

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, :

**APPLICANT’S RESPONSES
TO STAFF’S SECOND SET
OF DATA REQUESTS**

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Applicant Navigator Heartland Greenway LLC makes the following responses to Staff’s Second Set of Data Requests pursuant to SDCL § 15-6-33, and SDCL § 15-6-34(a). These responses are made within the scope of SDCL 15-6-26(e) and shall not be deemed continuing nor be supplemented except as required by that rule. Applicant objects to definitions and directions in answering the requests to the extent that such definitions and directions deviate from the South Dakota Rules of Civil Procedure.

- 2-1) Refer to Page 2 of the Application. The Applicant states it “has an agreement with one of its customers to connect to an additional 10 facilities in a later phase of development and Applicant anticipates entering into agreements with additional CO₂ emitting facilities for future development phases.”
- a) Please identify the customer referenced in the statement.
 - b) Does the customer have any facilities located in South Dakota? If yes, please identify the locations in South Dakota.
 - c) When does the Applicant anticipate filing a siting permit with the South Dakota PUC for the pipelines connecting these facilities?
 - d) Has the Applicant secured other agreements with additional CO₂ emitting facilities in South Dakota since this Application was filed? If yes, please identify.

RESPONSE:

- a) Objection. This request seeks information related to a second phase of development that is not presently before the Commission and is contingent on Applicant being granted a permit in this docket. Without waiving the objection, the customer referenced in the statement is POET.
- b) Objection. This request seeks information related to a second phase of development that is not presently before the Commission and is contingent on Applicant being granted a permit in this docket. Without waiving the objection, permitting additional facilities in a secondary phase of the Project will be based on regulatory approvals and construction commencement of Phase 1.
- c) Objection. This request seeks information related to a second phase of development that is not presently before the Commission and is contingent on Applicant being granted a permit in this docket. Without waiving the objection, there is no current schedule for filing a second application.
- d) Objection. This request seeks information related to a second phase of development that is not presently before the Commission and is contingent on Applicant being granted a permit in this docket. Without waiving the objection, no other agreements have been secured.

- 2-2) Refer to Page 2 of the Application. The Applicant states “the initial design capacity of the HGPS, which is not expected to be fully utilized by the 21 facilities at the outset, is for the capability of capturing and transporting up to 10 million metric tons (MMT) of carbon dioxide per year and can be expanded to its full potential capacity of up to 15 MMT of carbon dioxide per year by adding booster stations along the initial system and laterals to connect any new customer locations.”
- a) How many MMT of carbon dioxide per year is expected to be utilized by the 21 facilities at the outset?
 - b) Does the Applicant know if booster stations will need to be added to the system in South Dakota to expand to the full potential capacity of 15 MMT? Please explain.

RESPONSE:

- a) Objection. This request seeks information related to operation of the pipeline outside of South Dakota and not before the PUC. Without waiving the objection, the expected annual capture volume at the outset of operations from all 21 facilities is approximately 6.4 MMT.
- b) Objection. This request seeks information related to a second phase of development that is not presently before the Commission and is contingent on Applicant being granted a permit in this docket. Without waiving the objection, Applicant does not know whether booster stations will need to be added in South Dakota to expand to 15 MMT per year. Whether any booster stations in South Dakota are necessary will depend on the location of additional customers, and whether they must be served by additional new mainline or can be served with additional lateral pipelines.

2-3) Refer to Page 3 of the Application, Table 1.2-1. The Applicant states it will capture 0.9 MMT of carbon dioxide per year from facilities in South Dakota. Please identify how much carbon dioxide per year will be captured from each facility in South Dakota.

