affected land owners and communities usually appreciate that, more often than not, petroleum exploration wells will not find hydrocarbons and, if suitable, will be converted to water production, adding to their freshwater supply.</p>	No action required. Board may consider this information while deciding on an option.	Board to decide on the option.
5	PS/section 11.bis.4/paragraph 6	<p>As stated on the call, my suggestion would be to work with a modified version of Option 2. My proposed wording changes are as below:</p> <p>Option 2:</p> <p>“If the proposed geological storage site is suitable for potable water supply, or presents the risk of contamination of a suitable potable water supply (e.g. by requiring wells to traverse the potable aquifer), a decision about whether the site is eligible for geological storage shall be made by the host Party, taking into account the results of Site Characterization and the Risk and Safety Assessment of the proposed geological storage site, following the procedures outlined in CCS modalities and procedures.”</p>	No action required. The additional phrase is implicit part of the geological storage site and shall be considered during the risk and safety assessment.	Board to decide on the option.
6	PS/section 11.bis.4/paragraph 6	Option 2 is better. Since the negative effective would influence the host country, so the host part should have the decision.	No action required.	Board to decide on the option.
7	PS/section 11.bis.4/paragraph 6	Before we send 3 or more options to the EB, the starting point should be the categories of water reserves under analysis,	No action required. Board may consider this information while	Board to decide on the option.

#	Para no.	Comment (with justification for change)	Response	Recommendation
		<p>there are many commercial businesses based on water and companies dedicated to treatment and distribution of water that could be affected by unclear rules in the future if small or large CCS operations starts.</p> <p>So, I propose at least discuss the categories of water reserves to limit the guidelines and recommendations. Oil and Gas industry has tackled with these issues for long time and has lessons learned that should compiled as inputs for our recommendations.</p> <p>(a) Mineral or semi mineral water, water for commercial purposes on bottling plants, fountains or geological reservoirs located at the bottom of mountains or close to a river. The water quality changes according to many parameters, and it is very high value water, even if not exploited, any CCS project using an empty reservoir in that area should not be permitted. The reasons are clearly safety as this type of water business has frequent movement of containers and personnel.</p> <p>(b) Potable water underground ready for human use, this type of underground reservoirs are operated with little personnel, basically pumps and the water is transferred to plants for treatment, measurement and distribution. I do not see conflict with a CCS reservoir if the right studies are done, but we are discussing of different depths, this underground water is exploited until 100 m, and CCS operations will do it beyond. We should check some typical configurations and standards. This is not new, the Oil and Gas industry has sometimes the conflict of reservoirs close to potable underground water and we have to develop studies to assure no damage to this</p>	deciding on an option.	

#	Para no.	Comment (with justification for change)	Response	Recommendation
		<p>water, the level of damage here is much higher as the contaminant can be oil. We should hire a third party analysis on this to have references from this industry that should help a lot in our decisions for CCS.</p> <p>(c) Potable water underground salty, with levels of salt so high that is not available for human use, typical reservoirs on shore or 5-20 KM from sea border. In this case, this type of water is normally not planned for human consumption (direct or in agriculture), some clear exception if used in a purification plant using vaporizers and filters (not common cases, just if you have to cool a turbine and the economics work). Here the decision for CCS is easy as there are low barriers, specifically no demand.</p>		
8	PS/11.bis.10/paragraph 31 c	“technology with best performance to cost ratio” is suggested instead of “best available techniques”, as in previous comments	No action required at this stage. The phrase used in the CCS M&P is applying the best available techniques; the cost component is not included. In general practice this should be done based on the best available techniques which are available.	Board may consider this comment for further elaboration of requirements in future.
9	PS/11.bis.10/paragraph 31 c	Clause 28 (Appendix B) of the modalities and procedures is a requirement for environmental and socio-economic impact assessments of the CCS project. These assessments could, and should, include consideration of the potential impact of CO ₂ storage on potable water supply. The underlined additional wording could be appended to, Appendix 1. Amendments to the CDM project standard, 11.bis.10,	The phrase is included in paragraph 31 d of the section 11.bis.10 of PS.	No further action required.

#	Para no.	Comment (with justification for change)	Response	Recommendation
		environmental and socio-economic impact assessments, 31. (d), 'include at least a comprehensive analysis of the environmental and socio-economic impacts' "including consideration of the potential impacts of CO ₂ storage on potable water supply".		

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#	Para no.	Comment (with justification for change)	Response	Recommendation
10	VVS/section 8.4. bis. 3 and VVS/8.4. bis. 4	<p>In the para's mentioned, the document as drafted seems to require the Validator to confirm that the Risk and Safety Assessment and the Environmental and Socio-Economic Impact Assessment has been conducted in accordance with laws and regulations of the host Party. (please note that the terms "confirm" and "determine" are used interchangeably in places, and I assume only "confirm" makes this an absolute requirement – suggest to check this again).</p> <p>I have some general concerns regarding this requirement:</p> <ul style="list-style-type: none"> • It goes beyond the CCS M&P requirements. The requirement to (a) have risk assessment and ESEIA laws in place is not a Participation Requirement; and, (b) is not a requirement in Appendix B. • Countries may not have specific laws which require these to be carried out. <p>Therefore, I believe the requirement as drafted goes beyond the scope of the CCS M&Ps, and may be difficult to implement in practice.</p> <p>As described previously, my suggestion is that this be either covered by Section 7.13.1 of the VVS mutatis mutandis (although the voluntary EIA parts would not apply, so probably may not be the best approach), or rather through formulation of new text in the Specific Requirements for CCS in the Section 8.4. of the VVS that reflect similar requirements to those of existing Section 7.13.1.</p> <p>Alternatively, Section 8.2.6 of the VVS (A/R Specific Requirements) could also be used to formulate something that draws on accepted norms under CDM.</p>	<p>As per CCS M&P, section G paragraph 10 (c) and 10 (d) this requirement is mandatory. However based on this comment the word as applicable is included in the sections of the VVS where the host Party laws are referred.</p> <p>Regarding the word confirm and determine the selection of word is based on the specific requirement and is consistent with the existing VVS.</p>	No further action required.

#	Para no.	Comment (with justification for change)	Response	Recommendation
11	VVS/section 8.4 bis. 7.2	Document currently refers to “historical matching”, which should read “history matching”.	This is corrected in the section 8.4 bis.7.2	No further action required
12	Appendix 4/ Guidelines paragraph 7	Include, but not limited, the following information	For the CDM this is the only requirement as per CCS M&P and therefore word include is used.	No action required.
13	Appendix 5/EOA	It was useful to note the progress of the Expression of Agreement. As stated before, I would urge the Board to consider flexibility, mainly because this is an emerging area, and presently existing legislation could be applicable, but countries may opt to introduce new legislation in the future. DRAFT	No action required.	Board to consider this while deciding on option as mentioned in paragraph 3 and 3.bis in section 4.1 bis.1, “Expression of host Party agreement for CCS project activities”, in the PCP, and appendix 5 “Draft example expression of agreement form for CCS project activities.
14	General	I think it would be useful to raise CCS requirements in the DNA Forum, and would be happy to discuss the sorts of issues that might arise for DNAs.	No action required as of now.	Board may wish to request the secretariat to include CCS in future DNA forum

#	Para no.	Comment (with justification for change)	Response	Recommendation
				meeting(s).

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