

SUBSIDIARY LEGISLATION 549.68**GEOLOGICAL STORAGE
OF CARBON DIOXIDE REGULATIONS**

29th August, 2011*

LEGAL NOTICE 346 of 2011, as amended by Legal Notice 291 of 2015.

1. (1) The title of these regulations is the Geological Storage of Carbon Dioxide Regulations. Citation and scope.

(2) These regulations transpose Directive 2009/31/EC on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006.

(3) The scope of these regulations is to establish a legal framework for the environmentally safe geological storage of carbon dioxide (CO₂) to contribute to the fight against climate change. The purpose of environmentally safe geological storage of CO₂ is permanent containment of CO₂ in such a way as to prevent and, where this is not possible, eliminate as far as possible negative effects and any risk to the environment and human health.

2. (1) These regulations shall apply to the geological storage of CO₂ in Malta and on the continental shelf within the meaning of the United Nations Convention on the Law of the Sea (Unclos). Applicability.

(2) These regulations shall not apply to geological storage of CO₂ with a total intended storage below 100 kilotonnes, undertaken for research, development or testing of new products and processes.

(3) The storage of CO₂ in a storage site with a storage complex extending beyond the area referred to in sub-regulation (1) shall be prohibited.

(4) The storage of CO₂ in the water column shall be prohibited.

3. (1) Unless otherwise stated in these regulations, the definitions in the Act shall apply. Interpretation.
Amended by:
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(2) In these regulations, unless the context otherwise requires:

"the Act" means the Malta Resources Authority Act;

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"closure of a storage site" means the definitive cessation of CO₂ injection into that storage site;

"CO₂ plume" means the dispersing volume of CO₂ in the geological formation;

"CO₂ stream" means a flow of substances that results from CO₂ capture processes;

*See regulation 1(4) of these Regulations as originally promulgated.

"the Commission" means the European Commission as established by the Treaty on the European Union as amended by subsequent Treaties;

"the Community" means the European Community as established by the Treaty on the European Union as amended by subsequent Treaties;

"the competent authority" means the Office of the Prime Minister, and such other body or person as the Prime Minister may prescribe and designate as the competent authority for different purposes in terms of different provisions of these regulations;

"corrective measures" means any measures taken to correct significant irregularities or to close leakages in order to prevent or stop the release of CO₂ from the storage complex;

"Environment and Resources Authority" means the Environment and Resources Authority established under article 6 of the Environment Protection Act;

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"exploration" means the assessment of potential storage complexes for the purposes of geologically storing CO₂ by means of activities intruding into the subsurface such as drilling to obtain geological information about strata in the potential storage complex and, as appropriate, carrying out injection tests in order to characterise the storage site;

"exploration permit" means a written and reasoned decision authorising exploration, and specifying the conditions under which it may take place, issued by the competent authority pursuant to the requirements of these regulations and any other applicable law;

"geological formation" means a lithostratigraphical subdivision within which distinct rock layers can be found and mapped;

"geological storage of CO₂" means injection accompanied by storage of CO₂ streams in underground geological formations;

"hydraulic unit" means a hydraulically connected pore space where pressure communication can be measured by technical means and which is bordered by flow barriers, such as faults, salt domes, lithological boundaries, or by the wedging out or outcropping of the formation;

"leakage" means any release of CO₂ from the storage complex;

"migration" means the movement of CO₂ within the storage complex;

"operator" means any natural or legal, private or public person who operates or controls the storage site or to whom decisive economic power over the technical functioning of the storage site has been delegated according to applicable legislation;

"post-closure" means the period after the closure of a storage site, including the period after the transfer of responsibility to the competent authority;

"significant irregularity" means any irregularity in the injection or storage operations or in the condition of the storage complex itself, which implies the risk of a leakage or risk to the environment

or human health;

"significant risk" means a combination of a probability of occurrence of damage and a magnitude of damage that cannot be disregarded without calling into question the purpose of these regulations for the storage site concerned;

"storage complex" means the storage site and surrounding geological domain which can have an effect on overall storage integrity and security; that is, secondary containment formations;

"storage permit" means a written and reasoned decision or decisions authorising the geological storage of CO₂ in a storage site by the operator, and specifying the conditions under which it may take place, issued by the competent authority pursuant to the requirements of these regulations and any other applicable law;

"storage site" means a defined volume area within a geological formation used for the geological storage of CO₂ and associated surface and injection facilities;

"substantial change" means any change not provided for in the storage permit, which may have significant effects on the environment or human health;

"transport network" means the network of pipelines, including associated booster stations, for the transport of CO₂ to the storage site;

"waste" shall have the same meaning as in the Waste Regulations;

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"water column" means the vertically continuous mass of water from the surface to the bottom sediments of a water body.

4. (1) The competent authority shall retain the right to determine the areas within the meaning of regulation 2(1) from which storage sites may be selected pursuant to the requirements of these regulations and any other applicable law. This includes the right of the competent authority not to allow for any storage in parts or in the whole of those areas.

Selection of storage sites.