RESPONSE: VLO Aurora = 392,067
POET Chancellor = 308,246
POET Hudson = 194,682

- 2-4) Refer to Page 3 of the Application. The Applicant states “mainline valves (MLVs), each approximately 30-feet wide by 70-feet long, will be placed along the route in accordance with or exceedance of PHMSA regulations for proper and safe operation and control of the system.”
- a) Has the Applicant identified where the mainline valves will be located along the route? If yes, please identify. If no, please identify why the Applicant has not been able to identify the location.
 - b) Please identify the distance between each main line valve and explain whether the distance between each valve meets or exceeds the distance required by PHMSA regulations.
 - c) Please explain the quantitative and/or qualitative analysis performed when determining if the distance between mainline valves should exceed PHMSA regulations.

RESPONSE:

- a) Preliminary placement of MLV's has been determined and preliminary mapping is attached to these responses. Additional valve placement may occur as a result of Emergency Flow Restriction Device (EFRD) analysis, and additional review of HCA and ESA analysis as a result of outstanding surveys. Additional locations may be identified through stakeholder engagement discussions.
- b) Although the additional and exact locations of mainline valves have not yet been determined, (a) preliminary mapping of MLVs is attached to these responses subject to the Protective Order and (b) the spacing will not exceed 7.5 miles in High Consequence Areas and 20 miles in non-HCA areas, which exceeds PHMSA requirements for non-HCA areas and meets the PHMSA requirement for HCAs.
- c) The spacing of mainline valves is determined based on 49 CFR Part 195, CO2 dispersion modeling, and will account for HCAs, populated areas, environmentally sensitive areas, and unusually sensitive areas. Where possible NHG is exceeding based on the aforementioned criteria and associated risk assessment of the pipeline in relation to these areas. An evaluation of exceedances of 49 CFR 195 is included in Exhibit D of the Application.

- 2-5) Refer to Page 4 of the Application. The Applicant states “the Project, including the approximately 1,300-mile HGPS, capture facilities and sequestration site is expected to cost approximately \$3.2 billion, with the 111.9 miles of pipeline with South Dakota costing approximately \$142 million.”
- a) Please provide a detailed breakdown of the South Dakota cost estimate provided in the Application.
 - b) Has inflation impacted the cost estimate provided in the Application? Please explain.

RESPONSE:

- a) The updated costs account for additional information from vendors and contractors.

Right-Of-Way (Services & Acquisition)	\$ 27.5 million
Engineering/Survey/Environmental	\$ 9.6 million
Materials	\$ 23.5 million
Construction	\$ 97.8 million
TOTAL	\$158 million

- b) Inflation has not impacted the cost estimate provided in the Application. Cost estimates were established using a variety of best practices such as: historical actuals, expert judgment, analogous estimation, and parametric modeling. To account for uncertainty in the estimate, Navigator performed a comprehensive Risk Analysis to inform contingencies included in the estimates. As engineering diligence progresses, cost estimates will be updated, estimate accuracy will tighten, and contingency will decrease.

2-6) Pursuant to ARSD 20:10:22:10, please explain the consequences of delay or termination of the construction of the facility.

RESPONSE: Delaying construction of the Project/facilities would cause delay in capturing approximately 0.9 MMT of carbon dioxide per year of delay within the State of South Dakota. Delays could cause a loss in additional revenue for Ethanol producers that would benefit from low carbon fuel markets. Property Tax revenue for local communities and counties would also be delayed.

2-7) Refer to the Applicant's response to Staff data request 1-7. The setbacks were not clearly identified in the memo provided. Provide the specific setback distances, by foot, for inhabited structures, gathering places, and population centers.

RESPONSE: As provided in Data Request response 1-7 and 1-8, Table on Page 3, column titled "Initial Routing": The setback distances for inhabited structures, gathering places, and population centers are the same based on the plume dispersion modeling: for a 6-inch pipe, 321 feet for initial routing and for an 8-inch pipe, 417 feet for initial routing.

- 2-8) Refer to Page 8 of the Application. The Applicant states the following: "In addition, Applicant has filed all forms required by PHMSA in advance of constructing the CO₂." It appears this sentence is missing information. Please clarify.

RESPONSE: The sentence was missing the word "pipeline."

