

**BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION**

**DOCKET NO. HP22-001**

**IN THE MATTER OF THE APPLICATION BY  
SCS CARBON TRANSPORT LLC  
FOR A PERMIT TO CONSTRUCT A CARBON DIOXIDE TRANSMISSION PIPELINE**

**Direct Testimony of William R. Byrd, P.E.  
On Behalf of the Staff of the South Dakota Public Utilities Commission  
June 23, 2023**

1 **Q: Please state your name and business address.**

2  
3 A: William Randall Byrd  
4 801 Louisiana St., Suite 200, Houston, Texas 77002  
5

6 **Q: Describe your educational background.**

7  
8 A: I hold Bachelors and Masters degrees in Mechanical Engineering from the Georgia  
9 Institute of Technology.

10  
11 **Q: By whom are you now employed?**

12  
13 A: I am President of RCP Inc, a professional engineering and regulatory consulting firm  
14 which offers consulting services to PHMSA-regulated pipeline companies, investors,  
15 legal firms, and governmental agencies on a wide variety of pipeline issues.  
16

17 **Q: What work experience have you had that is relevant to your involvement on this  
18 project?**

19  
20 A: I have over 40 years of experience in the oil, gas, and pipeline industry in positions  
21 ranging from engineer, engineering supervisor, gas coordination manager, regulatory  
22 compliance manager, pipeline company area manager, and consultant. My experience  
23 includes design, construction, operations, maintenance, corrosion control, emergency  
24 response, and risk management. I routinely teach both public and private courses on  
25 pipeline operations, risk management, and regulatory compliance, including classes  
26 funded by PHMSA for government officials and select members of the public. I am very  
27 familiar with the requirements of 49 CFR Parts 190 through 199, including Part 195 -  
28 Transportation of Hazardous Liquids by Pipeline which is applicable to pipelines  
29 carrying supercritical CO<sub>2</sub>, like the subject pipeline.  
30

31 My experience is explained further in my CV and attached to my testimony as  
32 Exhibit\_WB-1.  
33

34 **Q: What Professional Credentials do you hold?**

35  
36 A: I am a Licensed Professional Engineer in the States of Texas (license number 94036);  
37 Louisiana (license number 24058); Mississippi (license number 10881); and Alabama  
38 (license number 18066). I am also a Professional Member of the Association for  
39 Materials Protection and Performance (previously known as NACE).  
40

41 **Q: What is the purpose of your testimony?**

42  
43 A: My testimony is to state my opinions developed from my review of relevant portions of  
44 the application filed by SCS Carbon Transport LLC (Applicant) for a permit to construct  
45 the Midwest Carbon Express Pipeline (subject pipeline) together with related Docket  
46 filings. For purposes of my testimony, I am presuming that the Applicant will also be the

1 ultimate pipeline Operator, as that term is used by PHMSA, although the actual Operator  
 2 of the pipeline system in the future may be some other entity. At any rate, the Applicant  
 3 in this situation is making commitments that will apply to the future Operator, and  
 4 PHMSA holds both the Owner of a pipeline and its Operator responsible for compliance.  
 5

6 I was requested to develop opinions as to whether or not the proposed facilities will meet  
 7 the design, construction, testing, operation and other requirements of Federal Pipeline  
 8 Safety Regulations (49 CFR 195 – all subparts) and other applicable federal and state  
 9 regulations, including:

- 10 a. Compliance with Federal Integrity Management Plan requirements;
- 11 b. The adequacy of proposed pipeline design in Unusually Sensitive Areas (USAs) and  
 12 High Consequence Areas (HCAs);
- 13 c. The proper location and number of valves and pumping stations; and
- 14 d. Determining whether the proposed project will pose a safety risk, particularly for  
 15 leakage, above acceptable industry standards for carbon dioxide pipelines.  
 16

17 I have also been requested to determine, within my areas of expertise, whether the Project  
 18 meets the criteria set forth in SDCL 49-41B-22, as follows:

- 19 a. Project will not pose a threat of serious injury to the environment nor to the social and  
 20 economic condition of inhabitants or expected inhabitants in the siting area;
- 21 b. Project will not substantially impair the health, safety, or welfare of the inhabitants in  
 22 the siting area;
- 23 c. Project will comply with applicable laws and rules as provided by the Commission for  
 24 my review<sup>1</sup>; and
- 25 d. Project will not unduly interfere with the orderly development of the region with due  
 26 consideration being given the views of governing bodies of affected local units of  
 27 government.  
 28

