Queensland Conservation

PROTECT CONSERVE SUSTAIN

The Chief Executive
Attn: The EIS Coordinator - Surat Basin Carbon Capture and Storage Project
Department of Environment and Science
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Brisbane QLD 4000

Email: eis@des.qld.gov.au

Date: 23 February 2023

RE: Submission on the Environmental Impact Statement for the Proposed Surat Basin Carbon Capture and Storage Project

Dear Sir or Madam,

The Queensland Conservation Council (QCC) welcomes the opportunity to provide the following comments and recommendations to the draft Environmental Impact Statement (EIS) for the Surat Basin Carbon Capture and Storage (SBCCS) Project as proposed by the Carbon Transport and Storage Corporation (CTSCo) Pty Ltd.

In summary, this submission addresses:

1. The failure of the proponent to address the Terms of Reference for the EIS,
2. Other matters that need to be addressed and considered,
3. Inadequacies with the current regulatory framework for projects involving carbon capture and storage in Queensland,
4. Questions that should be asked by decision-makers when CCS assessing projects,
5. Issues with CCS, both generally and in relation to the SBCCS Project and,
6. Our recommendation that the EIS should not be accepted and the SBCCS Project should be rejected

1. Failure to address the TOR for the EIS

Examples of the proponent's failure to address the TOR for the EIS includes, but is not limited to:

1.1 Assessment of cumulative impact

Under section 8.3 of the TOR, the proponent is required to assess the cumulative impacts to environmental values and public health from the proposed project, in combination with adverse impacts potentially caused by other development activities and infrastructure proposals that are adjacent, upstream and downstream of the proponent's proposal in consideration of the combined scale, intensity, duration and frequency of the impacts.

In doing this, the TOR stipulates the proponent must make every effort to find information from all sources relevant to the assessment of cumulative impacts including from other major projects or development.

Despite this requirement, the proponent has not assessed the potential cumulative impacts from their project in combination with other potential carbon storage projects in the Surat Basin, which has been identified by the 2009 National Carbon Storage Taskforce report and the Queensland Government CO2 Storage Atlas as a key geo-storage area with the potential to permanently store approximately three billion tonnes of CO2, including 1.3 billion tonnes in the Precipice Sandstone aquifer.

Given the primary purpose of the proponent's project is to gather data to inform the development of other underground CO2 storage projects, the proponents failure to assess the cumulative impacts to environmental values and public health potentially caused by their project in combination other potential underground CO2 sequestration projects in the Surat Basin is a gross failure to comply with section 8.3 of the TOR for the EIS.

Recommendation: Require the proponent to assess potential cumulative impacts to environmental values, public health and existing and future groundwater users from their proposed project in combination with adverse impacts potentially caused by other underground CO2 storage projects in the Surat Basin.

1.2 Remediation options

Under section 9.3.1 of the TOR, the proponent is required to develop a rehabilitation strategy which must include suitable options for remediation and or reinstatement of the groundwater resource and geological formations should the project fail and or achieve project outcomes.

Despite this requirement, the proponent has not provided any information in the draft EIS about suitable options for remediating impacts that occur to groundwater resources and geological formations if the project fails due to technical, economic, environmental or any other issues.

Recommendation: Require the proponent to provide information about options for remediating impacts to groundwater resources if the project fails due to technical, economic, environmental or any other issues.

1.3 Water quality

Under section 9.4.1 of the TOR, the proponent must operate the proposed project in a way that protects the environmental values of groundwater and any associated surface ecological systems.

Based on information provided in the draft EIS, the proponent's proposed project will permanently degrade the quality of groundwater in the Sandstone Precipice, which does not comply with the purpose of the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* to protect the quality of Queensland's surface and underground water resources.

Recommendation: As it does not comply with the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*, the proposed project should not be approved under the *Environmental Protection Act 1994.*

1.4 Future use of groundwater

Under section 9.4.2 of the TOR, the proponent must describe present and potential users and uses of water in areas potentially affected by the proposed project, including municipal, agricultural, industrial, recreational and environmental uses of water.
Despite the requirement, the proponent has not provided sufficient information about the potential use of water from the Sandstone Precipice for future municipal, agricultural, Industrial, environmental or other purposes.