(2) The suitability of a geological formation for use as a storage site shall be determined through a characterisation and assessment of the potential storage complex and surrounding area pursuant to the criteria specified in the First Schedule.

(3) A geological formation shall only be selected as a storage site, if under the proposed conditions of use there is no significant risk of leakage, and if no significant environmental or health risks exist.

5. (1) Where the competent authority decides that exploration is required to generate the information necessary for selection of storage sites pursuant to regulation 4, an exploration permit issued by the competent authority shall be required for the carrying out of any exploration. Where appropriate, monitoring of injection tests may be included in the exploration permit.

Exploration permits.

(2) The procedures for the granting of exploration permits shall be open to all entities possessing the necessary capacities. Permits

shall be granted or refused by the competent authority on the basis of objective, published and non-discriminatory criteria.

(3) The duration of a permit shall not exceed the period necessary to carry out the exploration for which it is granted. The competent authority may extend the validity of the permit where the stipulated duration is insufficient to complete the exploration concerned and where the exploration has been performed in accordance with the permit. Exploration permits shall be granted in respect of a limited volume area.

(4) The competent authority may include any condition in the exploration permit as it may deem necessary and expedient.

(5) The holder of an exploration permit shall have the sole right to explore the potential CO₂ storage complex. No conflicting uses of the complex are to be permitted during the period of validity of the permit.

Storage permits.

6. (1) The operation of a storage site without a storage permit shall be prohibited.

(2) Only one operator for each storage site shall be permitted by the Competent Authority and no conflicting uses shall be permitted on the site.

(3) The procedures for the granting of storage permits shall be open to all entities possessing the necessary capacities. Permits shall be granted by the competent authority on the basis of objective, published and transparent criteria.

(4) Without prejudice to the requirements of these regulations and of the requirements of any other applicable law, priority for the granting of a storage permit for a particular site shall be given to the holder of the exploration permit for that site:

Provided that the exploration of that site is completed, that any condition set in the exploration permit has been complied with, and that the application for a storage permit is made during the period of validity of the exploration permit.

(5) Conflicting uses of the complex during the permit procedure shall be prohibited.

(6) The operator shall pay to the competent authority any cost incurred in the course of the issue of the storage permit and for the regulation of the operations so permitted.

Applications for storage permits.

7. Applications to the competent authority for storage permits shall include at least the following information:

- (a) the name and address of the potential operator;
- (b) proof of the technical competence of the potential operator;
- (c) the characterisation of the storage site and storage complex and an assessment of the expected security of the storage pursuant to regulation 4(2) and (3);
- (d) the total quantity of CO₂ to be injected and stored, as well as the prospective sources and transport methods,

the composition of CO₂ streams, the injection rates and pressures, and the location of injection facilities;

- (e) a description of measures to prevent significant irregularities;
- (f) a proposed monitoring plan pursuant to regulation 13(2);
- (g) a proposed corrective measures plan pursuant to regulation 16(2);
- (h) a proposed provisional post-closure plan pursuant to regulation 17(3);
- (i) the information provided pursuant to regulation 5 of the Environmental Impact Assessment Regulations; S.L. 549.46
- (j) proof that the financial security or other equivalent provision as required under regulation 19 shall be valid and effective before the commencement of the injection.

8. The competent authority shall issue a storage permit only if the following conditions are met: Conditions for storage permits.

- (a) the competent authority, on the basis of the application submitted pursuant to regulation 7 and of any other relevant information, is satisfied that:
 - (i) all relevant requirements of these regulations and of other relevant laws are met;
 - (ii) the operator is financially sound and technically competent and reliable to operate and control the site and that professional and technical development and training of the operator and all staff are provided;
 - (iii) in the case of more than one storage site in the same hydraulic unit, the potential pressure interactions are such that both sites can simultaneously meet the requirements of these regulations and of any other applicable law; and
- (b) the competent authority has considered any opinion of the Commission on the draft permit issued pursuant to regulation 10.

9. The permit shall contain at least the following: Contents of storage permits.

- (a) the name and address of the operator;
- (b) the precise location and delimitation of the storage site and storage complex, and information concerning the hydraulic unit;
- (c) the requirements for storage operation, the total quantity of CO₂ authorised to be geologically stored, the reservoir pressure limits, and the maximum injection rates and pressures;
- (d) the requirements for the composition of the CO₂

stream and the CO₂ stream acceptance procedure pursuant to regulation 12, and, if necessary, further requirements for injection and storage in particular to prevent significant irregularities;

- (e) the approved monitoring plan, the obligation to implement the plan and requirements for updating it pursuant to regulation 13 as well as the reporting requirements pursuant to regulation 14;
- (f) the requirement to notify the competent authority in the event of leakages or significant irregularities, the approved corrective measures plan and the obligation to implement the corrective measures plan in the event of leakages or significant irregularities pursuant to regulation 16;
- (g) the conditions for closure and the approved provisional post-closure plan referred to in regulation 17;
- (h) any provisions on changes, review, updating and withdrawal of the storage permit pursuant to regulation 11;
- (i) the requirement to establish and maintain the financial security or any other equivalent pursuant to regulation 19.

Commission
review of draft
storage permits.