29 **Q: What methodology did you employ?**

30  
 31 A: My methodology included a review of the permit application and exhibits for the subject  
 32 pipeline per SDCL 49-41B, testimony from others, responses to PUC Staff Data Requests  
 33 (DR), and other documents included in Docket No HP 22-001, including some materials  
 34 which were provided to PUC Staff in responses to data requests but are confidential and  
 35 not publicly available. I compared these documents to current PHMSA regulations and  
 36 relevant industry standards and practices, as well as my own knowledge and experience.  
 37

38 **Q: On whose behalf was this testimony prepared?**

39  
 40 A: This testimony was prepared on behalf of the Staff of the South Dakota Public Utilities  
 41 Commission.  
 42

43 **Q: Is the subject pipeline considered an interstate pipeline?**  
 44

<sup>1</sup> I am not an attorney and will not provide any legal opinions.

1 A: Yes, the proposed pipeline is considered to be an inter-state pipeline by PHMSA, because  
2 it transports CO2 between states and across state boundaries.  
3

4 **Q: What agency has primary regulatory authority for the safety of the subject**  
5 **interstate pipeline?**  
6

7 A: Interstate pipelines are regulated at the Federal level by the US Department of  
8 Transportation (DOT), and not by the individual states the pipeline operates in. The  
9 Pipelines and Hazardous Materials Administration (PHMSA) is the agency within DOT  
10 that enforces the Pipeline Safety Regulations. These regulations are contained in the  
11 Code of Federal Regulations (CFR) Title 49 Subchapter D – Pipeline Safety, Parts 190  
12 through 199.  
13

14 **Q: Is the subject pipeline considered a Hazardous Liquids Pipeline?**  
15

16 A: Yes, the proposed pipeline is considered to be a Hazardous Liquids pipeline regulated  
17 under 49 CFR Part 195-Transportation of Hazardous Liquids by Pipeline.  
18

19 **Q: What is the PHMSA permitting approval process for a hazardous liquid pipeline?**  
20

21 A: PHMSA requires advance notification of large pipeline construction projects, such as the  
22 subject pipeline, which provides PHMSA the opportunity to review and audit the early  
23 stages of pipeline design and construction. PHMSA regulations do not generally require  
24 an operator to apply for a permit or get approval from PHMSA for the construction or  
25 operation of a hazardous liquids pipeline.  
26

27 **Q: What documents does PHMSA require from the Applicant?**  
28

29 A: PHMSA requires the pipeline Operator to develop and maintain an extensive set of plans  
30 and documents for the life of the pipeline. An Operator is required to document, in  
31 detail, how they will meet PHMSA's regulatory requirements – and then they must  
32 follow their own plans and procedures. An Operator's non-compliance with its own  
33 procedures and plans is treated as non-compliance with the rule that required those  
34 procedures and plans.  
35

36 Specific plans and programs required by PHMSA include:  
37

- 38 • Comprehensive construction specifications and standards
- 39 • Geospatial and other pipeline data filed with the National Pipeline Mapping  
40 System (NPMS)
- 41 • Comprehensive Operating and Maintenance Procedures including Corrosion  
42 Control Procedures and Emergency Response Procedures
- 43 • Operator Qualification Program
- 44 • Damage Prevention Program
- 45 • Continuing Public Education Program
- 46 • Control Room Management Program

- Drug and Alcohol Program
- Integrity Management Program

1  
2  
3  
4 **Q: Does the subject pipeline require an Oil Spill Response Plan?**

5  
6 A: The subject pipeline does not contain “oil” and is not required to prepare an Oil Spill  
7 Response Plan under 49 CFR Part 194. It does, however, require emergency response  
8 procedures under 49 CFR Part 195.  
9

10 **Q: Where is the subject pipeline in the document development process?**

11  
12 A: The Applicant states that they are in the process of developing the required plans and  
13 procedures required by PHMSA, which will be in place prior to operations. These  
14 documents will typically evolve and be finalized as various details of the project are  
15 finalized.  
16

