BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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

SD PUC DOCKET NO. _____

PRE-FILED DIRECT TESTIMONY OF AARON DEJOIA
ON BEHALF OF SCS CARBON TRANSPORT LLC

November 19, 2024

Q. Please state your name, present position and business address.

A. My name is Aaron DeJoia. My business address is: 16379 Corkbark Terr, Monument Colorado 80132. I am owner and Principal Soil Scientist/Agronomist of Soil and Ecological Solutions, LLC.

Q. What is your educational and professional background?

A. I have a BS degree in Agriculture (Agronomy) and a MS degree in Agronomy (Soil Fertility) from Kansas State University.

I have worked as an environmental soil scientist and agronomist since 2000. Currently, I am a Principal Soil Scientist/Agronomist with Soil and Ecological Solutions, LLC based in Colorado. A majority of my work since 2004 has been focused on the reclamation of drastically, disturbed lands in agricultural, prime farmland, and rangeland/pasture settings throughout the United States. I have studied the effects of various restoration techniques and helped to design and implement successful reclamation plans for oil and gas exploration pads, pipeline right-of-ways, mines, solar facilities and roadways. I have particular expertise in agricultural land and saline/sodic soil restoration. I have attached to this testimony a copy of my resume as Exhibit 1.

Q. What professional credentials do you hold?

A. I am a Certified Professional Soil Scientist, through the Soil Science Society of America, Certified Professional Agronomist and Certified Crop Advisor, through the American Society of Agronomy, and a North Dakota Licensed Soil Classifier. All of these certification programs have required me to take and pass written tests and show education and professional experience in the chosen industry. I have had to sign ethics pledges for all three certifications that require me to provide ethical services to my clients and the greater community. The certification and Licenses that I currently hold are the highest certifications that can be obtained for Soil Scientists and Agronomists in the United States. In 2020 I received the Soil Science Society of America Presidential Award.

Q. Have you previously submitted or prepared testimony proceedings in South Dakota?

A. No.

Q. What is the purpose of your testimony?

A. My testimony focuses on the effect the Project has on currently installed drain tile, future drain tile, topsoil removal and management, and restoration after the Project is built, specifically regarding crop yields.

Q. Are you familiar with SCS's South Dakota Agricultural Impact Mitigation Plan (AIMP)?

A. Yes. I am familiar with SCS's South Dakota Agricultural Impact Mitigation Plan (AIMP). The AIMP outlines how construction will proceed on agricultural lands throughout South Dakota. The AIMP has sections regarding topsoil preservation and salvage, soil compaction, weed management, drain tile, and general reclamation of the site both during and after construction.

Q. Do you believe that SCS's AIMP adequately addresses impacts to agricultural lands?

A. Yes, SCS's AIMP represents best practices regarding topsoil separation and replacement, soil compaction erosion, drain tile issues, and revegetation. SCS's AIMP is similar to agricultural impact mitigation plans/agreements that I have written, reviewed, and executed in South Dakota and other states throughout the nation including Iowa, Illinois, Wisconsin, Indiana, Ohio, and Pennsylvania.

Q. Based your line of work and expertise, do you understand the concerns some landowners have concerning pipeline construction and what it may do to their yields?

A. Absolutely. Having grown up in a small rural community in north-central Kansas that is supported by the local agricultural community, I appreciate how important the land is to those that depend on it for their livelihood. I know there are concerns from landowners regarding their land. Those concerns are well received, and I am glad for this opportunity to respond to those concerns. I previously worked on the Dakota Access Pipeline. While working on that project, I was fortunate to meet with many affected landowners in South Dakota. These meetings allowed me to have a better perspective on the local farming and soils concerns associated with pipeline installations. My goal is to use the information I obtained on the Dakota Access Pipeline and those meetings to identify the best practices that work in South Dakota.

Q. Do you know what concerns some landowners have regarding the Project? If so, what were they.

A. I did notice several common concerns. I will address each of them individually:

I. NATURAL WATER WAY RECONSTRUCTION

Natural waterway reconstruction after pipeline installation is an important aspect for any well-functioning ecosystem. It is very important for the natural waterways crossed by the right-of way to be reconstructed properly to protect both the sensitive environment and valuable pipeline asset. The slopes approaching the natural waterways will need to be returned to the natural contours and stabilized using appropriate erosion control devices and seeded with appropriate seed mixes. The use of erosion control devices will stabilize the slopes until the newly planted vegetation can establish. In the actual waterway, it is critical that the pre-construction channel slope is returned so that the natural stream habitat and natural flow process are not altered.