10. (1) The competent authority shall make the permit applications available to the Commission within one month after receipt. The competent authority shall also make available to the Commission other related material that shall be taken into account by the competent authority when it seeks to make a decision on the award of a storage permit. The competent authority shall inform the Commission of all draft storage permits and any other material taken into consideration for the adoption of the draft decision.

(2) The competent authority shall notify the final decision to the Commission, and where it departs from the opinion delivered by the Commission, it shall give reasons for its decision.

Changes, review,
update and
withdrawal of
storage permits.
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L.N. 291 of 2015.

11. (1) The operator shall inform the competent authority of any changes planned in the operation of the storage site, including changes concerning the operator. Where it deems appropriate, the competent authority shall update the storage permit or the permit conditions.

(2) No substantial change may be implemented without a new or updated storage permit issued in accordance with these regulations. Point 10 of Schedule 1A to the Environmental Impact Assessment Regulations, regarding changes or extensions to approved projects, shall *mutatis mutandis* apply in such cases.

(3) The competent authority shall review and where necessary update or, as a last resort, withdraw the storage permit:

- (a) if it has been notified or made aware of any leakages or significant irregularities pursuant to regulation 16(1);

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- (b) if the reports submitted pursuant to regulation 14 or the environmental inspections carried out pursuant to regulation 15 show non-compliance with permit conditions or risks of leakages or significant irregularities;
- (c) if it is aware of any other failure by the operator to meet the permit conditions;
- (d) if it appears necessary on the basis of the latest scientific findings and technological progress; or
- (e) without prejudice to paragraphs (a) to (d), five years after issuing the permit and every ten years thereafter.

(4) After a permit has been withdrawn pursuant to sub-regulation 3, the competent authority shall either issue a new storage permit or close the storage site pursuant to regulation 17(1)(c). Until a new storage permit has been issued, the competent authority shall temporarily take over all legal obligations relating to acceptance criteria where the competent authority decides to continue CO₂ injections, monitoring and corrective measures pursuant to the requirements laid down in these regulations, the surrender of allowances in cases of leakage pursuant to the European Union Greenhouse Gas Emissions Trading System for Stationary Installations Regulations, and preventive and remedial action pursuant to regulations 6 and 7 of the Prevention and Remedying of Environmental Damage Regulations. The competent authority shall recover any costs incurred from the former operator, including by drawing on the financial security referred to in regulation 19. In case of closure of the storage site pursuant to regulation 17(1)(c), regulation 17(4) shall apply.

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12. (1) A CO₂ stream shall consist overwhelmingly of carbon dioxide. To this end, no waste or other matter may be added for the purpose of disposing of that waste or other matter. However, a CO₂ stream may contain incidental associated substances from the source, capture or injection process and trace substances added to assist in monitoring and verifying CO₂ migration. Concentrations of all incidental and added substances shall be below levels that would:

CO₂ stream
acceptance criteria
and procedure.

- (a) adversely affect the integrity of the storage site or the relevant transport infrastructure;
 - (b) pose a significant risk to the environment or human health; or
 - (c) breach the requirements of applicable Community legislation.
- (2) The operator shall:
- (a) accept and inject CO₂ streams only if an analysis of the composition, including corrosive substances, of the streams and a risk assessment have been carried out, and if the risk assessment has shown that the contamination levels are inline with the conditions referred to in sub-regulation (1);

- (b) keeps a register of the quantities and properties of the CO₂ streams delivered and injected, including the composition of those streams.

Monitoring.
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13. (1) The operator shall carry out monitoring of the injection facilities, the storage complex (including where possible the CO₂ plume), and where appropriate the surrounding environment for the purpose of:

- (a) comparison between the actual and modelled behaviour of CO₂ and formation water in the storage site;
- (b) detecting significant irregularities;
- (c) detecting migration of CO₂;
- (d) detecting leakage of CO₂;
- (e) detecting significant adverse effects for the surrounding environment, including in particular on drinking water, for human populations, or for users of the surrounding biosphere;
- (f) assessing the effectiveness of any corrective measures taken pursuant to regulation 16;
- (g) updating the assessment of the safety and integrity of the storage complex in the short and long term, including the assessment of whether the stored CO₂ will be completely and permanently contained.

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(2) The monitoring required to be carried out by the operator in terms of sub-regulation (1) shall be based on a monitoring plan designed by the operator pursuant to the requirements laid down in the Second Schedule, including details on the monitoring in accordance with the guidelines established pursuant to regulation 13 of the European Union Greenhouse Gas Emissions Trading System for Stationary Installations Regulations, submitted to and approved by the competent authority pursuant to regulations 7(f) and 9(5)(e). The plan shall be updated pursuant to the requirements laid down in the Second Schedule and in any case every five years to take account of changes to the assessed risk of leakage, changes to the assessed risks to the environment and human health, new scientific knowledge, and improvements in best available technology. Updated plans shall be re-submitted for approval to the competent authority.

Reporting by the operator.