17 **Q: What documents produced by the Applicant must be approved by PHMSA?**

18  
19 A: While some special activities require advance notice to and perhaps approval from  
20 PHMSA, most plans, programs and procedures are not approved in advance by PHMSA.  
21 However, PHMSA conducts routine and comprehensive inspections of these documents  
22 for adequacy during compliance audits. PHMSA notes deficiencies in the required plans,  
23 programs, and procedures, and requires the Operator to address such deficiencies through  
24 Notices of Amendment (NOA).  
25

26 **Q: Are there parts of the Operator’s siting permit application that PHMSA does not  
27 review?**

28  
29 A: The Operator’s application to the PUC is designed to satisfy the PUC’s requirements and  
30 may include information that is unrelated to PHMSA’s pipeline safety regulations. For  
31 example, documentation of a public need for a pipeline is unrelated to pipeline safety and  
32 would be outside of PHMSA’s purview. Likewise, an application to the PUC may not  
33 contain all the documentation that PHMSA will require. PHMSA reviews documents  
34 that are relevant to its regulations – whether they are contained in the application to the  
35 PUC or not.  
36

37 **Q: What inspections are required during construction of the pipeline?**

38  
39 A: PHMSA requires construction inspection by personnel trained and qualified in the phase  
40 of construction to be inspected, to ensure that the installation of pipe or pipeline systems  
41 is in accordance with 49 CFR Part 195 and the construction specifications and standards  
42 developed by the operator.  
43

44 While PHMSA does not currently require it, I recommend that the PUC require the  
45 Applicant to use inspectors with API 1169 certification. This certification program was

1 developed by the pipeline industry for large pipeline construction projects and is  
2 appropriate for inspectors on this project.

3  
4 **Q: What is PHMSA's inspection role during construction of the pipeline?**

5  
6 A: PHMSA conducts construction inspections to verify that activities in the field comply  
7 with the construction requirements of Part 195 and follow the operator's written  
8 construction specifications and standards. Field visits will typically focus on areas where  
9 PHMSA has encountered problems with other pipeline construction in the past, such as  
10 the proper execution of welding procedures, pipe handling, pipeline coating, lowering in  
11 and tie-ins.

12  
13 PHMSA typically schedules its inspections in advance and coordinates with the operator  
14 to ensure the appropriate people and documentation will be made available, or that  
15 certain types of activities will be occurring during the inspection. The operator will be  
16 notified of the types of documentation and phases of construction that PHMSA wishes to  
17 inspect and when it plans to do so.

18  
19 While PHMSA's inspections and audits are frequently comprehensive, PHMSA does not  
20 serve as the operator's construction inspectors.

21  
22 **Q: What is PHMSA's inspection role after construction?**

23  
24 A: After the pipeline has been placed into service, PHMSA conducts routine inspections to  
25 ensure that the operator is operating the pipeline in accordance with the operator's own  
26 procedures, plans and programs, and in compliance with regulatory requirements. These  
27 include operating, maintenance and corrosion control procedures and integrity  
28 management activities. A basic inspection will focus on verification that tests,  
29 inspections, patrols, surveys and other routine actions are being performed within the  
30 stipulated time frames and in accordance with the operator's procedures and ensuring that  
31 the individuals performing such tasks are qualified and subject to a compliant drug and  
32 alcohol program in accordance with Part 199. Other specialized inspections are  
33 conducted to examine, in detail, such things as an operator's integrity management and  
34 control room management programs.

35  
36 **Q: What is PHMSA's role in decommissioning the pipeline?**

37  
38 A: PHMSA requires operators to comply with its regulations until a pipeline is officially  
39 abandoned. Abandoned pipelines must be purged of products and isolated but do not  
40 necessarily have to be removed. PHMSA does require that the operator file a report of  
41 the abandonment with the NPMS.

42  
43 **Q: Does PHMSA have authority to grant special permits that waive compliance with  
44 one or more of the Federal pipeline safety regulations under Part 195?**

45

1 A: PHMSA can grant special permits that allow alternative means of compliance with its  
 2 regulations. The terms of these special permits are agreed to in writing and require  
 3 approval from PHMSA on a case-by-case basis. Such special permits include additional  
 4 requirements for testing and other restrictions and conditions to ensure an equivalent  
 5 level of safety as the original requirement, and often include an expiration date.