2-9) Refer to Pages 8 and 9 of the Application. The Applicant states they "will utilize conservative design safety factors and will pressure test the pipeline system at pressure exceeding the MOP, prior to placing the system in-service." Please specify what conservative design factor will be used and explain why the Applicant is using a more conservative design factor than is required or the industry standard.

RESPONSE: Refer to Application Exhibit D, Page 1 for pipeline design factors by pipeline diameter. Conservative design parameters are being used to enhance safety and long-term integrity of the pipeline. The standard design factor is 0.72 per 49 CFR Part 195.106.

$$[(2) \times (60,000) \times (wt) \times (1.0) \times (0.72)] / 6.625 = 2,200 \text{ psi}$$
$$wt = .169" \text{ min for } 6.625" \text{ OD}$$

$$[(2) \times (60,000) \times (wt) \times (1.0) \times (0.72)] / 8.625 = 2,200 \text{ psi}$$
$$wt = .220" \text{ min for } 8.625" \text{ OD}$$

- 2-10) Refer to Page 9 of the Application. The Applicant states the “ultimate spacing and location of the MLVs is dependent on final routing and will be determined after completion of necessary surveys and landowner negotiations.”
- a) Explain why the existing routing cannot be used to determine MLV locations when the Applicant states any additional routing modifications will be minor in nature.
 - b) Explain which surveys are necessary and haven't been completed to determine where MLVs should be located.
 - c) Explain how landowner negotiations will factor into the MLV location placement.

RESPONSE:

- a) The Applications includes this statement: "Ultimate spacing and locations of the MLVs is dependent on final routing ...". This statement is not meant to convey that the existing route is not being used to determine baseline MLV locations. There is a potential for final locations to shift based on landowner negotiations and additional locations may be added based on additional analyses discussed in DR2-4(a). Baseline MLV maps are provided with this response.
- b) The Applicant needs to complete biological, cultural, and threatened and endangered species surveys to determine additional environmentally sensitive locations that could be a factor in additional placement of mainline valves.
- c) The Applicant will work with landowners to place valves at appropriate locations. If a landowner has concerns regarding the proposed MLV placement on their property, the Applicant will work with such landowner and with adjacent landowners in an attempt to find the appropriate location.

- 2-11) Refer to Page 10 of the Application. The Applicant states the “primary method of installation of the pipeline will be conventional installation via open trench at a depth of at least five feet in soil ...”
- a) Explain why the Applicant decided to bury the pipe at least five feet deep rather than at least four feet deep.
 - b) Please produce any studies or professional literature that supports burying the pipe at least five feet deep.

RESPONSE:

- a) As stated in Section 4, Page 10 of the Application NHG made the decision to be at least five feet deep where conventional construction methods are employed to maintain at least a two-foot separation between the pipeline and existing infrastructure such as district drainage and existing utilities and at least one foot from existing or planned private drain tile. NHG also believes that a five-foot depth is an additional proactive safety measure to prevent damage by third parties, which are a significant threat to pipeline integrity.
- b) Applicant's decision to install the pipeline at a depth of at least 5 feet was not based on any professional literature but was determined based on professional experience and the Engineering and Construction accounting of the information provided in response to 2-11(a).

2-12) Refer to Page 10 of the Application. The Applicant states that “during the construction of the pipeline, the contractor will require off ROW areas for the storage of pipe and equipment necessary for the construction of the Project facilities. Applicant expects the siting of these yards will be done by the selected contractor and Applicant.” Does the Applicant expect to obtain these areas voluntarily from landowners, or would the Applicant utilize eminent domain to obtain access to land for a storage yard? Please explain.

RESPONSE: Yes, Applicant expects to obtain construction and storage yards by voluntary agreement and not through the use of eminent domain. Typically these are sited by similar previous use.

