

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

0-0

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 STEPHEN LEE**

0-0

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

Answer: My name is Stephen Lee. My business address is 2626 Cole Avenue, Dallas, Texas 75204.

2. Please state your position with Navigator and provide a description of your responsibilities.

Answer: I am Senior Vice President of Engineering for Navigator Heartland Greenway LLC (“NHG”) and its affiliated companies NES II LLC, Navigator CO₂ Ventures LLC, Navigator Carbon Services LLC, and HG Carbon Storage LLC. I am responsible for the safe, reliable, and compliant execution of the NHG capital program. I oversee the engineering, project management, construction, environmental/permitting, and right-of-way function groups that support the capital program.

3. Please describe your educational and professional background.

Answer: I have over 22 years of experience in the PHMSA regulated pipeline industry. I previously served as the Director of Special Projects at Plains All-American Pipeline. I have a

BS in mechanical engineering from Texas A&M University and an MBA in Global Energy Management from the University of Houston. I am a registered professional engineer in the State of Texas. A copy of my curriculum vitae is attached as Exhibit A.

4. Have you previously submitted testimony in this proceeding in South Dakota?

Answer: No.

5. Please state the subject of your testimony and identify the sections of the application that Navigator has filed with the South Dakota Public Utilities Commission for which you are responsible.

Answer: I will describe Navigator's engineering and construction plans for the Pipeline. This includes describing the design requirements and oversight of the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA), which has regulatory authority over the pipeline and design, construction, and safety requirements that will apply to the pipeline. I will describe the principal design and safety characteristics of the pipeline; the processes for pipe fabrication, transportation, installation, inspection, and testing; the engineering and construction resources that NHG has contracted with for engineering, design, and installation of the pipeline; the use of union labor for construction; and the process by which the pipeline will safely transmit carbon dioxide. My testimony relates to the following sections of the Application:

Section 2.1—Project Siting

Section 2.2—Route Selection

Section 2.3—Proposed Route

Section 3.0—Design and Engineering

Section 3.1-Technical Specifications and Design Capacity

Section 4.0 - Construction

Section 5.0 - Operations and Maintenance

Section 5.1 - Decommissioning

Section 6.2 – Geology

Section 7.1 – Population

Section 7.2 - Employment

Section 7.4 - Housing

Section 7.5 - Public Health and Safety

Section 7.7 - Transportation

Section 7.11 - Local Land Values

Section 7.12 - Local Land Use Controls

Section 7.13 - Reducing Negative Impacts on the Community

6. Please describe the Project site in South Dakota.

The proposed Project in South Dakota requires the installation of approximately 111.9 miles of new pipeline in three segments: the Aurora to Hartley lateral, the POET Chancellor lateral, and the POET Hudson lateral. A summary of these laterals is provided in Table 2.1-1 and described in Section 2.1 of the Application. Detailed maps of the Project in South Dakota are provided in Exhibit A to the Application. Exhibit A1 includes maps of the project vicinity.

7. Will Navigator update its exhibits during the course of this proceeding to show any changes to the proposed route?

Answer: Yes.

8. How did Navigator develop the proposed route?

Answer: As described in Section 2.0 of the Application, our key objective in determining the proposed route of the Pipeline is to minimize the collective impact of the Pipeline along its route. Provided all other things are equal, the most direct route between two points would offer the least impact. However, not all things are equal across a footprint of five states, or even multiple counties as in South Dakota. Positive and negative considerations and constraints such as colocation; avoidance and minimization of contact with populated areas and sensitive environmental resources; geological, topographical and other constructability factors; setbacks from inhabited structures and gathering places; and the other types of features were gathered and weighted in determining a preliminary route, along which a corridor was established (this is further described below). Then, as additional information and details were gathered from specific aerial imagery and Lidar data commissioned by Applicant and accomplished by flyovers along these routes; public informational meetings and other discussions with landowners and local officials; and on-the-ground surveys and inspections, further micro-routing was and will continue to be performed.

We used a third party GIS-based proprietary computer program known as Pivvot.

This GIS program provides suitable baseline pipeline routes between two points using and weighting multiple publicly available, purchased and licensed data sets that provide information on engineering, environmental, physical, geotechnical, and land use and ownership, and other geographic and demographic features. Features that were considered in the route development process include, but are not limited to, existing linear infrastructure (i.e. railroads, pipelines, and electric power lines, roads); infrastructure and structures (e.g. buildings, wells, levees,); environmental (i.e. wetlands, waterbodies, protected habitats, floodplains), land use (e.g. land

cover, conservation easements, land cover, state and national parks, national forests, and wildlife management areas; other federal and state lands; other recreation lands and areas; easements); geological (e.g. slope, topography, depth bedrock, karst, fault lines/areas, landslide potential, peak ground acceleration; mines and mining activity), soils (series, soils categories, prime farmlands, hydric soils, and corrosivity) cultural (cemeteries, national register of historic places); other (e.g. brownfield, superfund, and hazardous waste sites and landfills. Each of the data sets used in the GIS program is weighted, based on whether it represents characteristics desirable for a pipeline route or undesirable characteristics to be avoided. The GIS program also takes into account the objective to minimize the overall length of the route, consistent with consideration of the other criteria and constraints (*i.e.* features to be avoided as described above).

