WSPA

Catherine Reheis-Boyd
President

March 26, 2020

Ms. Rajinder Sahota
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: WSPA Comments on Carbon Neutrality/CCS Workshop

Dear Ms. Sahota,

Western States Petroleum Association is a trade association that proudly represents companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas, and other energy supplies in California and four other western states. Currently 152,000 men and women have careers in the oil and gas industry in California and 366,000 people have careers whose jobs depend on the industry. The industry in California contributes $152 billion every year in economic activity and directly contributes $21.6 billion in in local, state, and federal tax revenue to support schools, roads, public safety and other vital services.

During the CARB Carbon Neutrality/CCS workshop, we were glad to see a robust conversation regarding various approaches to carbon capture, utilization, and sequestration (CCUS) and the role these approaches can play in meeting the state's climate goals. In the past, WSPA has provided significant comment regarding the CCUS protocol in the state's Low Carbon Fuel Standard. In addition to those comments provided to date, we offer additional input below.

CCUS Will Play an Important Role in Carbon Neutrality
The way the world produces and consumes energy is evolving. And the members of Western States Petroleum Association are on the cutting edge of those changes, investing in and developing the diverse energy sources and technologies of the future. We believe that, working together, we can rise to the challenge of a changing climate.

The Intergovernmental Panel on Climate Change (IPCC) has concluded that limiting global warming to 1.5°C with limited or no overshoot will require the use of Negative Emissions Technology (NETs) by the middle of this century. According to the National Academy of Sciences (NAS), recent analyses found that deploying NETs may be less expensive and less disruptive than reducing some emissions, such as a substantial portion of agricultural and land-use emissions and some transportation emissions. A recent NAS study finds, "Stopping the growth of atmospheric CO2 requires that anthropogenic emissions are less than or equal to natural and anthropogenic carbon sinks—**not that they cease altogether**."[1]

CCUS can help the state significantly reduce carbon emissions from many sectors (oil production, refining, biofuels, cement manufacturing, power generation, agriculture, dairy, etc.). WSPA member companies are in the process of designing and permitting facilities to accomplish this.

[1] Negative Emissions Technologies and Reliable Sequestration: A Research Agenda (2019). National Academies of Sciences, Engineering, and Medicine. https://doi.org/10.17226/25259

For example, California Resources Corporation (CRC) has developed a 2030 Sustainability Goal to install carbon capture on its 550 MW power plant at Elk Hills Field and further to sequester 1.4MM Metric Tons per year within the field. In addition, the use of NETs enabled by and as a complement to CCUS (and as highlighted by the recently released report by LLNL), will also be crucial. Therefore, at a high level, policy makers should pursue and implement policies that will foster technological and regulatory environments that further encourage substantial CCUS project development and deployment.

Four Categories of Barriers to CCUS Development
Because of California's unique geology, the state is a prime location to deploy CCUS projects. But there are barriers that need to be addressed in order to create the right environment to encourage these technologies to proliferate. Those barriers fall into four categories: 1) Permitting; 2) Financing Uncertainty; 3) Lack of Infrastructure; and 4) Legal Uncertainty. We discuss each of these in the below sections.

Permitting - One of the major obstacles to increasing CCUS project deployment in California is the complicated spiderweb of permitting requirements that exists across state, regional, and local regulatory bodies. Currently permitting CCUS projects involves several departments and agencies at the state and local government level. As an example, for CCUS associated with a power plant, the following types of activities and permits (among many others) would be needed.

Local Government	Air District	CalGEM/Water Board	CARB
Installation of carbon capture equipment - the tower could exceed a height limit so this would need a variance which requires a conditional use permit.	Permits through the air districts for new emissions points	Injection wells would require involvement of agencies, such as CalGEM (California Geologic Energy Management) and county environmental agencies to administer environmental impact reports and well permits for Class II wells associated with EOR. Class VI injection wells required for non-EOR applications would need development of a new permitting process with approval from the US EPA.	Because the state's LCFS program contains a CCUS protocol, approved pathways will be required. CARB will need to be very active in this space.
Injection wells would require involvement of agencies, such as CalGEM (California Geologic Energy Management) and	Amine (liquid) capture: liquid in contact with flue gas to extract CO2 and let nitrogen through would trigger the	Permitting for production	

county environmental agencies to administer environmental impact reports and well permits for Class II wells associated with EOR. Class VI injection wells required for non-EOR applications would need development of a new permitting process with approval from the US EPA.	need for an air permit.		
County will be charged with CEQA review of project. Need a conditional use permit for sequestration process.	This process requires steam therefore a steam boiler or modification of currently existing steam boilers may be necessary. The boiler would require a permit.		

