

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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HP 22-002

IN THE MATTER OF THE APPLICATION :
OF NAVIGATOR HEARTLAND :
GREENWAY, LLC FOR A PERMIT UNDER :
THE SOUTH DAKOTA ENERGY :
CONVERSION AND TRANSMISSION :
FACILITIES ACT TO CONSTRUCT THE :
HEARTLAND GREENWAY PIPELINE IN :
SOUTH DAKOTA, :
:
:

**DIRECT TESTIMONY OF
MARK HERETH**

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1. Please state your name and address for the record.

Answer: My name is Mark Hereth. My business address is 2368A Rice Boulevard, Suite 444, Houston, Texas, 77005.

2. Have you previously submitted testimony in this matter?

Answer: No.

3. Please describe your present employment.

Answer: I am one of two principals of Process Performance Improvement Consultants, LLC (P-PIC), a wholly-owned subsidiary of the Blacksmith Group. We have served the energy pipeline industry since 2002 by working to improve the way in which pipeline safety and reliability are managed. We assist clients in complying with pipeline safety regulations, conduct compliance audits, and evaluate the effectiveness of pipelines. We provide process-based solutions that enable engineering and technology to be integrated into day-to-day energy pipeline operations. We have expertise in pipeline safety regulatory analysis, pipeline design, construction, operations, maintenance, and integrity management.

4. Please describe your educational history, professional background, and professional affiliations.

Answer: My degrees are from Ohio University, where I graduated with a B.S. in Zoology in 1976, and a M.S. in Chemical Engineering in 1978. I have since worked in the areas of risk management, management system development, pipeline operations, project management, process plant design, and environmental and pipeline safety legislation and regulations. In 1979, I started as a staff engineer at Radian Corporation, which is a subsidiary of Hartford Steam Boiler Inspection and Insurance Company. I worked there until 1993 as a staff engineer, senior engineer and Department Head. From 1993 to 1996, I worked as General Manager of the Chemical, Oil and Gas Operations at Hartford Steam Boiler Inspection and Insurance Company. From 1996 to 2003, I served as Senior Vice President and General Manager—Pipeline Consulting for HSB. In that capacity, I worked with pipeline companies, industry trade associations, and research organizations to develop and improve the management of risk and maintenance of the integrity of pipeline systems in order to improve safety and environmental impact as well as the cost structure and reliability of these systems. In 2002, I testified before the House Energy and Commerce Committee during Pipeline Safety Reauthorization Hearings. John Zurcher, Joe Martinelli and I started P-PIC in 2003. I teach courses on pipeline safety regulations for the Northeast Gas Association as well as the Southern Gas Association, including sessions on hazardous liquid pipeline safety. John Zurcher and I have taught over 3,500 personnel since 2003. I have been an invited speaker at the National Association of Pipeline Safety Representatives and have presented at workshops and conferences sponsored by PHMSA, the American Petroleum Institute, the Interstate Natural Gas Association of America (INGAA), the INGAA Foundation, the American Gas Association, and the ASME

International Pipeline Conference. I have supported hazardous liquid and gas operators in the development and improvement of their integrity management programs. I was the technical editor of the first edition of API Recommended Practice (RP) 1160, Managing System Integrity for Hazardous Liquid Pipelines. I also was one of the authors of the first edition of ASME B31.8S, the Integrity Management Supplement for ASME B31.8, for gas pipelines. I was appointed by the Secretary of Transportation in 2016 to the Voluntary Information Sharing Committee, which was designated in the 2016 amendments to the Pipeline Safety Act to find ways to improve the sharing of data and learnings from the use of integrity assessment technologies. In 2018, I served as the chair of the INGAA Foundation, which represents the full life cycle of pipelines, including operators, engineering and design firms, construction contractors, consultants, equipment manufacturers, lawyers, and insurers. I served as the technical lead for the work group developing API 1173, Recommended Practice for Pipeline Safety Management Systems, and am currently serving as the technical lead for the work group developing API 1185, Public Engagement. I am a member of ASME, ASTM, the American Institute of Chemical Engineers, the Instrument Society of America, and AMPP/NACE. P-PIC is a member of the Carbon Capture Utilization and Storage Commercial Deployment Consortium operated by the Southern States Energy Board and the University of Houston's Center for Carbon Management in Energy. A copy of my resume is attached as Exhibit A.

5. Are you being compensated for your testimony?

Answer: Yes. I am being compensated at the rate of \$420/hour for my work in this matter.