14. The operator shall submit to the competent authority at a frequency required by the competent authority, and in any event at least once a year:

- (a) all results of the monitoring pursuant to regulation 13 in the reporting period, including information on the monitoring technology employed;
- (b) the quantities and properties of the CO₂ streams delivered and injected, including composition of those streams, in the reporting period, registered pursuant to regulation 12(2)(b);

- (c) proof of the putting in place and maintenance of the financial security pursuant to regulations 9(i) and 19;
- (d) any other information the competent authority considers relevant for the purposes of assessing compliance with storage permit conditions and increasing the knowledge of CO₂ behaviour in the storage site.

15. (1) The competent authority shall organise a system of routine and non-routine inspections of all storage complexes within the scope of these regulations for the purposes of checking and promoting compliance with the requirements of these regulations and of monitoring the effects on the environment and on human health. Inspections.

(2) Inspections should include activities such as visits of the surface installations, including the injection facilities, assessing the injection and monitoring operations carried out by the operator, and checking all relevant records kept by the operator.

(3) Routine inspections shall be carried out at least once a year until three years after closure and every five years until transfer of responsibility to the competent authority has occurred. The competent authority shall examine the relevant injection and monitoring facilities as well as the full range of relevant effects from the storage complex on the environment and on human health.

(4) Non-routine inspections shall be carried out:

- (a) if the competent authority has been notified or made aware of leakages or significant irregularities pursuant to regulation 16(1);
- (b) if the reports pursuant to regulation 14 have shown insufficient compliance with the permit conditions;
- (c) to investigate serious complaints related to the environment or human health;
- (d) in other situations where the competent authority considers this appropriate.

(5) Following each inspection, the competent authority shall prepare a report on the results of the inspection. The report shall evaluate compliance with the requirements of these regulations and indicate whether or not further action is necessary. The report shall be communicated to the operator concerned and shall be publicly available in accordance with relevant Community legislation within two months of the inspection.

16. (1) In the event of leakages or significant irregularities, the operator shall immediately notify the competent authority, and shall take the necessary corrective measures, including measures related to the protection of human health. In cases of leakages and significant irregularities which imply the risk of leakage, the operator shall also notify the competent authority pursuant to the European Union Greenhouse Gas Emissions Trading System for Stationary Installations Regulations.

Measures in case of leakages or significant irregularities.
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(2) The corrective measures referred to in sub-regulation (1)

shall be taken as a minimum on the basis of a corrective measures plan submitted to and approved by the competent authority pursuant to regulations 7(g) and 9(f).

(3) The competent authority may at any time require the operator to take the necessary corrective measures, as well as measures related to the protection of human health. These may be additional to or different from those laid out in the corrective measures plan. The competent authority may also at any time take corrective measures itself.

(4) If the operator fails to take the necessary corrective measures, the competent authority shall take the necessary corrective measures itself.

(5) The competent authority shall recover the costs incurred in relation to the measures referred to in sub-regulations (3) and (4) from the operator, including by drawing on the financial security pursuant to regulation 19.

Closure and post-closure obligations.
Amended by:
L.N. 291 of 2015.

17. (1) A storage site shall be closed:

- (a) if the relevant conditions stated in the permit have been met;
- (b) at the substantiated request of the operator, after authorisation of the competent authority; or
- (c) if the competent authority so decides after the withdrawal of a storage permit pursuant to regulation 11(3).

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(2) After a storage site has been closed pursuant to sub-regulation (1)(a) or (b), the operator remains responsible for monitoring, reporting and corrective measures, pursuant to the requirements laid down in these regulations, and for all obligations relating to the surrender of allowances in case of leakages pursuant to the European Union Greenhouse Gas Emissions Trading System for Stationary Installations Regulations, and preventive and remedial action pursuant to regulations 6, 7, 8 and 9 of the Prevention and Remedying of Environmental Damage Regulations, until the responsibility for the storage site is transferred to the competent authority pursuant to regulation 18(1) to (5). The operator shall also be responsible for sealing the storage site and removing the injection facilities.

(3) The obligations referred to in sub-regulation (2) shall be fulfilled on the basis of a post-closure plan designed by the operator based on best practice and in accordance with the requirements laid down in the Second Schedule. A provisional post-closure plan shall be submitted to and approved by the competent authority pursuant to paragraph of regulations 7(h) and 9(g). Prior to the closure of a storage site pursuant to sub-regulation (1)(a) or (b), the provisional post-closure plan shall be:

- (a) updated as necessary, taking account of risk analysis, best practice and technological improvements;
- (b) submitted to the competent authority for its approval; and

- (c) approved by the competent authority as the definitive post-closure plan.

(4) After a storage site has been closed pursuant to sub-regulation (1)(c), the competent authority shall be responsible for monitoring and corrective measures pursuant to the requirements laid down in these regulations and for all obligations relating to the surrender of allowances in case of leakages pursuant to the European Union Greenhouse Gas Emissions Trading System for Stationary Installations Regulations, and preventive and remedial action pursuant to regulations 6(1) and 7(1) of the Prevention and Remedying of Environmental Damage Regulations. The post-closure requirements pursuant to these regulations shall be fulfilled by the competent authority on the basis of the provisional post-closure plan referred to in sub-regulation (3), which shall be updated as necessary.