9. In developing the proposed route of the Project in South Dakota, did Applicant consider and evaluate any alternative routes to the route proposed in the Application?

Answer: Navigator did not use a process in which it first expressly identified a set of distinct or largely distinct potential routes for the Pipeline segments and then analyzed the competing routes based on a set of criteria to select the optimal route. The GIS program that I described earlier in this testimony essentially performs this type of analysis by identifying multiple paths from the designated starting points to designated ending points and evaluating them based on the extensive information provided by the data sets, to identify a preferred baseline route. The micro-routing process I described earlier then further evaluates the baseline route for possible alterations and deviations based on additional information such as I described earlier, including information obtained from landowners, surveys, and inspections of individual properties.

10. Are comments and information obtained from landowners in South Dakota taken into account in developing the route?

Answer: Yes. Specific information from landowners about their property was taken, and continues to be taken, into consideration, such as plans for future development of the property or the presence of conditions within the property that could make it undesirable for pipeline installation.

11. Please describe the federal regulatory oversight of the Pipeline as outlined in Section 3.1 of the Application.

Answer: The design, construction, operation, and maintenance of the Project is regulated by the Pipeline Hazardous Materials Safety Administration (PHMSA), pursuant to federal law and regulation, primarily 49 Code of Federal Regulations (CFR) Part 195. Navigator is committed to designing, building, and operating a safe, reliable, state-of-the-art system. In doing so, Navigator will meet and often exceed federal regulations and industry standards. Exhibit D to the Application provides a summary of measures in 49 CFR Part 195 that NHG is proactively exceeding. PHMSA has the jurisdiction to enforce compliance with the requirements in 49 CFR Part 195 during the design, construction, and operation of the pipeline. Thus, PHMSA has the authority to, and does, perform inspections to ensure ongoing compliance with its regulations by pipeline owners and operators. We have already had meetings with PHMSA regarding the Heartland Greenway and expect PHMSA will perform multiple inspections to document compliance with its regulations and required specifications during the design, material procurement, and installation of the pipeline.

Design requirements are included in Subpart C of Part 195 and address, among other items, requirements related to design temperature, internal and external pressure, external and

geohazard loads, design and composition of the pipe, and design and location of the isolation valves. Leak detection and internal inspection devices are also covered in Subpart C and are applicable in the design phase of the Project. Construction requirements are included in Subpart D, including requirements governing the transportation of pipe, welding requirements, weld integrity inspection, and installation requirements such as specifications for the location and depth of pipe and the location of valves.

12. Are there other design requirements or recommended practices being used to design a safe and reliable pipeline system?

Answer: NHG will also use several recommended practices identified in DNV-RP-F104 Design and Operations of CO₂ Pipelines (Sep 2021) and portions of 49 CFR Part 192 to enhance the design and public safety of the system. See <https://www.dnv.com/oilgas/download/dnv-rp-f104-design-and-operation-of-carbon-dioxide-pipelines.html>

13. Will there be other third-party oversight over installation of the pipeline in South Dakota?

Answer: Yes. NHG will implement a robust third-party inspection program for the pipeline, employing third-party inspectors including utility, welding, coating, safety, agricultural, and environmental inspectors to ensure compliance with applicable specifications, standards, regulatory requirements, and commitments. None of these third-party inspectors will be affiliated with NHG, its affiliates, or the contractors hired to assist with designing and installing the pipeline. In addition, NHG will comply with the inspection protocols the Commission may include in permit conditions.

14. Please describe the principal design characteristics of the pipeline in South Dakota as discussed in Section 3.1 of the Application.

Answer: The pipeline in South Dakota will consist of three segments, the Aurora to Hartley lateral, the POET Chancellor lateral, and the POET Hudson lateral. The Aurora to Hartley lateral will be constructed of 8-inch diameter pipe, and the POET Hudson lateral will be built of 6-inch diameter pipe and the POET Chancellor lateral will be built of 6-inch diameter steel pipe until the junction of the POET Hudson lateral, at which point the volumes from those lines will merge into one 8-inch diameter pipeline. Both the Aurora to Hartley and POET Chancellor lateral (after it connects with POET Hudson) extend into Iowa and connect to each other south of the South Dakota state line and Minnehaha County. Consistent with PHMSA regulations, the Pipeline will have a maximum operations pressure (“MOP”) of 2,200 psig, with a normal operational range between 1,300 and 2,100 psig. NHG will determine the metallurgical and dimensional properties of the steel in accordance with PHMSA requirements and will account for all pressure ranges, temperature ranges, and risk for both ductile and brittle failure.