6. What is the purpose of your testimony?

Answer: The purpose of my testimony is to address concerns raised by members of the public since Navigator’s application was filed with the Commission that carbon-capture pipelines are not adequately regulated by the Pipeline Hazardous Materials Safety Administration (PHMSA) and are therefore, unsafe. In particular, I will address the applicable statutes and regulations governing hazardous liquids pipeline safety, including carbon dioxide pipelines; PHMSA’s role and procedures in regulating the safety obligations of hazardous liquids pipelines; and PHMSA’s rulemaking process and how the public can be involved.

7. Please describe what federal statutes and regulations govern hazardous liquids pipelines.

Answer: Hazardous liquid pipelines, including carbon-capture pipelines, are subject to the requirements of the Hazardous Liquid Pipeline Safety Act of 1979 and its amendments (the “Act”). The Act authorized the United States Department of Transportation to regulate pipeline transportation of hazardous liquids, including crude oil, petroleum products, anhydrous ammonia, and carbon dioxide. Regulations promulgated by the US DOT govern the life cycle of a pipeline, including the design, construction, testing, operation, and maintenance of pipelines, including integrity management. Regulations adopted pursuant to the Act are found at 49 CFR Part 195. The US DOT delegated its authority under the Act to PHMSA. In 1994, the Natural Gas Pipeline Safety Act and Hazardous Liquid Pipeline Safety Act were recodified into what is now called the Pipeline Safety Act.

8. What is PHMSA’s role in regulating the safety of hazardous liquids pipelines?

Answer: PHMSA has established an extensive set of pipeline safety requirements for hazardous liquid pipelines, including carbon dioxide. The requirements address each stage of the

life cycle of a pipeline, from the design and specification of line pipe and pipeline appurtenances, such as valves, construction, testing prior to operation, operations, corrosion control, maintenance, integrity management, and emergency preparedness and response. Many of the requirements are based on international consensus standards. International consensus standards are developed under the American National Standards Institute (ANSI) accreditation. Workgroups developing the standards comprise personnel from operators, manufacturers, federal and state regulators, and in many instances, representatives of the public.

9. Does PHMSA regulate pipeline design?

Answer: Yes. Requirements for the design and specification of materials for line pipe and appurtenances are based on international consensus standards published by the API and ASME. Design requirements specific to carbon dioxide include requirements for fracture control. Design requirements also include the use of a leak detection system and where computational leak detection systems are used that they conform with API RP 1130, Computational Pipeline Monitoring for Liquids.

10. Does PHMSA regulate the location of pipelines?

Answer: Yes. Requirements for the location of pipelines are set forth in the construction regulations. Specifically, the regulations require that the pipeline right of way must be selected to avoid, as far as practicable, areas containing private dwellings, industrial buildings, and places of public assembly. In addition, no pipeline may be located within 50 feet of any private dwelling, or any industrial building or place of public assembly in which persons work, congregate, or assemble unless it is provided with at least 12 inches of cover in addition to that prescribed in the depth of cover requirements.

11. Does PHMSA regulate construction of a pipeline?

Answer: Yes. Requirements for key safety critical steps in construction include use of specifications, material inspection, transportation of pipe, procedures for welding, welding procedure qualification and welder qualification, installation of pipe, backfilling, location of valves and pre-service pressure testing. Transportation of pipe and welding incorporate API standards, API RP 5LT, and API RP 1104, respectively. Requirements for pressure testing before placing a pipeline into operation are defined in the regulations and based on API RP 1110. Pressure testing establishes a safety margin between the test level and the maximum operating pressure of the pipeline. Use of pressure testing is noteworthy as pipelines and other pressure vessels are one of the only engineered structures that are tested prior to being placed into service.

12. Does PHMSA regulate operation of a pipeline?

Answer: Yes. PHMSA regulations also set forth requirements for the safe operation of the pipeline as well as inspection and testing maintenance work. Recent improvements to the regulations require inspection of the right of way following large precipitation events to identify and monitor ground movement. PHMSA has requirements for defining where pipelines could affect high consequence areas. Dispersion or plume modeling is used to define areas that could be affected. Operations and maintenance requirements also establish the basis for a maximum operating pressure, a pressure established that reduces the pressure achieved during the testing conducted before operation, by a safety factor. The safety factor ensures that the pipeline is safely operated at a pressure below the level to which it was tested.

13. Does PHMSA regulate emergency preparedness and response?

Answer: Yes. PHMSA has requirements for emergency preparedness and response plans and training of emergency response personnel. PHMSA regulations require training of

emergency response personnel, including coordination and liaison with local emergency responders to establish clear lines of communication in the event of an incident. Emergency preparedness and response plans must be reviewed annually and updated to ensure the manual is effective. PHMSA or an authorized state agency reviews the plans during routine compliance inspections and can require operators to amend the plan and specific procedures. PHMSA regulations also address excavation damage. Damage prevention programs for pipelines include the use of 811 notification and Call Before You Dig in each state. An operator's damage prevention program includes identifying entities that engage in excavation activities in the area in which the pipeline is located. The programs also provide for notification of the public, including excavators, in the vicinity of the pipeline to make them aware of the damage prevention program, including how to learn the location of underground pipelines before excavation activities commence and marking of the pipeline and safe excavation practices using state requirements.