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(5) The competent authority shall recover from the operator the costs incurred in relation to the measures referred to in sub-regulation (4), including by drawing on the financial security pursuant to regulation 19.

18. (1) Where a storage site has been closed pursuant to regulation 17(1)(a) or (b), all legal obligations relating to monitoring and corrective measures pursuant to the requirements laid down in these regulations, the surrender of allowances in the event of leakages pursuant to the European Union Greenhouse Gas Emissions Trading System for Stationary Installations Regulations, and preventive and remedial action pursuant to regulations 6(1) and 7(1) of the Prevention and Remedying of Environmental Damage Regulations, shall be transferred to the competent authority on its own initiative or upon request from the operator, if the following conditions are met:

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- (a) all available evidence indicates that the stored CO₂ will be completely and permanently contained;
- (b) a minimum period, to be determined by the Competent Authority has elapsed. This minimum period shall be no shorter than twenty years, unless the competent authority is convinced that the criterion referred to in paragraph (a) is complied with before the end of that period;
- (c) the financial obligations referred to in regulation 20 have been fulfilled;
- (d) the site has been sealed and the injection facilities have been removed.

(2) The operator shall prepare a report documenting that the condition referred to in sub-regulation (1)(a) has been met and shall submit it to the competent authority for the latter to approve the transfer of responsibility. This report shall demonstrate, at least:

- (a) the conformity of the actual behaviour of the injected CO₂ with the modelled behaviour;

- (b) the absence of any detectable leakage;
- (c) that the storage site is evolving towards a situation of long-term stability.

(3) Where the competent authority is satisfied that the conditions referred to in sub-regulation (1)(a) and (b) are met, it shall prepare a draft decision of approval of the transfer of responsibility. The draft decision shall specify the method for determining that the conditions referred to in sub-regulation (1)(d) have been met as well as any updated requirements for the sealing of the storage site and for the removal of injection facilities. If the competent authority considers that the conditions referred to in sub-regulation (1)(a) and (b) are not met, it shall inform the operator of its reasons.

(4) Where the competent authority is satisfied that the conditions referred to in sub-regulation (1)(a) to (d) are complied with, it shall adopt the final decision and notify that decision to the operator. The competent authority shall also notify the final decision to the Commission, and where it departs from an opinion which may be issued by the Commission, it shall give reasons for such decision.

(5) After the transfer of responsibility, routine inspections provided for in regulation 15(3) shall cease and monitoring may be reduced to a level which allows for detection of leakages or significant irregularities. If any leakages or significant irregularities are detected, monitoring shall be intensified as required to assess the scale of the problem and the effectiveness of corrective measures.

(6) In cases where there has been fault on the part of the operator, including cases of deficient data, concealment of relevant information, negligence, wilful deceit or a failure to exercise due diligence, the competent authority shall recover from the former operator the costs incurred after the transfer of responsibility has taken place. Without prejudice to regulation 20, there shall be no further recovery of costs after the transfer of responsibility.

(7) Where a storage site has been closed pursuant to regulation 17(1)(c), transfer of responsibility shall be deemed to take place if and when all available evidence indicates that the stored CO₂ will be completely and permanently contained, and after the site has been sealed and the injection facilities have been removed.

Financial security.
Amended by:
L.N. 291 of 2015.

19. (1) The potential operator shall present proof, as part of the application for a storage permit, that adequate provisions can be established, by way of financial security or any other equivalent and on the basis of arrangements established by the competent authority which may include financial security instruments, bank guarantees and adequate insurance cover, in order to ensure that all obligations arising under the permit issued pursuant to these regulations, including closure and post-closure requirements, as well as any obligations arising from inclusion of the storage site under the European Union Greenhouse Gas Emissions Trading System for Stationary Installations Regulations can be met. This financial security shall be valid and effective before

commencement of injection.

(2) The financial security shall be periodically adjusted to take account of changes to the assessed risk of leakage and the estimated costs of all obligations arising under the permit issued pursuant to these regulations as well as any obligations arising from inclusion of the storage site under the European Union Greenhouse Gas Emissions Trading System for Stationary Installations Regulations. S.L. 423.50

(3) The financial security or any other equivalent referred to in sub-regulation (1) shall remain valid and effective:

- (a) after a storage site has been closed pursuant to regulation 17(1)(a) or (b), until the responsibility for the storage site is transferred to the competent authority pursuant to regulation 18(1) to (5);
- (b) after the withdrawal of a storage permit pursuant to regulation 11(3):
 - (i) until a new storage permit has been issued;
 - (ii) where the site is closed pursuant to regulation 17(1)(c), until the transfer of responsibility pursuant to regulation 18(7):

Provided that the financial obligations referred to in regulation 20 have been fulfilled.

20. The operator shall, on the basis of arrangements established by the competent authority, make a financial contribution available to the competent authority before the transfer of responsibility pursuant to regulation 18 has taken place. The contribution from the operator shall take into account those criteria referred to in the First Schedule and elements relating to the history of storing CO₂ relevant to determining the post-transfer obligations, and cover at least the anticipated cost of monitoring for a period of thirty years. This financial contribution may be used to cover the costs borne by the competent authority after the transfer of responsibility to ensure that the CO₂ is completely and permanently contained in geological storage sites after the transfer of responsibility. Financial mechanism.