- 2-13) Refer to Page 11 of the Application. The Applicant states that “access roads have not yet been thoroughly defined. Applicant will seek and enter into road use agreements with respective landowners and obtain necessary permits from units of government as warranted.”
- a) Explain why access roads have not been defined, and when the Applicant expects that to occur.
 - b) Does the Applicant expect to obtain areas for access roads voluntarily from landowners, or would the Applicant utilize eminent domain to obtain access to land for access roads? Please explain.

RESPONSE:

- a) There are approximately 14 temporary access roads planned for use for construction of the Project. The Applicant will gather additional information during the 2023 surveys and anticipates providing an update in June 2023
- b) Applicant expects to obtain necessary access roads by voluntary agreement and not through the use of eminent domain. Applicant would condemn for an access road only if no alternative were available. Applicant is not aware of any area on the right of way where that may occur.

- 2-14) Refer to Page 11 of the Application. The Applicant states that “to ensure safe operation of the line, Applicant will install numerous remote controlled MLVs to allow for prompt response and isolation of line segments in the unlikely event of an emergency.”
- a) Provide the exact number of remote controlled MLVs that will be installed on the line.
 - b) The Applicant claims that an emergency is unlikely to occur. Does the Applicant have any specific estimates of the likelihood of any emergency event? If yes, please provide and support.

RESPONSE:

- a) Determining the number and location of valve placement is an iterative process. To date NHG has completed its initial effort to address MLVs and currently identified 18 MLVs along the alignment in South Dakota, all of which will be remotely operated. Additionally check valves will be installed with an automatic closure.
- b) The Applicant has reviewed pipeline safety data available via the PHMSA website from other CO2 pipelines that operate within the United States, to analyze the likelihood of an emergency event and incorporate findings and lessons learned into design and operations planning. CO2 pipelines have been operating safely in the United States for decades, currently there are 5,339 miles of installed CO2 pipelines. Federal pipeline safety law and government safety regulations administered by the U.S. Pipeline and Hazardous Materials Safety Administration mandate safe operations of CO2 pipelines. Per PHMSA records, there have been 102 incidents from 2003-2023, resulting in 1 PHMSA reportable injury in 2007 see attached PHMSA Facts Table. The Liquid Energy Pipeline Association (LEPA) advocates for policies and regulations that support the pipeline industry's safety record, operational excellence, and environmental stewardship. LEPA promotes safe, reliable, and efficient transportation of liquid products through pipelines. Please refer to LEPA's website (link below) and CO2 Pipeline Safety Fact Sheet (link provided and attached) for additional information on CO2 pipeline safety track record and operations.

[About LEPA | Liquid Energy Pipeline Association \(liquidenergypipelines.org\)](https://www.liquidenergypipelines.org)

[CapturingCarbon_082922 \(liquidenergypipelines.org\)](https://www.liquidenergypipelines.org/capturing-carbon-082922)

2-15) Refer to Page 11 of the Application. The Applicant states that “every valve site and pump station will be connected to an Operations Control Center by modern communication facilities.” Has the Operations Control Center been constructed? If not, what is the timeline for construction?

RESPONSE: No, the Operations Control Center (OCC) has not been constructed. Applicant is progressing its evaluation of the location of the OCC in the Midwest. A backup OCC will be in a different location. Applicant does not anticipate constructing an OCC building, but using an existing building/office space that will be outfitted for an OCC. The location(s) of the OCC(s) are anticipated to be determined by the end of 2023.

- 2-16) Refer to Page 13 of the Application. The Applicant states that “if/when decommissioning is necessary it will be done pursuant to applicable federal and state laws at the time of decommissioning.”
- a) Regarding the statement of “if”, does the Applicant foresee a scenario where decommissioning is not required? Please explain.
 - b) Provide the current federal and state laws regarding decommissioning.
 - c) Does the Applicant intend to remove the pipe from the ground in the decommissioning process? Please explain.