14. Please explain PHMSA's rulemaking process and the opportunity for the public to be involved.

Representatives and citizens of South Dakota can participate in US DOT PHMSA rulemaking. The rulemaking process is governed by the Administrative Procedures Act. The rulemaking process is typically initiated with an Advance Notice of Public Rulemaking (ANPRM) or a Notice of Public Rulemaking (NPRM). A federal agency may elect to use an ANPRM to pose a series of questions, seeking information from the public and pipeline operators to define the need for and possible scope of regulation. PHMSA also considers statutes passed by Congress and signed into law by the President in developing its rulemaking approach. Statutory requirements for pipelines are typically embedded in provisions of the reauthorization

of the Pipeline Safety Act. If it issues an ANPRM, PHMSA typically proposes topics and questions about how the topics might be addressed with regulation. Rulemakings are published in the Federal Register. PHMSA provides between 30 and 120 days for comment, which allows the public, including elected representatives, to participate in the process. Comments are posted on a public docket and PHMSA must evaluate and respond to each comment. PHMSA considers the information provided in comments and develops an NPRM, which considers costs of compliance. For major rulemaking, the draft is sent to the Office of Management and Budget for review and analysis to evaluate the cost-benefit of the rule. PHMSA also holds public meetings as part of this process. For example, PHMSA has scheduled a public meeting to discuss carbon dioxide pipelines in Des Moines, Iowa, from May 31 to June 1, 2023. The purpose of the meeting is to inform rulemaking decisions by discussing key topics such as public awareness, emergency response and effective communication with emergency responders and the public, geohazards, dispersion modeling, safety measures to address other constituents besides CO2 in CO2 pipelines, leak detection, and reporting. As with most PHMSA public meetings, it is webcast for those who cannot attend in person. After taking these steps, PHMSA deliberates and develops a final rule. PHMSA presents proposals to be considered in the final rule to the Pipeline Advisory Committees formed by law under 45 U.S.C. § 60115. The committees comprise balanced membership from the public, operators, and regulators, and they serve to ensure the technical feasibility, reasonableness, cost-effectiveness, and practicability of each proposal. PHMSA proposed final rule is published in the Federal Register and typically becomes effective within 60 to 90 days after publication.

15. Does PHMSA regulation cover carbon dioxide pipelines?

Answer: Yes. PHMSA has regulated CO2 pipelines since the 1970's. As allowed by 49 U.S.C. § 60101 et seq., carbon dioxide is defined in 49 CFR § 195.2 and regulated under Part 195 when it is transported in a supercritical state. Attached as Exhibit B is a letter from John A. Gale, Director, Office of Standards and Rulemaking for PHMSA, to the Deputy General Counsel for the Illinois Commerce Commission, dated April 13, 2023, responding to two questions posed by the ICC. In the letter, PHMSA confirmed that it regulates the safety of interstate pipelines transporting carbon dioxide in a supercritical state and addressed the extent and frequency of its regulation of such a pipeline. Attached as Exhibit C is a presentation to the Iowa Legislature made by Linda Daugherty, DAA Field Operations for PHMSA, on March 21, 2023. In the presentation, PHMSA outlined its regulation of CO2 pipelines and its efforts to strengthen existing regulations.

16. Please explain PHMSA's review of its regulations related to carbon dioxide pipelines after the incident in Satartia, Missouri.

Answer: On May 26, 2022, PHMSA announced it was undertaking a new rulemaking for CO2 pipelines, including requirements related to emergency preparedness and response. PHMSA also issued an advisory bulletin to all pipeline operators underscoring the need to plan for and mitigate risks related to land movement and geohazards. As noted above, PHMSA is holding a public meeting on May 31 and June 1 to discuss these and other topics. In my experience, public meetings like the one proposed provide an opportunity for operators to describe their approaches to managing safety related to the identified topics and for other stakeholders, including state regulators to provide their perspectives.

17. Does PHMSA’s review of its regulations mean that it cannot effectively regulate existing or proposed carbon dioxide pipelines in the meantime?

Answer: No. The current regulations have provided for safe transportation of CO2 as described in 19 and 20, below. In fact, Ms. Daugherty, PHMSA’s Deputy Associate Administrator, in testifying before the Iowa House Environmental Protection Committee stated, “We are strengthening our CO2 regulations, not because we don't have strong regulations but because we are continually learning. We have to learn from what we saw in Satartia.¹”

18. Please describe the existing network of carbon dioxide pipelines in the United States, including the number of miles of pipeline, their location, and how long they have been in operation.