21. (1) The competent authority shall establish and maintain: Registers.

- (a) a register of the storage permits granted; and
- (b) a permanent register of all closed storage sites and surrounding storage complexes, including maps and sections of their spacial extent and available information relevant for assessing that the stored CO₂ will be completely and permanently contained.

(2) The registers referred to in sub-regulation (1) shall be taken into consideration by the Environment and Resources Authority in relevant planning procedures when permitting any activity that could affect or be affected by the geological storage of CO₂ in the registered storage sites.

Access to transport
networks and
storage sites.
Added by:
L.N. 291 of 2015.

21A. (1) The competent authority shall take the necessary measures to ensure that potential users are able to obtain access to transport networks and to storage sites for the purpose of geological storage of the produced and captured CO₂, in accordance with sub-regulations (2), (3) and (4).

(2) The access referred to in sub-regulation (1) shall be provided in a transparent and non-discriminatory manner determined by the competent authority. The competent authority shall apply the objectives of fair and open access, taking into account:

- (a) the storage capacity which is or can reasonably be made available within the areas determined under regulation 4, and the transport capacity which is or can reasonably be made available;
- (b) the proportion of the national CO₂ reduction obligations pursuant to international legal instruments and to Community legislation that Malta intends to meet through capture and geological storage of CO₂;
- (c) the need to refuse access where there is an incompatibility of technical specifications which cannot be reasonably overcome;
- (d) the need to respect the duly substantiated reasonable needs of the owner or operator of the storage site or of the transport network and the interests of all other users of the storage or the network or relevant processing or handling facilities who may be affected.

(3) Transport network operators and operators of storage sites may refuse access on the grounds of lack of capacity. Duly substantiated reasons shall be given for any refusal.

(4) The competent authority shall take the necessary measures to ensure that the operator refusing access on the grounds of lack of capacity or a lack of connection makes any necessary enhancements as far as it is economic to do so or when a potential customer is willing to pay for them:

Provided this shall not negatively impact on the environmental security of transport and geological storage of CO₂.

Designation of
independent
authority.
Added by:
L.N. 291 of 2015.

21B. (1) The Prime Minister shall designate an independent authority for the purpose of these regulations and Directive 2009/31/EC, and such independent authority shall have access to all relevant information, in order to settle expeditiously all disputes relating to access to transport networks and storage sites, taking into account the criteria referred to in regulation 21A(2) and the number of parties which may be involved in negotiating such access.

(2) In the event of cross-border disputes, the dispute settlement arrangement referred to in sub-regulation (1) shall be applied when Malta has jurisdiction over the transport networks or the storage site to which access has been refused. Where, in cross-border disputes, more than one Member State covers the transport network

or storage site concerned, the competent authority shall consult with its counterparts in the Member States concerned with a view to ensuring the consistent application of Directive 2009/31/EC.

22. The competent authority shall make available to the public environmental information relating to the geological storage of CO₂ in accordance with the applicable Community legislation. Information to the public.

23. The competent authority may issue guidelines, in regard to the provisions of these regulations. Guidelines.

24. (1) The competent authority may issue a compliance order against any person who in its opinion has contravened any of the provisions of these regulations or a condition of a licence or authorisation issued thereunder. Compliance orders.

(2) Any person who fails to abide by the provisions of a compliance order issued by the competent authority shall, without prejudice to any other liability under these regulations, the Act or any other law, be guilty of an offence and be liable, on conviction, to a fine (*multa*) of not less than one thousand euro (€1,000) and of not more than sixty thousand euro (€60,000) for each day during which the failure to comply subsists.

25. (1) Any person who contravenes any of the provisions of these regulations or of a permit or licence condition or of an authorisation or approval issued thereunder, shall be guilty of an offence and shall, on conviction, be liable to a fine (*multa*) of not more than sixty-nine thousand euro (€69,000) or for one thousand and three hundred euro (€1,300) for each day during which the offence persists. Offences.

(2) Any person who, when information with respect to these regulations is requested or required by the competent authority, knowingly or recklessly -

- (a) gives any false, inaccurate or misleading information; or
- (b) supplies incomplete information; or
- (c) fails, without reasonable cause, to supply information requested within the time given; or
- (d) prevents or hinders any investigation; or
- (e) produces or furnishes, or causes or knowingly allows to be produced or furnished, any document or information which he knows to be false in any material respect,

shall be guilty of an offence. and shall, on conviction, be liable to a fine (*multa*) of not less than one thousand euro (€1,000) and of not more than sixty thousand euro (€60,000) for each day during which the offence subsists.