6  
 7 **Q: Has the subject pipeline requested a special permit as described above?**

8  
 9 A: According to Lawrence Meredith’s testimony on November 1, 2022 (pg 4 of 5), the  
 10 Applicant has not applied for and does not intend to apply for any waivers from PHMSA.

11  
 12 **Q: What are HCAs?**

13  
 14 A: In the pipeline safety regulations, HCAs are High Consequence Areas. For hazardous  
 15 liquid pipelines, these are defined as

- 16 1. A commercially navigable waterway.
- 17 2. A high population area, which means an urbanized area delineated by the Census  
 18 Bureau as having a population of 50,000 or more people or a population density  
 19 of 1000 people per square mile.
- 20 3. Other populated area with a concentrated population such as an unincorporated  
 21 town or designated commercial area.
- 22 4. An unusually sensitive area (USA), defined as a drinking water or ecological  
 23 resource area that is unusually sensitive to environmental damage from a  
 24 hazardous liquids pipeline such as a community water intake, a source water  
 25 protection area for aquifers, a wellhead protection area, an ecological resource, a  
 26 migratory bird concentration area, an area containing endangered or imperiled  
 27 species, as defined in Part 195 section 195.6.

28  
 29 **Q: What is the relevance of HCAs to pipelines?**

30  
 31 A: PHMSA imposes special “integrity management” requirements on sections of pipelines  
 32 that “could affect” an HCA with a “Worst Case Discharge” (WCD). Per 49 CFR 195.452  
 33 *Pipeline integrity management in high consequence areas:*

34  
 35 *(a) Which pipelines are covered by this section?*  
 36 *This section applies to each hazardous liquid pipeline and carbon dioxide*  
 37 *pipeline that could affect a high consequence area, including any pipeline located*  
 38 *in a high consequence area unless the operator effectively demonstrates by risk*  
 39 *assessment that the pipeline could not affect the area. (Appendix C of this part*  
 40 *provides guidance on determining if a pipeline could affect a high consequence*  
 41 *area.)*

42  
 43 PHMSA’s integrity management regulations require detailed threat and risk analysis of  
 44 the affected pipeline segments, extensive inspections to look for defects, and deadlines to  
 45 address these defects.

1 **Q: Could the subject pipeline affect any HCAs in South Dakota?**

2  
3 A: Inhalation is the main threat from CO<sub>2</sub>. CO<sub>2</sub> in sufficient concentrations can be toxic  
4 and displace oxygen, causing illness or death. A CO<sub>2</sub> release is short-lived (measured in  
5 minutes, not days), and once released it is at atmospheric pressure. A CO<sub>2</sub> release is  
6 unlikely to have a significant impact on drinking water or navigable waters.

7  
8 A large release of CO<sub>2</sub> could travel some distance from the release site, primarily  
9 downhill and downwind. In response to a Staff Data Request, Applicant has provided a  
10 confidential DRAFT Report (February 2023) which states that [BEGIN

11 CONFIDENTIAL] [REDACTED]  
12 [REDACTED] END CONFIDENTIAL]

13  
14 **Q: The Commission received public comment regarding concerns from inhabitants**  
15 **within the project area about pipeline rupture and distance that carbon dioxide may**  
16 **adversely impact individuals and livestock. Would site-specific dispersion and**  
17 **overland flow modeling help the Commission understand whether or not the subject**  
18 **pipeline will substantially impair the health, safety or welfare of the inhabitants?**

19  
20 A: Site-specific dispersion and overland flow modeling is part of a pipeline's integrity  
21 management program, to determine pipeline segments requiring a higher level of  
22 integrity management / accident prevention / accident mitigation. The net effect is to  
23 minimize or avoid any exceptional risk to the potentially affected areas from these  
24 pipeline segments. Thus, the Commission does not need to delay its approval pending  
25 site-specific dispersion and overland flow modeling, because "the health, safety or  
26 welfare of the inhabitants" should be adequately addressed by the PHMSA-mandated  
27 pipeline integrity management program.