The specific design factors and steel properties for the pipeline in South Dakota include, but are not limited to, high-yield carbon steel with added toughness parameters, maximum operating pressures of 72% specified minimum yield strength (SMYS), isolation valves located at a maximum interval of 20 miles in non-HCAs and 7.5 miles in HCAs, external coating and cathodic protection system to have redundant external corrosion prevention systems, redundant leak detection system, crack arrestors to mitigate future propagation, increased depth of cover to mitigate risk of third-party damage, CO₂ plume dispersion modeling and buffer concentration for initial route alignment and high consequence area determinations, and inlet monitoring devices for CO₂ quality assurance.

A process flow diagram for the South Dakota segment of the Project is included in Exhibit B to the Application.

15. Will the Pipeline’s design characteristics meet or exceed the design requirements in the PHMSA regulations?

Answer: Yes. The pipeline will always meet and often exceed PHMSA design requirements. Some examples of exceedances we are implementing include using increased wall thickness, enhanced API 5L-PSL2 line pipe specifications, redundant leak detection systems, constant materials inspections during the manufacturing process, increased clearance between existing utilities, more frequent isolation and control valves, 100% non-destructive testing of all welds, increased depth of cover from 36” to a minimum of 60”, and continuous eight-hour hydrotest at 125% of the MOP.

16. How will the pipeline be tested before operation to verify that it can safely operate at or above its MOP as determined by PHMSA regulations?

Answer: NHG will use eight continuous hours of hydrotest at a pressure of 125% of the maximum operating pressure for each pipeline segment. After a successful hydrotest, a high-resolution internal inspection tool will be used to inspect all mainline and lateral pipe segments.

17. How will NHG ensure that the pipeline is not operated in excess of its MOP?

Answer: NHG will use redundant systems and equipment to ensure that the MOP is not exceeded during operations, including a Supervisory Control and Data Acquisition (SCADA) system with control set points for all compression and pump equipment (located at the capture facilities and booster stations) that are continuously monitored by qualified controllers 24/7/365 so that if any parameter at a set point (i.e., monitored location) detects conditions outside the set tolerance, the system can control the compression and pump equipment to prevent an incident.

The SCADA system is discussed in Section 5.0 of the Application. There are also local equipment shut-down parameters and set points at the pump and compression stations that are set below the established MOP. Each pipeline segment and facility piping will have independent over-pressure devices that are calibrated to open at a set pressure that is at or below MOP for a controlled release of carbon dioxide to the atmosphere.

18. Are there other ways in which the integrity of the pipeline will be tested before the pipeline is placed in service?

Answer: Yes. The pipeline coating will be examined during handling and installation of the pipe. Non-destructive testing will be performed on all field welds, which greatly exceeds PHMSA's requirement of ten percent. The pipeline will be inspected after installation using a caliper pig to validate that damage did not occur during installation. In-line smart tools will be used to conduct an internal inspection of the pipeline before carbon dioxide is introduced to establish a baseline to monitor for corrosion throughout the operational life of the pipeline. Finally, the pipeline system will be placed into service after a detailed inspection and review, referred to as the Pre-Start Up Safety Review, to verify compliance with applicable regulations, design and construction standards, and operational checklists and management of changes (MOCs). This review is conducted by a team of engineering, operations, environmental health and safety, and regulatory personnel to inspect all field installations, equipment set points, safety and communication devices, operating procedures, compliance records/documents, and local notifications before commissioning.

19. In what form will the pipeline transport carbon dioxide?

Carbon dioxide will be received from customers via carbon-capture equipment installed at each customer's emitting facility. The carbon capture equipment will include dehydration

equipment to remove water, and cooling and compression equipment that effectively compresses the carbon dioxide gas to convert it to a dense phase to allow for increased transportation efficiency and volume. While these carbon capture systems are not part of the pipeline for which NHG is seeking a permit under SDCL Ch. 49-41B, there will be continuous monitoring of the carbon dioxide stream before it enters the pipeline to ensure that the quality of carbon dioxide meets or exceeds the necessary composition quality to ensure safe and efficient transportation of the carbon dioxide.