Recommendation: Require the proponent to provide information about the potential use of water from the Sandstone Precipice for future municipal, agricultural, Industrial, environmental or other purposes

2. Other matters that need to be addressed and considered

Other matters that need to be addressed and considered when assessing the proponents proposed project includes:

2.1 Monitoring

As the potential impacts to groundwater resources are likely to occur over an extended period of time, the proponent's proposal to monitor the project for a total of 3 years after ceasing to inject CO2 into the Sandstone Precipice is manifestly inadequate.

Given that it is permanent and that adverse impacts may not occur for some time into the future, it's essential that the proponent is required to monitor the effect of the CO2 plume on the economic, environmental and social values of the region for at least 100 years.

Recommendation: Require the proponent to monitor (and manage) the project site for at least 100 years.

2.2 Additional commitments

Along with the commitments contained in the draft EIS, the proponent must also commit to:

- Fully remediating groundwater resources if the project fails due to technical, economic, environmental or any other issues at any point in the future
- Monitoring and managing the project site in perpetuity,

Recommendation: Require the proponent to implement the above additional commitments if their project is approved

2.3 Chapter 3 of the Water Act

As the proponent's project is classified as a resource activity under section 107 (b) of the *Environmental Protection Act 1994* and is located within the Surat Cumulative Management Area, the proponent should be required to comply with Chapter 3 of the *Water Act 2000* to ensure that impacts to groundwater from their proposed project are managed in accordance with the framework that impacts to groundwater from other resource activities in the Surat Basin are managed.

Recommendation: Require the proponent to comply with Chapter 3 of the *Water Act 2000* if their project is approved

2.4 Section 41 of *Environmental Protection Regulation 2019*

Given that it will continue to degrade the quality of groundwater in the Sandstone Precipice into the future, the CO2 plume the proponent is seeking approval to inject into the Sandstone Precipice should be classified as a waste under the *Environmental Protection Act 1994.*

As a classified waste that will continue to degrade the environmental values of the receiving aquifer into the future, the proponent's application for an Environmental Authority should be refused under section 41 (2)(c) of the *Environmental Protection Regulation 2019.*

Recommendation: Refuse the proponents Environmental Authority application under section 41 (2)(c) of the *Environmental Protection Regulation 2019*

3. Inadequacies with existing regulatory framework

We would like to use this submission as an opportunity to highlight the inadequacies with the current regulation of CCS in Queensland. In particular, we refer to and rely on the attached report prepared by the Environmental Defenders Office Ltd, which is included in this submission as Attachment A: 'Improving Regulation of Carbon Capture and Storage in Queensland'.

4. Questions that decision makers must ask when assessing CCS projects

There are a number of critical questions that must be asked when assessing CCS projects to ensure that environmental, economic and social impacts are fully considered. We recommend that when assessing the SBCCS Project, the questions listed below should be asked by the decision-maker. Our response to these questions in context of the SBCCS Project are included below.

- ***Will the Project contribute meaningfully to emissions reductions? Has the project been designed with indefinite CO_2 sequestration as the one and only goal?***

Our response: This project is a demonstration of CO_2 sequestration in the Precipice Sandstone Aquifer. There is a disconnect, as the project requires millions of dollars to set up plants for trapping and transporting the CO_2, yet the project duration is only a couple of years. Therefore, the project does not make sense economically or in terms of energy use for construction. There is insufficient information to evaluate whether the CO_2 captured by this project will exceed the amount produced by construction of infrastructure and transportation of CO_2 to injection. Given the relatively low volumes of CO_2 injected, it is unlikely that the project lifecycle would be, overall, emissions negative. More information is required to understand the long-term plans for these facilities. If the plan would be to continue trucking the CO_2 beyond the lifetime of this project, the project requires additional impact statements to review the social impacts and risk of road injury on communities along the transportation route. Moreover, trucking CO2 is among the most energy consumptive modes of transporting CO_2.

- ***Is the CCS activity relevant at climate-change scale?***

Our response: No, the SBCCS Project will inject a relatively small amount of CO_2, and not impact state or national goals at a meaningful level. The technologies demonstrated by this project are already well established; the difficulties with CCS exist when upscaling to a meaningful volume (E.G: Martin-Roberts et al., 2021), and this project will not address those difficulties.