RESPONSE:

- a) The pipeline will not be decommissioned as long as it is in-service. With proper operations and maintenance the pipeline can operate in perpetuity.
- b) 49 CFR 159.9 currently governs the abandonment or deactivation of facilities. Applicant is not aware of any South Dakota law that governs decommissioning.
- c) If decommissioning were to occur, NHG plans to adhere to abandonment procedures, including PHMSA requirements, in place at the time that abandonment of the pipeline occurs. Such procedures may not require “removal” but may allow, and even prefer, abandonment in place. Additionally, removal from the ground would cause additional impacts to the land and environment.

2-17) Refer to Page 17 of the Application. The Applicant states that “HGPS will be constructed to meet or exceed federal, state, and local standards to withstand impacts from landslides or slips.” Please identify the main construction standards that help the pipeline withstand landslides or slips.

RESPONSE: Mitigation measures of landslides and slips include micro routing to minimize areas of impact, installation of trench breakers, and the use of benched slopes and/or terraces. Enhanced monitoring of these areas is incorporated into the integrity management plan.

2-18) Refer to Table 6.4-2 which reflect water wells within 400 feet of the HGPS centerline. Please explain why 400 feet was selected as the appropriate distance from the pipeline to identify wells of potential consequence.

RESPONSE: NHG identified water wells within 400 feet to ensure spill related impacts would not affect any municipal water supply wells, as stated in Section 6.4.3, Fuel Handling and Storage. Evaluation of water wells within 400 feet is a typical industry standard to ensure mitigation of impacts from construction activities.

2-19) Please explain the impact on groundwater, specifically aquifers and wells, if there was a CO₂ release from the pipeline. If the response is based on any studies, please provide citations to those studies.

RESPONSE: As described in Section 6.4.2 of Application the major aquifers crossed by the Project are the Big Sioux, the Dakota, and the Sioux Quartzite aquifers which range in depth from less than 100 feet deep to 1,000 feet deep. The deepest the pipeline will be installed will be at HDD crossings (typically 25-50 foot depth). The pipeline would be installed above drinking water aquifers within South Dakota and in the event of a release the CO₂ would migrate upward and not downward. While CO₂ is non-toxic and non-combustible temporary impacts to groundwater or surface streams could occur and result from increased CO₂ concentrations by lowering the pH of the water, soil and surrounding vegetation.

A study conducted by Shell Canada Limited to assess the potential risk of CO₂ pipeline leakages into groundwater found that the initial pH of groundwater could drop from 7.5 to 5.5 after 20 years of CO₂ leakage. However, unintentional releases of CO₂ to groundwater resources will be avoided through regular pipeline monitoring and using trace detection technology to identify any pipeline failures as early as possible and implementing emergency response procedures in the event of a leak detection, and no long-term leakages would occur with proper use of such pipeline monitoring tools.

Reference:

Li, Z., Fall, M., & Ghirian, A. (2018). CCS risk assessment: Groundwater contamination caused by CO₂. *Geosciences*, 8(11), 397.

2-20) Refer to Page 27 of the Application. The Applicant states it “will collaborate with the rural water systems regarding crossing their respective lines.”

- a) Please elaborate on what the Applicant means by collaborating with the rural water systems.
- b) Has the Applicant been able to resolve the concerns of the South Dakota Association of Rural Water Systems? Please explain what was done to address the concerns if Applicant has been able to resolve their issues.

RESPONSE:

- a) NHG is in the process of engaging county rural water districts and drainage districts to gather mapping and permit information related to crossing stipulations.
- b) Applicant is only aware of the statements provided in their Party Status application indicating that the Project crosses several Member Companies. Applicant will engage SD Association of Rural Water Systems in crossing agreements where applicable; these types of agreements are typically approached subsequent to receipt of the state siting permit.

2-21) Refer to Page 28 of the Application. The Applicant states it “will work with municipal and rural water system districts to manage well or source water protection conflicts that they are made aware of.” Please elaborate on how the Applicant will work to resolve well or source water protection conflicts.

RESPONSE: Applicant anticipates engaging municipal and rural water system districts in regard to crossing stipulations in Q2 2023 upon additional finalization of the route.