20. What may be experienced in the event of a pipeline leak?

Answer: An unintended release of carbon dioxide from the pipeline will not cause long-term environmental consequences and carbon dioxide does not ignite. In the unlikely event of a release, there would be an initial release of energy at the point of failure and a plume of carbon dioxide would enter the atmosphere, undergoing immediate phase change to its gaseous state as it dissipates into the air. Carbon dioxide is non-flammable, colorless, odorless, and heavier than air. The symptoms from exposure depend on a combination of concentrated CO₂ coupled with exposure time and range from no effects, mild to moderate respiratory stimulation to asphyxiation. The natural environment (air, soil, plants) would experience a large drop in temperature in the immediate vicinity of the release and a white plume would be visible as a result of the water vapor in the air cooling rapidly. The carbon dioxide would passively release from the isolated pipeline segment until equalization and would continue to dissipate into the atmosphere. NHG has used several established air dispersion and plume models to evaluate the various concentration levels of CO₂ as a function of both time and distance. These plume models were used to assist in initial routing of the pipeline to further mitigate the risk and impacts to stakeholders.

21. What steps will be taken to minimize the potential for leaks?

Answer: The pipeline includes many features to prevent or minimize leaks that meet or exceed PHMSA requirements and industry standards; (1) installation of mainline isolation and control valves (MLVs); (2) internal and external corrosion protection equipment and programs; (3) initial and ongoing integrity validation of the pipeline; (4) the installation and use of a state-of-the-art leak detection system; and (5) the use of a SCADA telecommunications network.

Third-party damage is a notable threat to pipeline integrity, so the pipeline will be installed at least five feet below ground surface with a 24-inch separation from existing utilities, in excess of PHMSA requirements. Warning tape will be installed 24 inches above the pipeline where conventionally installed to avoid and minimize the potential for unintentional damage. NHG will participate in the 811 Call Before You Dig program and public-awareness programs.

Corrosion is also a contributing factor to leaks on pipeline systems, which NHG is mitigating with the quality control monitoring and automatic shut-off capability of the CO₂ stream entering the Pipeline, and the cathodic protection system and routine inspection of the system further discussed in Vidal Rosa's testimony.

22. Please explain how the pipeline is inspected internally after construction.

Answer: As explained in Section 3.1 of the Application, all pipeline segments will allow the passage of internal inspection devices, which are capable of detecting internal and external anomalies in the pipe such as corrosion, dents, deformations, and scratches. Internal inspection of pipelines has been largely responsible for reducing pipeline incident frequencies over the past decade; these inspections are conducted using in-line inspection (ILI) tools often referred to as pigs. Launcher/receiver facilities are designed to launch and receive these internal inspection devices and are located at the capture facilities and generally at interconnection points of pipeline

segments. Approximately 2-4 acres will be necessary for launcher/receiver facilities at interconnection points for the pipelines, which will be located on and extend adjacent to the pipeline right-of-way (ROW), and will be fenced on permanent easements or land purchased or leased from landowners. Only one of these facilities is proposed on the pipeline system in South Dakota at the interconnection of the POET Chancellor and Hudson laterals in Lincoln County. Inline inspection will occur once at installation after the successful hydrostatic test to establish a baseline and will then be conducted periodically at three- to five-year intervals throughout operation.

23. Please describe the pipeline's leak detection system.

Answer: As discussed in Section 5.0 of the Application, the system will use both continuous and non-continuous monitoring. The non-continuous components will consist of an aerial patrol of the pipeline at a minimum of two times per month and use of an in-line inspection tool to validate pipeline integrity. The continuous components will consist of a variety of compensated mass balance, real time transient model, negative pressure wave, fiber optic sensing cables, and strategically placed carbon dioxide monitoring devices. The compensated mass balance monitors the mass that enters the pipeline to ensure that it is equal to the mass at the delivery facility. The quantitative fiber optic systems will be placed externally to the pipeline and use acoustics to identify third-party activity or the acoustic signature of a CO₂ release. The negative pressure wave technology sends a signal through the product on the inside of the pipeline and measures the return waves in the event of a leak or abnormal operation. The fiber will also detect a drop in temperature, which is indicative of a CO₂ phase change. NHG will use CO₂ and air quality monitors at mainline valve locations and strategic locations along the pipeline system.

24. Will there be pumping stations on the pipeline?

Answer: Yes. Mainline booster stations are needed in places to ensure that the carbon dioxide is continually transported in the target range of 1,300 – 2,100 psi to remain in a dense phase. There are currently four booster stations anticipated for the pipeline, however none are proposed to be located in South Dakota.