28  
29 **Q: In your opinion, should site-specific dispersion and overland flow modeling for the**  
30 **subject pipeline be used to inform route selection and siting at the state level?**

31  
32 A: Applicant has conducted dispersion modeling using historical weather data along the  
33 planned route and has identified "critical valleys" which would be most likely to channel  
34 CO<sub>2</sub> into a populated area. They have used a combination of dispersion modeling and  
35 overland flow analysis using site-specific terrain to determine the impact of a major CO<sub>2</sub>  
36 release in these areas. The purpose of this modeling is to inform risk management  
37 decisions such as higher integrity pipe or enhanced emergency response. It has not been  
38 used to determine the pipeline's route.

39  
40 **Q: Are main line block valves planned to be installed at the proper locations?**

41  
42 A: PHMSA issued a new valve spacing rule on April 8, 2022 (Amdt. No. 195-105, 87 FR  
43 20987). At 49 CFR 195.260 Valves: Location, paragraph (c), it requires that "newly  
44 constructed or entirely replaced onshore hazardous liquid or carbon dioxide pipeline  
45 segments":  
46



1           ...valve spacing must not exceed 15 miles for pipeline segments that could affect  
 2 or are in HCAs, as defined in § 195.450, and 20 miles for pipeline segments that  
 3 could not affect HCAs. Valves on pipeline segments that are located in HCAs or  
 4 which could affect HCAs must be installed at locations as determined by the  
 5 operator's process for identifying preventive and mitigative measures established  
 6 pursuant to § 195.452(i) and by using the selection process in section I.B of  
 7 appendix C of part 195, but with a maximum distance that does not exceed 7 1/2  
 8 miles from the endpoints of the HCA segment or the segment that could affect an  
 9 HCA.

10  
 11 The Applicant is aware of and has committed to meet or exceed these new valve spacing  
 12 requirements. A detailed HCA analysis, which depends upon site-specific dispersion /  
 13 overland flow analysis, would be required to verify that every valve location is  
 14 appropriate. I was not provided with the detailed HCA analysis, nor the exact location of  
 15 the proposed valves, and cannot pass judgement on the number of valves or their proper  
 16 location.

17  
 18 **Q: Does Part 195 require that the pipeline be protected from external and internal**  
 19 **corrosion?**

20  
 21 A: Yes, it does. The Applicant intends to use Fusion Bonded Epoxy (FBE) as an external  
 22 coating and cathodic protection to control external corrosion. I have not seen details  
 23 concerning the Applicant's plans to avoid internal corrosion but note that each pipeline  
 24 segment will have pig launchers and receivers, which can be used for maintenance  
 25 pigging if necessary to assist with internal corrosion control.

26  
 27 **Q: What provisions will be made for detecting leaks on the pipeline?**

28  
 29 A: The Applicant intends to use a Real Time Transient Model (RTTM) for leak detection,  
 30 which should be capable of detecting any rapid release of CO<sub>2</sub> from the pipeline and  
 31 provide an alarm to the pipeline control center (Powell testimony pg 16 of 19). Bi-  
 32 monthly patrols can detect longer-term but slow CO<sub>2</sub> release locations. The Applicant  
 33 has not committed to install other forms of CO<sub>2</sub> leak detection, such as fiber optic cables,  
 34 which may be able to detect smaller releases of CO<sub>2</sub> from the pipeline with higher  
 35 precision concerning the leak location than an RTTM. However, I have not seen the  
 36 performance specifications of the RTTM that the applicant intends to use and thus cannot  
 37 compare the expected performance of that system versus other alternatives at this time.

38  
 39 I recommend that the Applicant use direct forms of CO<sub>2</sub> detection (external CO<sub>2</sub>  
 40 sensors) at pump stations, which are the most likely locations for a significant CO<sub>2</sub>  
 41 release to occur, in addition to the RTTM.

42  
 43 **Q: Will the contents of the pipeline be odorized?**

44  
 45 A: PHMSA does not require odorization of CO<sub>2</sub> pipelines, and such odorants may not be  
 46 technically feasible for the subject pipeline. Applicant has not committed to odorization.

