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Clerk of the Board
California Air Resources Board
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Submission in relation to LCFS18

Thank you for the opportunity under the 13 August Notice to provide a submission in relation to the Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard.

We note that the Post-injection site care and monitoring period is specified as a minimum of 100 years. This period is significantly longer than other comparable regulations on CO₂ storage, and we do not see any evidence-base provided in the Protocol for this period. The evidence-base that is publicly available supports both a shorter period and some discretion by the regulator in determining the period for each case. This evidence-base is provided by the IPCC Special Report on CCS (2005) which shows for example that CO₂ storage becomes more secure with time, and the IPCC Guidelines for Greenhouse Gas Inventories (2006) which recognizes this aspect and allows for a zero leakage assumption if evidence from monitoring and modelling indicates no leakage. This IPCC evidence was used by the EU in the development of the CCS Directive (2009) and ETS Directive (2009), whose post injection site care equivalent is for a minimum of 20 years which can be earlier if the authority is convinced that “all available evidence indicates that the stored CO₂ will be completely and permanently contained”. Note that in addition, the EU Directive requires a financial contribution to the authority to be able to monitor for a further 30 years if necessary. The CCS Directive was extensively reviewed in 2014 and found fit for purpose and no case made that these periods should be changed (Triple E 2015).

The same evidence base with updated evidence from further experiences (Dixon 2011) was used by the UNFCCC in the development of the rules (Modalities and Procedures) for CCS in the Clean Development Mechanism (UNFCCC 2011). These require monitoring of at least 20 years after the last crediting period, and then it can cease 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”.

We also note that the US EPA Class VI rule requires 50 years of post-injection site care, which “could be shortened by the Director after cessation of injection if the owner or operator could demonstrate that USDWs would not be endangered prior to 50 years”.

All of these examples have the post injection site care period equivalents based upon evidence-based assessments.

Since these regulations have been developed, there has been further substantial increase in the knowledge gained from real project experiences as well as further R&D and modelling in understanding the behavior of CO₂ in the subsurface and environment. This further knowledge reinforces the earlier evidence in these aspects. A review of this updated knowledge and experience

was provided for the 10th anniversary of the IPCC Special Report by a Special Issue of the International Journal of Greenhouse Gas Control (2015).

Such evidence-based assessments for post injection site care are further facilitated by the availability of peer-reviewed tools to enable storage performance assessment by operators and by regulators. Such tools are provided by US DOE NETL in their National Risk Assessment Partnership program, with a range of peer-reviewed tools and guidance available at <https://edx.netl.doe.gov/nrap/>.

We suggest that the evidence base and tools for assessment exist for at least flexibility to be allowed in the Post-injection site and monitoring period in the Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard, if not actually a reduced period to be more in line with international best practice.

References

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3. EC 2009 EU Directive for Geological Storage of Carbon Dioxide 2009/31/EC
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5. Triple E, Ricardo-AEA and TNO 2015. Support to the Review of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide (CCS Directive). Triple E, Ricardo-AEA and TNO
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8. EPA, 2010. Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide (CO₂) Geologic Sequestration (GS) Wells, 75 Fed. Reg. 77230, 77303 (10 Dec. 2010) (amending 40 C.F.R. § 124, 144, 145, 146, and 147).
9. International Journal of Greenhouse Gas Control 2015 Volume 40 Special Issue

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