25. Please describe the purpose, operation, and location of mainline valves (MLVs).

Answer: As explained in Sections 3.1 and 5.0 of the Application, NHG will install numerous remote-controlled and automatic MLVs along the pipeline as a safety measure. The MLVs will allow for prompt response and isolation of line segments in the unlikely event of an emergency or other abnormal operating condition. These MLV locations will be approximately 30 feet wide by 70 feet long and located within the permanent easement area. The MLVs will be installed in locations that are accessible to authorized employees, protected from tampering, and consistent with 49 CFR § 195.260. The spacing intervals between the MLVs will be determined in accordance with 49 CFR Part 195 as well as CO₂ dispersion modeling, and will account for HCAs, populated areas, environmentally sensitive areas, and unusually sensitive areas. Spacing will not exceed 20 miles in non-HCA areas and 7.5 miles in HCA areas. The final MLV locations cannot be determined until the final route of the pipeline is determined.

26. Please describe the remote monitoring and control capabilities of the pipeline.

Answer: The SDACA system will be monitored and controlled from an Operations Control Center (OCC) 24/7/365. MLVs, pumps, and compressors will be remote controlled to allow for prompt response and isolation in the event of an abnormal operating condition or emergency. The advanced SCADA system will be used to continuously monitor pressure, temperature, and flow of carbon dioxide in the pipeline. The SCADA system is designed and

will be installed with back-up power and communication capabilities. The SCADA system will include a subsystem called the Computational Pipeline Monitoring System, which will analyze deviations of flow through the pipeline, improving the ability to identify leaks and other abnormal operating conditions. In addition to remote control, local automated controls and manual overrides will be installed to enable field operators to control and operate the pipeline if remote communication fails.

27. What is multiphase flow and what will Navigator do to prevent it?

Answer: Multiphase flow occurs when both gas and liquid are present in a pipe segment. This could occur if pipe pressure were to drop below its specified MOP. Multiphase flow is not a hazardous condition and does not create a risk of leak or rupture, but it could create operational difficulties in the respective pipe segment. The NHG system will have pressure monitoring devices and pressure control devices that will maintain the minimum pressure to ensure single-phase flow. These devices will actuate or close to ensure the minimum pressure is maintained throughout the system.

28. What other safety features will the pipeline have?

Answer: Navigator will use an AC mitigation system when the pipeline is in the proximity of high-voltage transmission power lines to mitigate any induced AC current on the system. NHG is also in the process of research and development of a unique odorant to further enhance public awareness and leak detection. The NAV911 system we are developing will be an automatic call alert system to a local region in the event of an emergency.

29. Please describe the fabrication process for the pipe.

Answer: Pipe fabrication will occur in accordance with NHG's line pipe and material specifications, applicable PHMSA regulations, and industry standards. Third-party inspection

will be used at all phases of manufacturing and logistics for quality control and quality assurance to the respective specifications and requirements. Each line pipe joint will undergo a hydrotest at the production facility before coating. The pipe will be externally coated with 14-16 mils fusion-bonded epoxy to protect against corrosion. Coating in a controlled environment, such as a factory, will enhance the efficacy of the coating process. Pipe segments that will be installed via trenchless methods will have an additional 30-50 mils of abrasive resistant outer coating. All field welded pipe joints will utilize non-shielding field-applied two-part epoxy at girth welds. The pipe will be inspected, and integrity tested at the mill where it is fabricated for quality assurance. After delivery, the coating of the pipe will be re-inspected in the field during each phase of installation. Cathodic-protection systems will be installed to prevent external corrosion and preserve the integrity of the system.

30. What measures will you take to prevent damage to pipe segments while in transit and during installation?

Answer: The pipe segments will be transported in accordance with PHMSA regulations and industry standards to their installation locations. There will be several intermodal systems (truck/rail/ship) utilized between the mill and the final installation location of the line pipe and inspection for quality control and quality assurance will occur throughout the process. As noted above, the coating and the pipe will be re-inspected multiple times in the field during installation, including for damage occurring during in transit, for quality assurance purposes.

31. Please describe how the pipeline will be installed.

Answer: As explained in Section 4.0 of the Application, different techniques will be used to install the pipe depending upon site-specific conditions and factors along the route. These techniques include conventional trenching, bore, and horizontal directional drilling (“HDD”).

The primary method used for installation will be conventional installation via open trench at a depth of at least five feet in soil. The line pipe joints (typically 40 to 80-foot lengths) will be welded together by qualified welders into a single pipeline. Non-destructive inspection of every weld will be performed to validate integrity. Upon successful inspection, the pipeline will be lowered into the excavated trench. A separation of approximately two feet will be kept between the pipe and existing infrastructure like district drainage and existing utilities. A separation of at least one foot will be kept between the pipe and existing or planned private drain tile.