II. AFFECT ON STOCK DAMS

In my opinion, the SCS will have no effects on dams that are either not crossed or are in close proximity of the pipeline right-of-way if erosion control devices are properly placed and maintained during construction as outlined in the Stormwater Pollution Prevention Plan.

III. PRODUCTION ABILITY OF AFFECTED TILLABLE ACRES

The yield potential of tillable lands after pipeline right-of-way restoration is required to be at least equal to pre-disturbance yield potential levels. I have worked on many pipeline projects throughout the nation, including some of the best farmland in North America, and in all cases that I know of, these lands have been as productive following pipeline construction as they were prior to construction of the pipeline with very few exceptions. Pipeline projects that I have worked on and have helped on observed the return of farmland to its original state of productivity include Rockies Express Pipeline (Nebraska, Kansas, Missouri, Illinois, and Indiana), Bison Pipeline (Montana, and North Dakota), Alliance Pipeline (Iowa), Dakota Access Pipeline (North Dakota, South Dakota, Iowa and Illinois) and others. In a very few instances, some of the farmland did take longer than the allotted crop loss payment period to return years but these were a very few areas that had special circumstances that were returned to pre-disturbance yields once limiting factors were addressed. To the best of my knowledge, all of the farmers along the SCS Pipeline will be compensated for crop losses experienced beyond the initial payments, if any losses occur.

Pipeline construction is not always completed during a time when site conditions are optimal, however if a good plan is utilized and proper reclamation techniques are implemented,

returning the productivity of the sites can be accomplished. Time is a critical element for returning farmland productivity to its pre-disturbance productivity.

Based on my experience, if proper reclamation techniques are utilized and landowners/tenants work with the pipeline company productivity can be returned to pre-disturbance conditions within 3 years. However, if the landowner/tenant interrupts the reclamation process with good intention practices such as additional unnecessary tillage, it can short circuit the process and cause productivity lags for extended periods. However, it should be recognized the reclamation process is conducted on natural, dynamic systems and I have witnessed isolated areas where it has taken longer than 3 years to return crop productivity to pre-disturbance conditions. Keep in mind, these have been very isolated and typically it was due to a variety of site-specific situations, but in all instances the land was eventually returned to full productivity at the end of the project.

IV. REHABILITATION OF GRAZING/PASTURE GROUND

The rehabilitation (revegetation) of grazing/pastureland takes time, effort and science but certainly can be accomplished if an appropriate revegetation plan is used. As with all revegetation of disturbed areas, the soils are the foundation and must be managed appropriately during the construction and revegetation process. SCS is addressing this very important resource by segregating topsoil during the construction phase.

Once the soil is protected, an appropriate seed mixture is required to effectively protect the replaced soil and begin to redevelop the natural vegetative community. SCS will work with the NRCS, wildlife agencies, and landowner/tenants to develop appropriate and desired seed mixtures for the construction areas. Proper restoration can only be achieved if the planted seed mixture and resulting crop has a non-compacted root zone to explore and obtain required water and nutrients. Compaction can occur when the soil compresses and soil porosity is decreased by forces exerted by heavy equipment such as tractors, grain carts, combines, dozers and other construction equipment travel across the soil surface. Decompaction is the process of physically removing the induced compaction from the soil. Decompaction can be performed by either mechanical or natural processes. The mechanical process typically used in an agricultural setting to alleviate soil compaction is deep ripping. Deep ripping generally is a process where the soil is lifted and shattered. Crop roots are the primary natural process to alleviate soil compaction. The crop roots travel through the pore space and as they grow they widen the pore spaces and decrease soil compaction. Natural process take longer to remove compaction

therefore to enhance the restoration processes mechanical decompaction is the preferred alternative. SCS is committed to all best management practices, including rooting zone decompaction in areas where decompaction would help promote growth and sustainability.

Finally, replanting of grazing/pastureland must be performed in an appropriate manner that provides a conducive environment for germination plant, establishment and growth. The seeds must be planted at the right depth, right time and into an appropriate seed bed. SCS is currently working with the local county, state, and federal agencies to develop appropriate seed mixes for the project. The use of reclamation techniques and seed mixes such as those developed and being developed on by SCS will provide the rehabilitation success that is expected for this Project.

V. REHABILITATION OF SOIL STRUCTURE

With any soil excavation procedure, soil structure (pores) will be damaged and some soil structure will definitely be destroyed during the construction process. However, it should be noted that a majority of soil structure loss is due to the excavation and movement of the soil material and compaction. Research indicates that the soil structure and associated pores can quickly redevelop in the soil profile. Sencindiver and Ammons (2000) and Haering et al. (1993) indicate that in mine soils, soil structure in the surface horizons have developed soil structure within 1 to 2 years. The time it takes for the surface horizon to begin to redevelop soil structure has been anticipated and is one of the reasons SCS is offering crop loss payments for multiple years post construction. The development of soil structure in the subsurface horizons can take longer depending on the degree of decompaction and root growth that can be established. SCS's AIMP includes soil compaction relief of the subsoil to ensure that rooting is not limited by soil compaction.