- ***Are other toxic/noxious by-product gases (E.G: H_2S, NO_x) released to the atmosphere during the carbon capture stage? Does the application include rigorous examination of such fugitive GHG emissions at all steps, including the carbon-capture stage compression and transport stages, and the injection stage?***

Our response: No information about fugitive gases is provided in the draft EIS. There is one acknowledgement of fugitive gases during transportation in Chapter 2 of the draft EIS, which states: “Couplings for connections between an iso tank container and a tank will be designed to minimise fugitive emissions of the GHG stream”. However, no further details are given as to how “minimise” is achieved, monitored, or quantified.

- ***Is this CCS project for an industry that is especially hard to decarbonize (e.g., the cement and iron and steel industries)?***

Our response: No. The SBCCS Project is a post-combustion retrofit of an existing coal-fired power plant. The CO_2 will be of relatively low concentration in the source, and therefore the process of trapping and concentrating the CO_2 is inefficient. Moreover, the MEA system of carbon capture, which is typical of post-combustion capture at coal-fired power plants, and which will be used in this demonstration project, reduces the efficiency of the power plant. As described by Gingerich and Mauter, "MEA solvent regeneration imposes a significant energy penalty on CFPPs".

- ***Is CCS economically viable regarding operational costs of installing CCS at a power plant or for resource generation, whether the future revenue stream is sufficient to cover all of the investment in the upfront drilling and infrastructure, the costs associated with the injection phase operations and the continuance of monitoring during the post-injection phase, whether the CCS is economically viable without subsidies and is there sufficient supply of CO_2 over many years?***

Our response: As the Milmerran Power Plant is already operating, the supply of CO_2 is sufficient for the amount needed for demonstration. No details are given as to the economic viability of this project; the outlays for construction of facilities are substantial.
The Project has been granted $210 million by the Australian Government to capture carbon dioxide from the Millmerran power station and store it underground in the Surat Basin in Queensland. Therefore, this project is not economically feasible without subsidies. Moreover, Millmerran Power Plant is hoping to extend its operating life to 2056 (E.G: beyond the 2050 zero emissions goal), and the carbon capture will no doubt be used as an excuse to continue local coal mining and coal burning at the expense of the transition to carbon neutral technologies. Thus, it is not in the long-term interest of Australia.

- ***Is the proposed site suitable for long term storage of CO_2, including:***

(Please note that we are unable to provide our response to some of the suggested questions in this section due to the lack of information and that the SBCCS Project is regarded as demonstration project.)

  - ***What means is used to convey the CO_2 to the injection site, including if it is a former natural-gas pipeline, have the risks of leaks or rupture been critically evaluated regarding length, age and state of pipeline, number of compression stages, incidental damage (including seismic events—esp. subsea pipelines) and human error, and is the CO_2 to be thoroughly dried if it's to be transported by pipe to mitigate corrosion?***

Our response: The CO_2 will be transported via the surface road system; trucked 2 hours from the capture site to the injection site, adding road traffic and burning additional fossil fuels. There is no economic analysis to show under what conditions it would be economically feasible to use CCS as an effective offset for this power station for the long-term.

It is obvious that this demonstration study is intended to "prove" that the aquifer is suitable for storage; however, the monitoring will not continue for a sufficient period.

Corrosion is addressed in the application, and there are no long pipelines of concern in this project. However, Milmerran Power Station is located 260 km from the injection site across two townships; therefore, transportation of CO2 to the injection site over the long-term (beyond the 3-year lifespan of the project) would be a challenge and a large expense requiring further subsidies.

- ***If geo-sequestration is to be used as the storage means, have the geological strata or feature/s been validly proven for long-term retention (centuries to millennia)?***

Our response: The geological and hydrological studies for this project have been done in consultation with the University of Queensland, which is one of the strongest points of the application.

- ***Has rigorous risk assessment been made of the likelihood of contamination of adjoining aquifers during injection or subsequent storage, including indirect mobilisation of toxicants?***

Our response: There is only one injection bore, which carries the CO_2 to a depth of 2.5 km. This is well below the aquifers typically used for domestic and agricultural purposes. Information on how the borehole will be monitored to make sure there is no contamination are not within the current application.