FIRST SCHEDULE

Regulation 4(2)

CRITERIA FOR THE CHARACTERISATION AND ASSESSMENT OF THE
POTENTIAL STORAGE COMPLEX AND SURROUNDING AREA REFERRED
TO IN REGULATION 4(2)

The characterisation and assessment of the potential storage complex and surrounding area referred to in regulation 4(2) shall be carried out in three steps according to best practices at the time of the assessment and to the following criteria. Derogations from one or more of these criteria may be permitted by the competent authority provided the operator has demonstrated that the capacity of the characterisation and assessment to enable the determinations pursuant to regulation 4 is not affected.

Step 1: Data collection

Sufficient data shall be accumulated to construct a volumetric and three-dimensional static (3-D)-earth model for the storage site and storage complex, including the caprock, and the surrounding area, including the hydraulically connected areas. This data shall cover at least the following intrinsic characteristics of the storage complex:

- (a) geology and geophysics;
- (b) hydrogeology (in particular existence of ground water intended for consumption);
- (c) reservoir engineering (including volumetric calculations of pore volume for CO₂ injection and ultimate storage capacity);
- (d) geochemistry (dissolution rates, mineralisation rates);
- (e) geomechanics (permeability, fracture pressure);
- (f) seismicity;
- (g) presence and condition of natural and man-made pathways, including wells and boreholes which could provide leakage pathways.

The following characteristics of the complex vicinity shall be documented:

- (h) domains surrounding the storage complex that may be affected by the storage of CO₂ in the storage site;
- (i) population distribution in the region overlying the storage site;
- (j) proximity to valuable natural resources (including in particular Natura 2000 areas pursuant to Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds and Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, potable groundwater and hydrocarbons);
- (k) activities around the storage complex and possible interactions with these activities (for example, exploration, production and storage of hydrocarbons, geothermal use of aquifers and use of underground water reserves);
- (l) proximity to the potential CO₂ source(s) (including estimates of the total potential mass of CO₂ economically available for storage) and adequate transport networks.

Step 2: Building the three-dimensional static geological earth model

Using the data collected in Step 1, a three-dimensional static geological earth model, or a set of such models, of the candidate storage complex, including the caprock and the hydraulically connected areas and fluids shall be built using computer reservoir simulators. The static geological earth model(s) shall characterise the complex in terms of:

- (a) geological structure of the physical trap;
- (b) geomechanical, geochemical and flow properties of the reservoir overburden (caprock, seals, porous and permeable horizons) and surrounding formations;
- (c) fracture system characterisation and presence of any human-made pathways;
- (d) areal and vertical extent of the storage complex;
- (e) pore space volume (including porosity distribution);
- (f) baseline fluid distribution;
- (g) any other relevant characteristics.

The uncertainty associated with each of the parameters used to build the model shall be assessed by developing a range of scenarios for each parameter and calculating the appropriate confidence limits. Any uncertainty associated with the model itself shall also be assessed.

Step 3: Characterisation of the storage dynamic behaviour, sensitivity characterisation, risk assessment

The characterisations and assessment shall be based on dynamic modelling, comprising a variety of time-step simulations of CO₂ injection into the storage site using the three-dimensional static geological earth model(s) in the computerised storage complex simulator constructed under Step 2.

Step 3.1: Characterisation of the storage dynamic behaviour

At least the following factors shall be considered:

- (a) possible injection rates and CO₂ stream properties;
- (b) the efficacy of coupled process modelling (that is, the way various single effects in the simulator(s) interact);
- (c) reactive processes (that is, the way reactions of the injected CO₂ with in situ minerals feedback in the model);
- (d) the reservoir simulator used (multiple simulations may be required in order to validate certain findings);
- (e) short and long-term simulations (to establish CO₂ fate and behaviour over decades and millennia, including the rate of dissolution of CO₂ in water).

The dynamic modelling shall provide insight into:

- (f) pressure and temperature of the storage formation as a function of injection rate and accumulative injection amount over time;
- (g) areal and vertical extent of CO₂ vs time;
- (h) the nature of CO₂ flow in the reservoir, including phase behaviour;
- (i) CO₂ trapping mechanisms and rates (including spill points and lateral and vertical seals);

- (j) secondary containment systems in the overall storage complex;
- (k) storage capacity and pressure gradients in the storage site;
- (l) the risk of fracturing the storage formation(s) and caprock;
- (m) the risk of CO₂ entry into the caprock;
- (n) the risk of leakage from the storage site (for example, through abandoned or inadequately sealed wells);
- (o) the rate of migration (in open-ended reservoirs);
- (p) fracture sealing rates;
- (q) changes in formation(s) fluid chemistry and subsequent reactions (for example, pH change, mineral formation) and inclusion of reactive modelling to assess affects;
- (r) displacement of formation fluids;
- (s) increased seismicity and elevation at surface level.

Step 3.2: Sensitivity characterization

Multiple simulations shall be undertaken to identify the sensitivity of the assessment to assumptions made about particular parameters. The simulations shall be based on altering parameters in the static geological earth model(s), and changing rate functions and assumptions in the dynamic modelling exercise. Any significant sensitivity shall be taken into account in the risk assessment.