2-22) Refer to Page 30 of the Application, Table 6.5-1. The Applicant states that 2.93 miles of the pipeline are going to go through developed vegetation communities. Please explain all the measures implemented by the Applicant to minimize the amount of developed vegetation communities impacted by the pipeline.

RESPONSE: NHG will work to limit disturbance to developed vegetation, like windbreaks, shelterbelts, and roadside ditches via reduced workspace or construction methodologies. NHG does not anticipate disturbance to landscaped yards. Developed communities disturbed by construction of the pipeline will be restored to pre-existing conditions as practicable and allowed to revert to preconstruction land use. Specific measures will be implemented during construction to enhance and expedite the restoration of disturbed lands to pre-construction condition. Such measures will include topsoil management, soil-segregation, erosion control practices, decompaction and timely restoration.

- 2-23) Refer to Page 33 of the Application. The Applicant states that “landowners will be compensated for crop losses, short term reduced yields, and other damages resulting from the pipeline construction.”
- a) Will the Applicant compensate landowners for long term reduced yields? Please explain.
 - b) Please provide some of the other damages resulting from the pipeline construction that the Applicant may compensate landowners.

RESPONSE:

- a) NHG offers a crop loss at 250% calculated over 5 years which is anticipated to exceed actual loss. Should yield loss beyond this occur as a result of the project, NHG will negotiate with the landowner. NHG does not anticipate that yield losses will exceed that amount, but should yield loss beyond 250% occur as a result of the pipeline construction or operation, NHG will compensate the landowner based on actual additional documented yield losses resulting from the pipeline construction or operation.
- b) Other damages can include but are not limited to: tree removal, relocation of livestock, replacement of drain tile, and any activities landowners may self perform such as decompaction, restoring terraces or other conservation measures, fence repair or replacement, and soil inputs/enhancements.

2-24) Refer to Page 33 of the Application. The Applicant states that "landowners will be compensated for loss to landscaping and timber on areas impacted by the Project." Please explain how compensation is determined for landscaping and timber.

RESPONSE: Compensation is negotiated with the Landowner and calculated on a per acre value basis.

2-25) The Commission received comments from Mr. Glen Heynen on December 09, 2022, and January 30, 2023, that propose an alternative route for the Big Sioux River crossing in Lincoln County. Please assess the feasibility of the alternative route proposed by Mr. Heynen and provide an analysis as to whether Mr. Heynen's proposed route would further mitigate impacts from the potential pipeline at that location.

RESPONSE: The alternative route that Mr. Glen Heynen proposed extends beyond NHG's notice corridor in South Dakota and in Iowa. This route would traverse through two wildlife management areas in Iowa (Hidden Bridge Wildlife Area and the Peterson Prairie Wildlife Area) and introduces additional impacts to wetlands and waterbodies.

In November of 2022, NHG agreed to an alignment shift with Mr. Heynen to address his concerns at that time. This shifted the alignment approximately 900 feet to the west to accommodate his plans for subdividing lots. Further, this segment of the pipeline across the Big Sioux River and Mr. Heynen's property will be installed via horizontal directional drill (HDD) resulting in no surface impacts and only a development restriction of the 50-foot permanent easement.

2-26) Please provide a copy of DNV-RP-F104 Design and Operations of CO₂ Pipelines (September 2021) as cited in the prefiled testimony of Mr. Lee.

RESPONSE: Objection. This request seeks information that is proprietary and is maintained as confidential. Without waiving the protective order, a copy of the document is provided subject to the Protective Order entered by the Commission.

2-27) Would Navigator oppose a permit condition that requires the use of an odorant in the pipeline? If yes, please explain in detail why Navigator opposes such a condition.

RESPONSE: Applicant is still studying and working to identify viable technology that would allow the use of an odorant. Absent evidence that a specific odorant could be effectively used without affecting sequestration, Applicant would oppose a general condition requiring use of an odorant. The Commission should not mandate the use of something that may not technologically be feasible.