1 In my opinion, odorants are helpful in natural gas distribution pipelines because they  
 2 assist with detection of small leaks inside homes, but they are not applicable and should  
 3 not be required for CO2 transmission pipelines. It should be noted that PHMSA does not  
 4 require natural gas transmission pipelines to be odorized in most situations, even though  
 5 the gas they carry must be odorized once it enters a gas distribution system.  
 6

7 **Q: What are PHMSA's emergency response requirements?**  
 8

9 A: PHMSA requires that a pipeline operator develop comprehensive emergency response  
 10 plans, train their personnel on those plans, coordinate and drill those plans with local  
 11 officials, have personnel, equipment, instruments, tools and materials as needed to  
 12 respond to emergencies, and provide immediate and direct notification to public safety  
 13 agencies in the event of an emergency.  
 14

15 **Q: Does PHMSA require the operator consult with state agencies, such as the**  
 16 **Department of Public Safety, on the development and review of emergency response**  
 17 **plans?**  
 18

19 A: PHMSA's regulation require that a pipeline operator communicate with emergency  
 20 officials and local public officials, by incorporating API RP 1162 as part of the federal  
 21 pipeline safety regulations:  
 22

23 *§195.440 Public awareness.*

24 *(a) Each pipeline operator must develop and implement a written continuing*  
 25 *public education program that follows the guidance provided in the American*  
 26 *Petroleum Institute's (API) Recommended Practice (RP) 1162 (incorporated by*  
 27 *reference, see § 195.3).*  
 28

29 PHMSA's regulations require, in §195.440 (d) (4), communication concerning:  
 30

31 *Steps that should be taken for public safety in the event of a hazardous liquid or*  
 32 *carbon dioxide pipeline release*  
 33

34 PHMSA audits a pipeline operator's emergency response plans and requires that relevant  
 35 information be communicated to public officials, but does not require that local officials  
 36 or state agencies review or approve those plans.  
 37

38 **Q: Will the subject pipeline comply with PHMSA's emergency response requirements?**  
 39

40 A: Applicant has committed to develop the emergency response plans required by PHMSA,  
 41 to share their emergency response plan with local responders, to train them on the plan,  
 42 and to conduct drills with them. This should meet PHMSA's requirements. Mr. Dillon's  
 43 testimony (pg 3 of 7) states that he has met with County Emergency Managers  
 44 representing each county through which the project will be located, and that those County  
 45 Emergency Managers are compiling first responder equipment needs.  
 46

1 **Q: The Commission has heard public comment from first responders with concerns**  
2 **about incidents and their ability to respond to those incidents. In order to assess**  
3 **whether or not the subject pipeline has emergency response plans in place that**  
4 **address those concerns, should the operator provide a copy of the emergency**  
5 **response plan to the Commission for review prior to the Commission making its**  
6 **determination on the application? Please explain why or why not.**

7  
8 A: PHMSA inspects pipeline operator emergency response plans on a routine basis.  
9 PHMSA has a “PREPAREDNESS, EMERGENCY SUPPORT, AND SECURITY  
10 DIVISION” within the Office of Pipeline Safety at the headquarters level, with a Director  
11 and 10 employees as of 4/23/2023 (Exhibit\_WB-2). PHMSA’s personnel deal with  
12 pipeline issues as a full-time job and develop a high level of expertise. First responders  
13 should communicate their concerns to the Applicant and to PHMSA – both of whom  
14 have expertise to respond appropriately to those concerns. For these reasons, I believe  
15 the Commission should rely on PHMSA’s pipeline-specific emergency response  
16 expertise for plan review.

17  
18 **Q: Is the subject pipeline following all PHMSA requirements?**

19  
20 A: PHMSA requires that plans, procedures, and specifications be developed either prior to  
21 the start of construction or the start of operations (as appropriate). The documentation  
22 that PHMSA will ultimately require has not been finalized and was not available for my  
23 review. I cannot at this time render an opinion concerning the operator’s final plans and  
24 procedures, but it appears that thus far, the subject pipeline is aware of and intends to  
25 follow all PHMSA requirements.

26  
27 **Q: PHMSA is in the process of updating its regulations for carbon dioxide pipelines.**  
28 **Do you have knowledge as to what PHMSA may require for carbon dioxide**  
29 **pipelines in the rule revision?**

30  
31 A: I am aware of concerns raised by the Pipeline Safety Trust concerning CO2 pipeline  
32 regulation and it is my understanding that the pending regulations will be responsive to  
33 those concerns, but I do not know what those regulations may require.