Bore and Horizontal Directional Drill (HDD) methods will be utilized when surface disturbance from trenching is not desired or feasible. For example, bore or HDD may be utilized at road crossings, railroad crossings, large waterbodies, or in other sensitive areas or areas with sensitive resources. When the bore method is used the pipe will typically be installed at a depth of at least 10 feet and when HDD is used it will typically be installed at a depth of 25-50 feet or deeper. When these methods are used for installation, additional measures will be taken to protect the pipe, including the application of an abrasion resistant overcoat on top of the fusion-bonded epoxy coat of the pipe. This further protects the integrity of the Pipeline by adding a reinforced coating layer to protect against physical encounters that may occur for pipe installed using these methods.

32. Has NHG retained outside engineering firms to perform or assist in the engineering and design of the pipeline?

Answer: Yes. DNV GL USA (“DNV”) and Integrity Solutions Ltd. (“IS”) have been retained to assist with the Pipeline design process and to assist with ensuring the safety of the Pipeline. DNV will validate the metallurgical analysis for the line pipe. It will also facilitate hazard identification and risk analysis and conduct a study, using proprietary software, of the

potential vapor cloud air dispersion for controlled and accidental releases of carbon dioxide from the Pipeline. IS will conduct air dispersion modeling using Areal Locations of Hazardous Atmospheres software for analysis and identification of HCAs crossed by or near the proposed Pipeline route.

Terracon Consultants, Inc. (“Terracon”) has been retained to complete a Geological and Geohazard Assessment. Terracon is a leading provider of geotechnical engineering services and will provide professional review of expected geotechnical conditions and geohazard threats crossed by or near the proposed Pipeline route.

LJA Engineering Inc. (“LJA”) has been retained to perform detailed engineering design for the Pipeline, including design of the pipe, MLV settings, launcher and receiver assemblies, booster pump facilities, and carbon capture facilities that will feed into the Pipeline. Trimeric Corporation has been retained to work with LJA to finalize the overall engineering related to carbon dioxide capture facilities and to provide additional quality and technical review of LJA-produced engineering packages. Together DNV, IS, LJA and Trimeric Corporation are referred to in the remainder of my testimony as the “Engineering Firms”

33. Please describe the experience and qualifications of each Engineering Firm.

Answer: DNV is an independent expert in assurance and risk management in the pipeline industry. IS is a company with expertise and experience supporting pipeline operators in making more informed integrity management decisions about their pipelines and related assets, based on integrated data analysis. LJA was founded in 1972 and is an experienced and comprehensive full service, multi-disciplinary engineering firm specializing in pipeline and facility design. Trimeric Corporation was founded in 2003 and provides process engineering, chemical engineering,

research and development, and other specialized technical services to industry and governmental entities.

34. Please describe how Navigator will oversee and manage the work of the Engineering Firms.

Answer: Navigator directly hired fulltime engineers who will manage and accept the engineering design scopes and deliverables associated with each of the Engineering Firms. Current personnel who will be overseeing and managing the Engineering Firms' work include but are not limited to: myself; our Director of Engineering; and our VP of Capital Projects.

35. Please describe Navigator's process for retaining a construction firm to construct and install the pipeline in South Dakota.

Answer: Navigator will retain multiple construction firms to construct the pipeline, which will be done in spreads. Navigator continues to be in discussions with several constructions firms and will select firms for the project when the final design of the system is complete and all material permits necessary for construction are received. Navigator uses a comprehensive pre-evaluation program for contractor selection that considers experience, previous projects in the region, labor and equipment resources, financial strength, safety record, and outstanding litigation, to name a few. An official pre-qualification package will be finalized when all permits and agricultural considerations are identified to ensure that qualified and competent contracts are selected.

36. How will Navigator oversee and supervise the contractors?

Answer: Navigator directly hired fulltime personnel to oversee and manage the construction firms to ensure compliance with all permits and regulations, as well as to ensure implementation of a proactive safety program that is part of the culture of Navigator. Our

Director of Construction and will be responsible for the performance and compliance of the construction firms. Hundreds of qualified and competent third party inspectors will perform QA/QC of the selected contractor to ensure compliance with all Company specifications, standards, and permit conditions.

37. Will Navigator use union labor for construction and installation of the pipeline in South Dakota?

Answer: Yes. Letters of Intent (“LOI”) were executed in February 2022 with the following labor unions for construction and installation of the Pipeline in South Dakota: Laborers’ International Union of North America (“LiUNA”); International Union of Operating Engineers (“IUOE”); the International Brotherhood of Teamsters (“IBT”); and United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry (“UA”). The labor unions have established training and competency verifications as well as proven track records for their members to promote the safe and quality installation of the pipeline. NHG is committed to using highly qualified and experienced resources to construct the pipeline. Employing a skilled workforce, including internal resources, consultants, and these labor unions, ensures that the pipeline will be constructed and designed to meet or exceed all applicable standards.