2-28) Would Navigator oppose a permit condition that requires the use of the NAV911 system? If yes, please explain in detail why Navigator opposes such a condition.

RESPONSE: Applicant intends to implement what it has described as the NAV911 system with or without a permit condition, but it is still under development. However, Applicant would oppose a permit condition tied to the system that it develops. This system and process is part of the Applicant's comprehensive Emergency Response Program; to condition one part of a larger program with multiple facets may not be an applicable effective condition in the future.

2-29) Please provide a copy of the Agricultural Mitigation Plan and Weed Control Plan when finalized.

RESPONSE: The Weed Control Plans and The Agricultural Mitigation Plan will be provided before the end of April 2023.

2-30) Referring to Navigator's response to DR 1-30, are the potential minor route changes expected to occur on the same tract of land? Is there the potential for the minor route changes to move the pipelines centerline to a new tract of land? Please explain.

RESPONSE: Results of outstanding cultural and biological surveys may have the potential to shift the route on the same tract of land or onto an adjacent tract. A minor route change could result in an alignment shift of tens of feet to a few hundred feet in either direction depending on the resource found.

2-31) Referring to section 7.11 of the Application and the market studies produced for Navigator's response to DR1-38, please elaborate on how the market study supports the following statement from the Application: "*[p]roperty values are not usually affected by the installation or presence of a pipeline in rural areas, which was reflected in the market study.*"

RESPONSE: NHG was pointing out that the market study did not include an adjustment of property values for the installation or presence of a pipeline in a rural area, as this is a factor that does not usually affect rural area property values. NHG is aware of a study that indicates that the presence of natural gas pipelines does not affect the value of a home.

See <https://www.ingaa.org/PropertyValues.aspx>.

- 2-32) Will the pipeline have pressure relief valves? If yes, please provide:
- a) The location of the valves;
 - b) The amount of carbon dioxide that could be released from a relief valve should an over-pressurization event occur; and
 - c) An explanation as to whether or not the valves could potentially get frozen open if they do cycle.

RESPONSE: Yes.

- a) Relief valves will be located at the booster stations and launcher/receive sites.
- b) A pressure relieve valve would only release CO₂ in the event the pressure exceeded the defined maximum operating limit. The volume of CO₂ released would be limited to the volume necessary to return pressure to below the defined maximum limit. The duration of the relief event would be limited to several seconds. This would result in a temporary release of negligible unknown volume. Complete relief valve sizing will be completed once the equipment has been purchased and abnormal operating scenarios have identified. The primary pressure safety is that compression equipment will have automated controls to shut down the equipment in an abnormal operating scenario. Relief valves are utilized as a secondary measure of protection.
- c) Valves subject to low temperatures associated with planned releases are designed to withstand low temperatures and will be flanged into the piping for ease of replacement. These valves will be properly maintained to ensure their proper function. Navigator is planning for relief scenarios which should vent from a "hot" stream versus a "cool" stream when the opportunity exists. Relieving pressure from a hot stream will prevent the deep temperature drops which may approach low temperature operating limits. The CO₂ at the capture facilities will be dehydrated before compressed to supercritical pressures. "Freezing" of a relief valve would not occur once the water is removed to the HGS pipeline quality specification.

Dated this 11th day of April, 2023.

WOODS, FULLER, SHULTZ & SMITH P.C.

By /s/James E. Moore
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OBJECTIONS

The objections stated to Staff's Second Set of Data Requests were made by James E. Moore, one of the attorneys for Navigator Heartland Greenway, for the reasons and upon the grounds stated therein.

/s/ James E. Moore
*One of the Attorneys for Navigator Heartland
Greenway*

CERTIFICATE OF SERVICE

I hereby certify that on the 11th day of April, 2023, a true and correct copy of the foregoing Applicant's Responses to Staff's Second Set of Data Requests was served via e-mail transmission to the following:

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/s/ James E. Moore
*One of the Attorneys for Navigator
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