The state needs a regulatory structure that will encourage deployment of projects. The state should consider ways to streamline the permitting process such as through establishing a one-stop shop that could reduce the iterative process with state agencies. Greater regulatory certainty would create more development interest which in turn would drive more competition and ultimately help drive down costs of deployment.

Recommendation: The state needs strong leadership on CCUS as well as a clear framework for processing and approving projects. Such a framework should coordinate and streamline connectivity between various regulatory aspects of the approval process at the state, regional, and local level.

Financing Uncertainty – A lack of certainty by project developers with respect to their ability to secure financing discourages development and deployment of CCUS opportunities. Please see the attached comments from past LCFS rulemakings for WSPA's comprehensive set of comments on the CCUS protocol. In addition, we believe there are additional considerations CARB should make on this issue.

The LCFS credit price may provide an incentive for deployment of CCUS, particularly when combined with the 45Q federal tax credits for CCUS projects. But there is a fundamental disconnect in the incentive structure. For example, concerns regarding the 100-year post-injection liability have been raised that bear repeating. At its heart, the 100-year liability is one of the largest hurdles to large scale adoption of CCUS as it disincentivizes investors to fund projects. Additionally, and equally as important, the science supports the idea that if there is going to be

leakage, it will happen early on and that the risk of leakage diminishes with time. We continue to advocate for reconsideration of the length of liability. Furthermore, CARB requires that a buffer account be in place as insurance against potential leakage. There is no need for the redundancy of potential liability, nor the significant cost penalty this would place on projects, thus reducing their economic viability.

Even if the CCUS protocol under the LCFS is not changed, there is the opportunity for California to take action to further incentivize CCUS through creative approaches. States like Louisiana and North Dakota have laws where the state will take some of the liability associated with the sequestration. This type of policy incentivizes CCUS projects in those states and California could follow suit. Additionally, California itself could be involved solely or through a public/private partnership to undertake the sequestration and/or jointly share in the liability. Regardless of which approach the state decides to take, it is critical that the 100-year liability is addressed in a meaningful way or investment in CCUS will be stifled.

In addition to the LCFS CCS protocol, CARB should also consider ways to incentivize development and deployment of CCUS through the state's cap-and-trade program. It could do so by ensuring that the mandatory reporting requirement (MRR) recognizes reduced emissions from CCUS projects. Currently, MRR emissions are reported via fuel consumed, but there is no mechanism to properly account for emissions subsequently captured/sequestered.

Another critical incentive would be a protocol for entities to take a positive credit for the application of negative emissions technologies. WSPA suggests this could be done through the creation of a protocol to generate an "emission removal credit" which could be fully fungible with a cap-and-trade or offset credit. CARB should take a similar approach to applications of CCUS technologies which remove more carbon from the atmosphere than they emit, thereby allowing the value of carbon removed to provide a critical economic incentive to the operator.

The state could also consider additional incentive opportunities through GGRF funding or other climate funding mechanisms. Outside of GGRF or other climate funding mechanisms, other states have offered tax breaks and/or low interest loans as a way to get carbon capture projects underway. While we will have more to say on this issue in future comment letters, we do believe that it is now time for the state to begin a conversation on how other existing regulatory and incentive structures can be aligned in order to fully incentivize CCUS deployment.

Recommendation: CARB should evaluate how fixes to the LCFS and other regulatory programs can create greater financing certainty for CCUS projects. Additionally, the legislature should be discussing what funding incentives can and should be offered to foster carbon capture projects.