38. How many union workers do you estimate will be involved in construction and installation of the pipeline?

Answer: As discussed in Section 7.2 of the Application, Navigator currently estimates approximately 600 to 1,000 workers on the two construction spreads anticipated for pipeline segments that originate in South Dakota and terminate in Iowa. The number present in South Dakota at any given point in time is dependent on the construction schedule, such that fewer

personnel would be present over a longer period if the spreads are constructed sequentially versus more personnel present for a shorter period if constructed concurrently.

39. Please describe any economic deposits within or affected by the proposed ROW.

Answer: As explained in Section 6.2.3, according to the South Dakota Department of Agriculture and Natural Resources, there are four construction aggregate sites within 0.25 miles of the Project area, one of which will be crossed by the Project. All four, however, are identified as reclaimed, so the Project is not expected to preclude access to mineral resources at these sites. There are no oil and gas wells within 0.25 miles of the Project. Thus, the Project is not expected to impact mineral resources in South Dakota.

40. How are geological hazards identified and addressed in design, construction, and operation of the pipeline?

Answer: A Geohazard Analysis is performed. First, a desktop analysis is performed along the route to understand the geological setting and identify potential hazards including topography (including lidar where available), geology (i.e. mines, slopes, landslides, slough, karst, etc.); earthquake/seismic hazards, mass wasting (movement of rock and soil down slope under the influence of gravity), flooding and high groundwater areas, stream channel migration and avulsion hazards, surface erosion, subsurface erosion and sinkhole development, karstic formations and proximity to subsurface mines, soil types (soil bearing pressure) and liquefaction risk, and frost lines and water table depths. The results of the study will lead to recommendation of hazard avoidance and mitigation along the route.

41. Is seismicity or soil liquefaction expected to be a concern along the route in South Dakota?

Answer: No. According to the USGS Seismic Hazards maps, the Project is located in an area of low seismic probability, and there are no faults within 100 miles of the Project area. Therefore, seismicity is not anticipated to be a concern but will be further evaluated by the third party geohazard evaluation. Because of the low probability of seismic activity, soil liquefaction, which is a condition that typically occurs when loose, saturated soil is subject to a seismic event, is therefore also unlikely. More detail is contained in Section 6.2.2 of the Application.

42. Is Karst geology or landslides expected to be a concern along the route in South Dakota?

Answer: Karst terrain occurs in approximately 15.58 miles of the Project ROW in South Dakota; this terrain is more susceptible to subsidence. Only one geologic formation within the Project ROW, Pierre Shale, which is crossed by approximately 8.32 miles of the Project ROW in South Dakota, is susceptible to landslides. Areas most susceptible to landslides are those with steep slopes that are cleared of vegetation during construction. To minimize the risk of landslides during construction, Navigator will use the erosion and sediment control devices in these areas. Upon receipt of the formal Geohazard Analysis and recommendations from Terracon, Navigator will implement additional mitigation measures in regard to Karst and landslides to protect the system throughout its existence.

43. What impacts do you expect to local housing during construction?

Answer: As explained in Section 7.4 of the Application, NHG expects that most non-local Project workers will use temporary housing, like rental units, hotels, motels, campgrounds, and recreational-vehicle parks. In the counties crossed by the Project route, there are

approximately 2,500 available rental units, 4,700 motel rooms, and 54 recreational vehicle parks within approximately 10-40 miles of the pipeline ROW. During construction which is anticipated between Q2 2024 and Q1 2025, NHG estimates that there will be approximately 1,000 pipeline construction personnel located in South Dakota at peak times. NHG expects that most of these temporary workers will seek housing in the more populated, service-oriented towns located within a reasonable commuting distance to the Project worksite. Navigator does not anticipate any man camps or temporary housing exclusively for construction of the pipeline to be in South Dakota.

44. What impacts do you expect to public health and safety during construction?

Answer: As discussed in Section 7.4 of the Application, with respect to health facilities, Navigator is committed to protecting the health and safety of construction workers and anticipates that any health-care needs during construction can be met by local healthcare facilities. The construction contractors will have health and safety plans in place prior to mobilizing, these plans include communication and coordination with local healthcare facilities. Because there are only a few permanent employees required for operations in South Dakota, there should be no effect on health services and facilities during operation of the Pipeline. With respect to energy use, construction needs can be provided through existing facilities. Navigator is working with local electric providers to provide power for the capture facilities and will enter in appropriate agreements to ensure that safe and reliable power is provided without any negative consequences for the grid. With respect to sewage and water, existing and portable facilities should be adequate during construction, and no effects during operation are anticipated. With respect to solid waste management, during construction there will be non-hazardous pipeline construction wastes including human waste, general refuse, pipe banding and spacers,

waste from coating products, welding rods and blast media, timber skids, cleared vegetation, and other miscellaneous construction debris. Trash will be removed from the construction ROW daily. Vegetation, rock, and other natural debris will be removed by the completion of clean up. All waste materials are expected be disposed of at local licensed waste disposal facilities. All HDD cuttings and drilling mud will be disposed of as required by applicable regulations. Human waste will be handled and disposed of through portable self-contained facilities. All petroleum products, oil, grease, and other solvents will be disposed of as required by state and federal regulations. There should be no significant impacts to solid waste management during construction or operation.