VI. REHABILITATION OF LAND'S NATURAL CONTOUR AND SLOPES

According to all documents that I have reviewed, SCS is committed to returning the land back to original contour and slopes. I understand that they will be doing pre- and post-construction aerial surveys so that pre-construction elevations and contours can be ensured to be correct.

VII. WEED CONTROL IN AFFECTED AREAS

Weed management of a pipeline right-of-way is necessary to achieve reclamation success. The use of Integrated Weed Management (IWM) is the most effective and appropriate

weed management. IWM evaluates the uses cultural, biological, mechanical and chemical weed control methods based on weed pressure, weed type, reclamation time frame and establishing vegetation. It should be noted that IWM protocols understand that a fully functioning rangeland or cropping system is the most effective manner to control weedy species. SCS has prepared a South Dakota Weed Management Plan and in my review this plan meets the IWM protocols and will be effective at identifying, monitoring and controlling weeds encountered along the pipeline right-of-way.

Cultural practices may include limited access or education to limit the spread of weedy species by construction personnel and equipment. Cultural practices are some of the most effective ways to inhibit the spread of noxious and invasive weeds along a pipeline right-of-way. As stated in the SCS weed management plan, biological practices are usually of limited use along the right-of-way due to limited options and time required for control. However, biological control of weedy species may be reviewed especially near sensitive resources and organic farms. Mechanical control (i.e., mowing, clipping, hand removal) of weeds is an effective manner of weed control during the beginning stages of right-of-way reclamation. Mechanical weed control general is effective against weedy annual species and certain perennial species (i.e., Canada Thistle), especially in the initial year or two of plant establishment in range or pastureland when the reclamation crop is susceptible to chemical applications. Mechanical methods allow for the newly established crops to continue their life cycle and start to outcompete the weedy species. Chemical methods (herbicides) of control will be evaluated on a site-by-site basis as with all other potential control methods. In certain instances, the use of broadcast spraying may be utilized however the preferred chemical control method will be spot spraying. Spot spraying allows for a more directed application that will limit the potential damage to desired species that are within the right-of-way. In organic farming areas chemical weed control will not be utilized to ensure that the organic status of the land is maintained.

VIII. OVERALL SUCCESS OF RESTORATION

Restoration success will be evaluated on a site-by-site review. For an agricultural site, restoration will be deemed successful when the post-construction yield potential is equivalent to existing off-right-of-way areas. This determination will be conducted through visual and data review of crop growth and yields. In rangeland areas, restoration success is initially achieved when the site is returned back to 70 percent of off-ROW coverage as defined in the Storm Water Pollution Prevention Plan.

Q. Explain whether SCS's plans for soil separation and stockpiling are adequate to protect the soil.

A. The method for topsoil and subsoil removal and segregation is outlined in SCS's AIMP. According to SCS's plan, all topsoil and subsoil will be separated and segregated in two separate stockpiles. Topsoil will be salvaged to a depth of up to 12 inches. The top 12 inches of topsoil contain the most plant nutrients and microbial life and is critical for successful reclamation. After the pipeline is installed and all drain tiles are fixed, the segregated subsoil stockpile will be returned to the trench. Once the trench line is replaced, the subsoil will be decompacted across the entire disturbed area to 18 inches, or to a little less than the depth of the drain tiles as to not compromise the drain tile integrity. After the subsoil is decompacted, the topsoil will be replaced and smoothed with a tillage implement, if necessary.

The topsoil and subsoil methods outlined in SCS's AIMP are common and successful practices in the pipeline industry. This method of topsoil salvage and segregation is the most successful and scientifically proven method to protect the soil resource and return the soil to 100 percent yield potential as quickly as possible. In addition, this method of topsoil segregation provide the highest level of protection for the topsoil and is intended not to allow for mixing of the topsoil and subsoil resources.