- ***Has evaluation of induced seismicity and the potential of pressurisation and or depressurisation to cause caprock fracture been made as a result of CO_2 injection?***

Our response: No, as this will be done as part of the project after shut-in of the West Moonie-1 Injection Well

- ***Has an assessment of the possibility of geohazards (E.G: earthquakes) been made as to the integrity of CO_2 storage in the long term?***

Our response: N/A

- ***If a depleted hydrocarbon reservoir is to be used for CO_2 sequestration, how is well integrity to be guaranteed and monitored in the long term?***

Our response: N/A

- ***Is the monitoring sufficient to ensure containment of CO_2 including:***

  - ***Will the transport stage/s be actively monitored for leaks or inadvertent releases of CO2?***

Our response: There is no mention in the draft EIS about monitoring for leaks during the transport stage of the project.

- ***Will the site be monitored for at least 100 years?***

Our response: According to table 2-5 in section 2.7 of the draft EIS, monitoring of the proponent is proposing to only monitor the site until 2030, which is clearly insufficient.

- ***Who is financially responsible for monitoring if the company is no longer solvent?***

Our response: From the draft EIS, it is unclear who would be responsible for dealing with leaks after 2030 when the "rehabilitation" stage of the project has concluded.

- ***What are the consequences for long-term land use*****?**

Our response: The proposed injection of CO_2 into the Sandstone Precipice will essentially preclude the use of water from this aquifer for future consumptive purposes forever.

- ***What is the management plan if leaks are discovered?***

Our response: On p.51 of the draft EIS under Project Description, it mentions development of a Trigger Action Response Plan for leaks, but the proponent has provided no information about how leaks will be actually managed.

- ***What are the consequences of a leak?***

Our response: Sudden leaks may produce fatalities. Concentrations of CO_2 over 10% even in the presence of oxygen can be fatal (IPCC, 2005: 392). Leaks may also change the geochemistry of the groundwater, which will alter water quality. Information about this issue has not been provided in the draft EIS.

- ***Is there public acceptance of the project (social license), including whether the public has been provided with adequate information regarding the proposed project, whether the proponent has provided the public with meaningful opportunities to raise any concerns and whether the public's concerns have been adequately addressed.***

Our response: The proponent has not provided sufficient information in the draft EIS regarding how the public and stakeholder concerns about the SBCCS Project have been addressed.

- ***Is there adequate planning to evaluate whether this project contributes meaningfully to state/national emissions goals, including whether the entities that validate CCS projects are truly independent, objective and scientifically credible and the remedial actions and consequential penalties for lack of compliance are sufficient to deter breaches of compliance***

Our response: No, there has not been adequate evaluation of whether this project will contribute meaningfully to state/national emissions goals.

5.Fundamental issues with CCS

Key issues regarding the viability of CCS includes, but is not limited to:

5.1 CCS will be used to justify continued fossil fuel emissions

There are concerns that CCS will be a greenwashing tool that will be utilised to justify continued emission of fossil fuels, rather than investment in renewable energy technologies. Of particular concern are arguments made by coal and gas companies that CCS will be used to allow the continued operation of fossil fuel power plants long after they would otherwise have been shut down.

This is the case for the Surat Basin Carbon Capture and Storage Project. Although it is only a demonstration project that will operate over three years, it is clear that it will encourage continued fossil fuel emissions from the Millmerran Power Station, where it's proposed to be captured.

An application has been made to extend the operation of the Millmerran Power Station and associated Commodore Coal Mine until 2056, which if approved would allow the production of 4.0 Mtpa of thermal coal solely for the Millmerran Power Station. This would amount to approximately 170 million tonnes of CO2 generated over 32 years.

If this extension is approved, then CCS technology will be needed to ensure compliance with Queensland's and Australia's emissions reduction targets. Intergen, one of the joint owners of the Millmerran Power Station, has even stated that it is 'involved in the early stages of a carbon capture and storage project at Millmerran', clearly referring to the Surat Basin Carbon Capture and Storage Project.

It is therefore clear the SBCCS Project will be used to justify continued fossil fuel emissions from a coal-fired power station until 2056, which "would run entirely counter to the aim of achieving net zero emissions by 2050".

5.2 The long-term effectiveness of CCS is uncertain

There are concerns about the long-term effectiveness of CCS, particularly given that its being relied on to offset GHG emissions. This is particularly concerning in the context of the SBCCS Project, which only proposes to monitor the injected CO2 plume for 3 years.

In order to ascertain whether the CO2 plume will not cause any adverse impacts to economic, social and environment values into the future, the proponent should be required to monitor the CO2 plume in perpetuity.