Lack of Dedicated CO2 Pipeline Infrastructure - Refiners and other industrials who may be interested in exploring opportunities to capture CO2 on-site at their facilities face a significant barrier due to a lack of local storage options (most large in-state CO2 sources are not in locations where CO2 injection is geologically possible) and poor CO2 transportation options to the locations where the geology supports sequestration.

Pipelines are generally the most cost-effective means of transport, but there is currently a lack of pipeline infrastructure to move CO2 from capture to storage. Therefore, CO2 sources are unlikely to devote significant resources to capture the CO2 unless there is a secured transportation network for the CO2. This creates a bit of a "chicken and egg" situation in that, without a secured source of CO2, it is unlikely that a CO2 transportation project would be undertaken.

It is critical from a business perspective that capture, transport, and sequestration come online and be fully operational at the same time. However, under the existing structure, the permitting, construction and commissioning of these three separate projects – which are likely to be owned by separate entities - is unlikely to sync up and delay of any one project would mean that the other two projects could be put at financial risk. For example, these projects could face legal challenges which could lead to delays that could strand capital invested in all three projects for long periods of time, putting all three projects at risk. As such, under the existing permitting, regulatory, and legal structure, there is significant financial risk associated with CCUS.

As an example of this challenge, some pipelines exist to support enhanced oil recovery (EOR), but there is no gathering network to link EOR opportunities with CO2 sources. CO2 transportation infrastructure will be critical to activate this type of CCUS application in the state. There are locations in the state which are prime for EOR, but CO2 sources may not exist in close proximity. This is the case in San Joaquin Valley as several oil fields there appear to be suitable for EOR. This is different than the Permian which has geologic CO2 sources close by oil and gas operations well suited for EOR. While this is an example from upstream oil and gas production, we would note that the downstream refining sector also faces similar challenges.

Recently stakeholders have begun to discuss the idea of CO2 collection hubs as a solution to this issue. While hubs are more complicated to implement, a hub concept has significant advantage in that it provides economies of scale for all involved. The hub would allow multiple sources of CO2 to all take advantage of potentially a single pipeline and a single sequestration site. Large CO2 pipelines needed to support a hub would also allow smaller sources of CO2 along the pipeline route to capture and sequester their CO2 as well.

Absent CO2 pipeline infrastructure, other options are simply not cost-effective for large scale deployment. Bulk movement by rail, where possible, would be expensive and would quickly erode the value of potential projects. Trucking of CO2 may be possible though it is likely an even more expensive alternative that would burden project economics with additional emissions (both GHG and NOx/Sox) as well as raise additional permitting and road traffic safety concerns. If the state wishes to bring CCUS to scale across several industrial settings, it seems most reasonable to do so via pipeline infrastructure in a hub and spoke model.

Recommendation: CARB and the state should play a key enabling role to support and improve the synchronization of this process. The state should consider how a hub and spoke concept to CCUS pipeline infrastructure would incentivize additional deployment of the technology. The state should also work with the private sector to identify locations that would best serve as a gathering point for such a network and understand the prime locations for sequestration.

Legal Issues – In addition to the above barriers, there are several legal issues that exist regarding CCUS implementation. These issues include legal questions around liability and pore-space ownership, CO2 ownership, unitization, and primacy rights. These issues are complicated, but the state will need to begin facilitating conversations on these legal questions in order to successfully advance CCUS deployment.

Recommendation: The state should assemble a team of legal experts who can begin to address and answer these legal questions.

Conclusion

We are very supportive of CCUS and want to see this technology deployed. The above discussion illustrates some of the practical challenges that need to be addressed. The state has an

opportunity to take a leadership role in each one of these areas. And doing so could create a foundational framework that would attract more investment into the market and could increase deployment of these technologies – which ultimately would help the state achieve its long-term climate goals.

Thank you for consideration of our comments. We would welcome the opportunity to discuss these ideas in more detail with you. If you have any immediate questions, please contact me or my staff, Tiffany Roberts, Director, Legislative and Regulatory Policy at troberts@wspa.org or 415-235-8741. We look forward to working with you on these important issue areas.

Sincerely,

Catherine Reheis-Boyd,
President
Western States Petroleum Association

cc: Jared Blumenfeld
Wade Crowfoot