Answer: There are approximately 5,339 miles of CO2 pipelines in the United States². These pipelines transport of carbon dioxide for use in enhanced oil recovery, where CO2 is injected into formations to assist in the recovery of crude oil.

19. Please describe the safety record of existing carbon dioxide pipelines.

Answer: The failure on the Denbury system in Satartia, Mississippi in 2020 has placed a spotlight on the safety of CO2 pipelines. It led to a local evacuation and caused 45 people to be hospitalized. PHMSA requires operators of pipelines to report accidents. The data, including the causes as well as consequences, are made available by PHMSA. PHMSA provides analysis tools to evaluate accidents at a high level. In a review provided by PHMSA for CO2 pipelines, for a

¹ <https://www.thegazette.com/state-government/regulator-co2-pipelines-safe-but-have-risks/>

² PHMSA Annual Report of Hazardous Liquid Pipelines including CO2 Pipelines, 2021, <https://www.phmsa.dot.gov/data-and-statistics/pipeline/annual-report-mileage-hazardous-liquid-or-carbon-dioxide-systems>.

twenty-year period starting in 2003, there had been no fatalities and one injury which occurred in 2007³. There have not been any of either since the Denbury failure to the time of this filing.

20. How does the rate of accidents on CO2 pipelines compare to all other hazardous liquid pipelines?

Answer: I reviewed the accident data gathered by PHMSA and used data from 2010 to date⁴. I chose 2010 as the starting point as that is a point where PHMSA’s regulations for High Consequence Areas would have been in effect for almost a decade. The form that PHMSA uses to collect data was also improved at that point and facilitates analyses of the data. The number of accidents and corresponding mileage for CO2 and separately for all other Hazardous Liquid Pipelines are shown in the table below.

	Accidents	Miles	Rate per 1,000 Miles/ Year
CO2 Pipelines	68	5,339	0.98
All Other Hazardous Liquid Pipelines	4,958	224,478	1.7

The data indicate that CO2 pipelines have a lower accident rate per 1,000 miles, about 58% of those on hazardous liquid pipelines. To place this in context, PHMSA states that pipelines are the safest mode of transport of hazardous liquids.⁵ Finally, it is important to note that none of the accidents were related to internal corrosion, something that could be attributed to the commodity

³ PHMSA Significant 20-Year Trend; [https://portal.phmsa.dot.gov/analytics/saw.dll?Portalpages&PortalPath=%2Fshared%2FPDM Public Website%2F portal%2FSC Incident Trend&Page=Significant](https://portal.phmsa.dot.gov/analytics/saw.dll?Portalpages&PortalPath=%2Fshared%2FPDM%20Public%2Fportal%2FSC%20Incident%20Trend&Page=Significant); Sort on CO2 Pipelines

⁴ PHMSA Incident Data; <https://www.phmsa.dot.gov/data-and-statistics/pipeline/distribution-transmission-gathering-lng-and-liquid-accident-and-incident-data>, Hazardous Liquid Data 2010 to present.

⁵ PHMSA Pipeline Safety Regulations, <https://primis.phmsa.dot.gov/comm/SafetyStandards.htm?nocache=977>

CO2. Accidents resulting from external corrosion, material and weld-related, natural force damage, and incorrect operations are not unique to CO2.

21. Much of your experience is on gas and hazardous liquid pipelines, with less on CO2 pipelines. How is your testimony relevant to this proceeding and specifically to CO2 pipelines?

Answer: I do have recent experience with CO2 pipelines. I developed the draft pipe specification for one of the other CCS projects in 2022 and worked with company personnel and external experts to refine the pipe specification, including incorporation of fracture control requirements. I developed the initial pipe specification, having drawn on experience in developing pipe specifications, fracture control, and mill inspection and quality assurance programs for projects since 2008. I have recently begun working with an owner/ operator of a pipeline that will capture CO2 from a variety of sources in the Gulf Coast industrial area. I have also worked with the operator of a dense-phase gas pipeline that operates at approximately 1,950 pounds per square inch for nearly 15 years. That work drew on my experience with thermodynamics to safely manage a pipeline in all modes of operation. Finally, as noted above, none of the causes of the accidents on the CO2 pipelines in the PHMSA database appear to be attributable or unique to the commodity CO2. My more than two decades of working with operators on their integrity management programs is very pertinent to understanding and preventing accidents like those in the PHMSA data.

22. Does this conclude your testimony?

Answer: Yes.

Dated this 25th day of May, 2023.

/s/ Mark Hereth

Mark Hereth