34  
35 **Q: The Commission has heard public comment that the subject pipeline should not be**  
36 **issued a permit until PHMSA updates its rules for carbon dioxide pipelines. Do you**  
37 **have an opinion as to whether or not the subject pipeline should be delayed until**  
38 **PHMSA’s rulemaking is complete?**

39  
40 A: CO2 pipelines are already regulated by PHMSA. As mentioned earlier, PHMSA has  
41 stated that they intend to amend its regulations specific to CO2 pipelines but the timing  
42 and content of those amendments is unknown. This is not unusual. PHMSA maintains a  
43 permanent schedule of pending / future regulatory changes. PHMSA’s rulemaking  
44 process can be lengthy and is in fact never complete because rules are always subject to  
45 future amendment. I do not believe the Commission should delay its decision pending a  
46 PHMSA rulemaking of unknown content and timing.

1  
2 **Q: The Applicant has committed to a minimum burial depth of 4 feet. What is the**  
3 **relationship between burial depth and pipeline safety?**

4  
5 A: Pipeline burial depth is related to surface loading impacts and unsupervised excavation  
6 impacts.

7  
8 Surface loading of buried steel pipelines is normally only of concern under highways and  
9 railroads with high cyclic loads (e.g. tires from heavy trucks or wheels from heavy trains)  
10 over the pipeline. Pipelines are typically buried far deeper beneath highways and  
11 railroads than required to handle surface loads, for a variety of other reasons. In  
12 agricultural areas, pipelines do not normally need to be concerned about surface loading  
13 because farm equipment is designed to minimize surface loading (to avoid getting stuck  
14 in dirt). At any rate, a four foot burial depth is normally adequate for almost every  
15 surface loading condition for modern steel pipelines – especially pipelines such as the  
16 subject pipeline which have thick walls relative to the pipe diameter (known in the  
17 pipeline industry as the d/t ratio).

18  
19 In agricultural areas, pipelines need to be buried below the depth of routine farming  
20 activity (such as plow depth). That is an issue to be addressed on a site-specific basis  
21 between the farmer and the pipeline operator. Installation of drain tiles frequently  
22 exceeds this depth and would require close coordination with the pipeline operator.

23  
24 It is generally assumed that deeper burial depths are safer (4' is better than 3', and 5' is  
25 better than 4', etc.), although there is little hard evidence in the industry incident reports  
26 to support that assumption. The data would indicate that compliance with the One Call  
27 system requirements (or lack of compliance) is much more important than pipeline burial  
28 depth.

29  
30 **Q: What are your conclusions as of the date of this report?**

31  
32 A: The Applicant has selected a pipeline route that is preferentially adjacent to and  
33 parallel with existing utilities. I recommend that the PUC require the Applicant to  
34 comply with API Recommended Practice 1172: *Recommended Practice for Construction*  
35 *Parallel to Existing Underground Transmission Pipelines*, at all locations where the  
36 pipeline will be installed parallel to other underground energy pipelines. While it is not  
37 required by PHMSA, RP 1172 was developed specifically to address the unique damage  
38 prevention needs of parallel construction projects such as anticipated for the proposed  
39 pipeline.

40  
41 Applicant has stated that they do not plan to install warning tape above the pipeline, since  
42 existing requirements for damage prevention are sufficient. While this may be true,  
43 excavation damage is an ongoing and significant threat that cannot be completely  
44 eliminated. I recommend that the PUC require warning tape in areas where future  
45 excavation may be expected, such as urban and agricultural areas, and near road  
46 crossings, since it provides an inexpensive and effective additional layer of protection.

1  
2 Based on the documents reviewed to date, and the claims concerning future activities  
3 made by the applicant, the proposed facilities should meet the design, construction,  
4 testing, operation and other requirements of Federal Pipeline Safety Regulations (49 CFR  
5 195 – all subparts) and other applicable federal and state regulations, should comply with  
6 Federal Integrity Management Plan requirements; be appropriately designed in relation to  
7 Unusually Sensitive Areas (USAs) and High Consequence Areas (HCAs); have the  
8 appropriate location and number of valves and pumping stations; and not pose a safety  
9 risk, particularly for leakage, above acceptable industry standards for carbon dioxide  
10 pipelines.

11  
12 **Q. Does this conclude your testimony?**

13  
14 **A:** Yes.

15