With respect to fire protection and law enforcement, local law enforcement agencies should have adequate officers to accommodate the construction workers. Throughout operations, Navigator will work with local law enforcement, fire departments, and emergency medical services to plan, coordinate, and implement effective emergency response. Navigator will maintain emergency response equipment and personnel at strategic points along the Project ROW and train and coordinate with local emergency responders to respond to any pipeline-related problems. After construction and throughout operation of the Pipeline, Navigator will conduct and host emergency response drills with its employees and local emergency responders.

45. What impacts do you expect to transportation?

Answer: As discussed in Section 7.4 of the Application, Navigator will work with state and local agencies, including county highway superintendents, county and local road managers, to establish transportation routes and to enter into road use agreements. Navigator will obtain any necessary permits to use state and local roads and has already initiated contacts with permitting authorities to establish timelines for road permit approvals. As required by SDCL §

49-41B-38, Navigator will post a road bond with the Commission to ensure that roads are returned to their preconstruction condition. During construction, traffic on highways and secondary roads will increase. Hauling pipe and most construction equipment will fall within existing state road and bridge weight limits, but Navigator will obtain any necessary temporary permits for heavier loads if needed. Navigator will repair any damage to roads and reach agreements with state and local authorities to establish a process to restore roads to their preconstruction condition.

46. Please describe the impact of the Project on local land values.

Answer: As discussed in Section 7.11, we are seeking non-exclusive easements for the project are based on a 50-foot permanent right of way and are limited to one pipeline for transporting CO₂. They prohibit a landowner from impounding water, establishing mature trees, and building a structure on the easement area, but they do not prevent growing crops, pasturing cattle, or other normal farming practices. Because the pipe will be under five feet of cover and normal farming practices are not restricted after construction, Navigator anticipates no decrease in property values as a result of the easement. Navigator commissioned a detailed HGPS-specific market study that analyzed local property values based on a multitude of factors to guide the base offers for easements and other land rights. The market study reflected that property values in predominantly agricultural areas are not usually affected by the installation or presence of a pipeline. Navigator is contractually obligated to repair any damage to land or property resulting from construction, and will pay damages for crop loss and the inability to use or limitations imposed on pasture during construction. Navigator will restore or compensate landowners for damage or disturbance to land and will repair or replace drain tile, irrigation systems, fences, and other damages resulting from construction and installation of the Pipeline.

47. Please describe the ways in which Navigator works with landowners during all phases of the Project.

Answer: Navigator engaged landowners along the Aurora corridor directly through mailings describing the project and public meetings held in Flandreau, Garretson, and Brookings, and a virtual meeting in January 2022. Starting in January 2022, our agents also attempted to directly contact each landowner along the proposed Aurora route to discuss our need for access to lands for surveys and to gather specific information from each landowner and their property, and to answer landowners questions about the Project. Agents began reaching out to landowners along the POET routes in June 2022 after those facilities and laterals were added to the Project. Additional virtual meetings were held in September 2022 to include the added POET laterals, but also to provide a project update to all potentially affected landowners in South Dakota. Invitations to these meetings were sent to all landowners within the one-mile corridor prescribed by SDCL § 49-41B-5.2. At the informational meetings, Navigator provided technical and general information about the company and the project and had subject matter experts available to answer questions from the participants. Land agents began contacting all potentially affected landowners in South Dakota in July 2022 to further discuss easements, construction, reclamation, crop yields, pasture or range concerns, and other information specific to each landowner and the property, and they continue to answer questions landowners may have. Navigator will maintain contact with landowners throughout construction, will provide each landowner and local jurisdiction with access to company representatives to address issues or questions that arise during operation of the Pipeline, and will cooperate with a public liaison officer that may be appointed by the Commission as a condition of permitting the Pipeline.

48. How will the Pipeline be decommissioned?

Answer: If and when decommissioning is necessary, it will be done pursuant to applicable federal and state laws at the time of decommissioning.

49. Does this conclude your direct testimony?

Answer: Yes.

Dated this 26th day of September, 2022.

/s/Stephen Lee
Stephen Lee