Step 3.3: Risk assessment

The risk assessment shall comprise, inter alia, the following:

3.3.1. Hazard characterization

Hazard characterisation shall be undertaken by characterising the potential for leakage from the storage complex, as established through dynamic modelling and security characterisation described above. This shall include consideration of, *inter alia*:

- (a) potential leakage pathways;
- (b) potential magnitude of leakage events for identified leakage pathways (flux rates);
- (c) critical parameters affecting potential leakage (for example maximum reservoir pressure, maximum injection rate, temperature, sensitivity to various assumptions in the static geological Earth model(s));
- (d) secondary effects of storage of CO₂, including displaced formation fluids and new substances created by the storing of CO₂;
- (e) any other factors which could pose a hazard to human health or the environment (for example physical structures associated with the project).

The hazard characterisation shall cover the full range of potential operating conditions to test the security of the storage complex.

3.3.2. Exposure assessment - based on the characteristics of the environment and the distribution and activities of the human population above the storage complex, and the potential behaviour and fate of leaking CO₂ from potential pathways identified under Step 3.3.1.

3.3.3. Effects assessment - based on the sensitivity of particular species, communities or habitats linked to potential leakage events identified under Step

3.3.1. Where relevant it shall include effects of exposure to elevated CO₂ concentrations in the biosphere (including soils, marine sediments and benthic waters (asphyxiation; hypercapnia) and reduced pH in those environments as a consequence of leaking CO₂). It shall also include an assessment of the effects of other substances that may be present in leaking CO₂ streams (either impurities present in the injection stream or new substances formed through storage of CO₂). These effects shall be considered at a range of temporal and spatial scales, and linked to a range of different magnitudes of leakage events.

3.3.4. Risk characterisation - this shall comprise an assessment of the safety and integrity of the site in the short and long term, including an assessment of the risk of leakage under the proposed conditions of use, and of the worst-case environment and health impacts. The risk characterisation shall be conducted based on the hazard, exposure and effects assessment. It shall include an assessment of the sources of uncertainty identified during the steps of characterisation and assessment of storage site and when feasible, a description of the possibilities to reduce uncertainty.

SECOND SCHEDULE

Regulation 13(2)

CRITERIA FOR ESTABLISHING AND UPDATING THE MONITORING PLAN REFERRED TO IN REGULATION 13(2) AND FOR POST-CLOSURE MONITORING

1. Establishing and updating the monitoring plan

The monitoring plan referred to in regulation 13(2) shall be established according to the risk assessment analysis carried out in Step 3 of the First Schedule, and updated with the purpose of meeting the monitoring requirements laid out in regulation 13(1) according to the following criteria:

1.1. Establishing the plan

The monitoring plan shall provide details of the monitoring to be deployed at the main stages of the project, including baseline, operational and post-closure monitoring. The following shall be specified for each phase:

- (a) parameters monitored;
- (b) monitoring technology employed and justification for technology choice;
- (c) monitoring locations and spatial sampling rationale;
- (d) frequency of application and temporal sampling rationale.

The parameters to be monitored are identified so as to fulfil the purposes of monitoring. However, the plan shall in any case include continuous or intermittent monitoring of the following items:

- (e) fugitive emissions of CO₂ at the injection facility;
- (f) CO₂ volumetric flow at injection wellheads;
- (g) CO₂ pressure and temperature at injection wellheads (to determine mass flow);
- (h) chemical analysis of the injected material;
- (i) reservoir temperature and pressure (to determine CO₂ phase behaviour

and state).

The choice of monitoring technology shall be based on best practice available at the time of design. The following options shall be considered and used as appropriate:

- (j) technologies that can detect the presence, location and migration paths of CO₂ in the subsurface and at surface;
- (k) technologies that provide information about pressure-volume behaviour and areal/vertical distribution of CO₂-plume to refine numerical 3-D simulation to the 3-D-geological models of the storage formation established pursuant to regulation 4 and the First Schedule;
- (l) technologies that can provide a wide areal spread in order to capture information on any previously undetected potential leakage pathways across the areal dimensions of the complete storage complex and beyond, in the event of significant irregularities or migration of CO₂ out of the storage complex.

1.2. Updating the plan

The data collected from the monitoring shall be collated and interpreted.

The observed results shall be compared with the behaviour predicted in dynamic simulation of the 3-D-pressure-volume and saturation behaviour undertaken in the context of the security characterisation pursuant to regulation 4 and Step 3 of the First Schedule.

Where there is a significant deviation between the observed and the predicted behaviour, the 3-D model shall be recalibrated to reflect the observed behaviour. The recalibration shall be based on the data observations from the monitoring plan, and where necessary to provide confidence in the recalibration assumptions, additional data shall be obtained.

Steps 2 and 3 of the First Schedule shall be repeated using the recalibrated 3-D model(s) so as to generate new hazard scenarios and flux rates and to revise and update the risk assessment.

Where new CO₂ sources, pathways and flux rates or observed significant deviations from previous assessments are identified as a result of history matching and model recalibration, the monitoring plan shall be updated accordingly.

2. Post-closure monitoring

Post-closure monitoring shall be based on the information collected and modelled during the implementation of the monitoring plan referred to in regulation 13(2) and above in item 1.2 of this Schedule. It shall serve in particular to provide information required for the determination of regulation 18(1).