5.3 CCS projects are resource intensive

Retrofitting CCS to existing power stations, whether coal or gas-fired, is highly resource intensive, making the use of energy from these power stations more expensive and less efficient. There are also outstanding questions about the efficiency of coal-powered retrofit technology, which suggest that such CCS facilities 'may not be as financially viable as predicted'. This renders arguments that CCS technology can justify continued investment in these energy sources entirely counter-intuitive and unsustainable.

For example, a 2020 desktop study by the Victoria Energy Policy Centre and Victoria University concluded that CCS applied to coal generation can be expected to cost at least six times as much as comparably firmed renewable generation. The gap between gas generation and CCS and comparably firmed renewable generation is even bigger.

The Surat Basin Carbon Capture and Storage Project involves the retrofitting of carbon capture facilities to the existing Millmerran Power Station, meaning it will be more costly and complex than other applications due to the diluted CO_2 in the flue gas stream.

Further, the CO_2 captured from the Millmerran Power Station will need to be transported 260km as a cryogenic liquid in B-double trucks. This is estimated to require 9 B-double trucks making 9 return trips per day, up to 6 days a week. Not only is it highly inefficient to transport CO_2 in this manner, but it is also significantly more costly and risky, and will involve the emission of significant amounts of CO_2 which do not appear to be quantified in the EIS.

The GHG stream will then need to be converted into a supercritical fluid for injection and piped along a 9.5km flowline to the injection site, creating further costs and greater risk of fugitive emissions from CO_2 leakage, which are also not quantified in the EIS.

It is clear that the Surat Basin Carbon Capture and Storage Project will be highly resource-intensive, even though it is merely a demonstration project, and will create significant inefficiencies both in terms of cost, complexity and emissions.

5.4 CCS Projects do not contribute meaningfully to carbon abatement

CCS projects generally focus on the volume of CCS captured. However, this value is an incomplete representation of the performance of CCS projects. This is because CCS projects also involve the emission of CO_2 into the atmosphere, through activities such as absorbance, dehydration, compressions, transportation and injection. As a result, many CCS projects are much less efficient at carbon abatement than they are promoted to be.

For example, the Surat Basin Carbon Capture and Storage Project will only inject 330,000 tonnes of CO_2, at a cost of approximately $210 million (AUD). However, the Scope 1, 2 and 3 emissions of the Project amount to 266,368 tCO_2-e, meaning that the Project will only reduce emissions to the atmosphere by 57,032 tCO_2-e – significantly less than the 330,000 tonnes of CO_2 captured.

While the SBCCS Project is only a demonstration project, it nonetheless fails to significantly abate the emissions that it produces, demonstrating instead that CCS will not contribute significantly to the achievement of net-zero or negative emissions that will be necessary to avoid the destructive impacts of climate change.

5.5 CCS has not been proven to be viable at scale

A major barrier to the viability of CCS, particularly CCS retrofitted to a coal-fired power station, is that there are very few successful examples of CCS implemented at the scale required to meet international emissions reduction targets.

It is estimated that to meet these targets, approximately 5.6 Gtpa of CO_2 will need to be captured and stored globally by 2050 using CCS technologies. However, as of 2020 only approximately 40 Mtpa of CO_2 is being captured globally.

What is needed to demonstrate the viability of CCS at these scales is not more demonstration projects – even the proponent acknowledges in the draft EIS for the SBCCS Project that 'the infrastructure, technology and monitoring techniques proposed by CTSCo are established and have proven successful in CO_2 geological storage projects worldwide and within Australia'. Instead of wasting $210 million on investigating the viability of CCS, which may encourage and create continued fossil fuel emissions, those funds should be used to install more renewable energy generation and storage infrastructure, such as large batteries.

6. Recommendation

Given that the proponent has failed to adequately comply with the TOR for the EIS, the other matters mentioned in section 2 and our concerns outlined in sections 4 and 5 of this submission, QCC is strongly opposed to the proponent's proposal to permanently store CO2 in the Sandstone Precipice, and as such we urge you to categorically reject the proponent's application for an Environmental Authority to undertake their proposed activity.

7. Conclusion

Please do not hesitate to contact me should you require any further information or clarification regarding the matters raised in this submission.

Yours sincerely,

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