Q. Will the SCS Pipeline increase soil temperatures surrounding the pipeline and will this effect agronomic yields.

A. Yes, it is likely that the SCS will increase the soil temperatures immediately above and below the pipeline. Based on the study performed by Lake Superior Consulting, the soil temperatures will have a low impact on soil temperature within 15 feet of the pipeline while a more moderate influence on soil temperatures will typically be constrained to within a maximum distance of 7 to 8 feet vertically from the pipeline centerline. Temperature at the surface generally increased very little at the time points modeled by Lake Superior Consulting, with the largest visual changes occurring in the April modeling where temperatures increased at the near surface by 3 to 5 degrees (visual review). There have been a limited number of studies reviewing soil temperature changes due to pipeline installation. The research indicated that soil warming from heated cables, buried at 36 inches and heated to 96-degree Fahrenheit, increased soil temperature by less than 5 degrees Fahrenheit (Rykbost et al., 1975). This study is similar to the modeling performed by Lake Superior where the pipeline was buried at 48 inches and heated to a temperature of 120-degree Fahrenheit in the summer and 80-degree

Fahrenheit in the winter (6" Pipe (2)). Rykbost et al. also indicated that corn yields were increased due to this slight soil warming. Dunn et al. (2008) found that yields were not affected by an increase in soil temperature due to pipeline heat. These studies clearly indicate that yields were not negatively impacted. In my professional opinion, based on these studies and my professional career as an agronomist working on pipelines throughout the country, I do not believe that the slight 3-to-5-degree Fahrenheit change in surface soil temperatures will negatively impact yields.

Q. Explain what SCS has done or failed to do to protect agricultural soils in designing this pipeline.

A. SCS has performed many tasks to protect soils along the pipeline right-of-way. As recommended by the SD PUC Staff, SCS has prepared an AIMP. The AIMP provides the minimum required practices that will be used to protect agricultural soils and includes topsoil salvage, rock and debris removal, compaction and rutting restoration, conservation structure restoration, drain tile repair, weed control, wet weather work, and final reclamation of the disturbed areas. In addition, SCS has identified all important soil conditions along the right-of-way that may become problematic during construction including, location of prime farmland, high clay content soils, high sand content soils, high water tables, and shallow restrictive layers. SCS also identified the estimated depth of topsoil throughout the alignment to ensure that the contractors could properly estimate needs and requirements for proper topsoil separation and storage.

The one item that many pipelines fail to do, and I would recommend SCS do before construction begins, is to actually sit down with each landowner and discuss and listen to what they see as the most important soil and agronomic trait of their land. Regardless of how much information we obtain on a parcel, the landowner who has been working the land for their entire career has the most valuable information and should become part of the data gathering process. I do not know if SCS intends to do this, but I would consider this an important part of understanding potential soil and agricultural impacts.

Q. Explain whether SCS's plans for drain tile repairs are adequate to protect future crop production.

A. Drain tiles are critical to maximize yield potential on some fields and must be replaced and repaired appropriately after pipeline construction. Drain tiles are typically installed on minimal grades and any deviation from this can cause the drain tile to not function properly.

Drain tiles are designed to remove excess water from the soil during wet periods to allow for the roots to have greater rooting depth thus increasing the yield potential. Repair of the drain tile must be completed appropriately to restore the yield potential of the fields. In my experience, if an experienced drain tile contractor is used, a majority of the drain tiles will be successfully repaired during the initial project. However, in my professional experience, some drain tile repairs will fail and a second repair must be performed. The failed drain tile repair is usually identified within the first or second growing season post construction and can be successfully repaired after harvest. Once drain tiles are repaired, the yield potential of the field is typically not negatively impacted by the internal soil drainage. It is my understanding that SCS has committed to an indefinite warranty for drain tile repairs for all landowners that the pipeline crosses. That commitment should relieve a lot of the concern regarding drain tile knowing that even if issues don't arise until years down the road, that it will be rectified.

Q. Does this conclude your testimony?

A. Yes.

References:

Dunn, G., L. Carlson, G. Fryer, and M. Pockar. 2008. Effects of heat from a pipeline on crop growth – Interim results. Environmental Concerns in Rights-of-Way Management: Eight International Symposium. J.W. Goodrich-Mahoney, L.P. Abrahamson. J.L. Ballard, and S.M. Tikalsky (editors). Elsevier.

Haering, K.C., W.L Daniels, J.A. Roberts. 1993. Changes in mine soil properties resulting from overburden weathering. J. Environ. Qual. 22:194-200.

Rykbost, K.A. L. Boersma, H.J. Mack, and W.E. Schmisseur. 1975. Yield response to soil warming: Agronomic crops. Agronomy Journal 67:733-738.

Sencindiver, J.C., J.T. Ammons. 2000. Minesoil genesis and classification. In Reclamation of Drastically Disturbed Lands. Agronomy Monograph 41. American Society of Agronomy, Madison, WI.

Dated this 19th day of November, 2024.

/s/ Aaron DeJoia

Aaron DeJoia